General Questions on Data Structures-01.

1. What is Data Structure?
    a. Addresses of the variables
    b. Subset of all variables
    c. The memory representation of data
    d. The type of the variables

    Ans. : c
2. A tool for specifying logical properties of a data type is…
    a. Abstract Data Type
    b. Logical Data Type
    c. Non Abstract Data Type
    d. Linear Data Type

    Ans . : a, Abstract Data Type… Logical Properties are defined by ADT.
3. The Separation of data structures and their operations from the implementation of the data structures in memory and functions is called _____.
    a. Data Abstraction
    b. Data hiding
    c. Data Extraction
    d. Data insertion

    Ans. : a
4. A set of instances or values is called a _____.
    a. variable
    b. Data Object
    c. Data type
    d. Class

    Ans. : b
5. The individual instances of a Data Object are called _____.
    a. class
    b. object
    c. Primitive
    d. Data object

    Ans. : c
6. Formulae based representation uses _____to represent the instances of object.
    a. tree
    b. link list
    c. Array
    d. Graph

    Ans. : c

7. An example of a dynamic data structure is:

    1. array
    2. record
    3. list

4. index

    a. 1 or 3
    b. 2 and 4
    c. Only 2
    d. Only 4

    Ans. : a, Array can also be dynamically allocated using malloc

8. Which Of the following is a collection of heterogeneous elements?
    a. Array
    b. Structure
    c. Stack
    d. Queue

Ans)B

9.Which Data Structure is used to manage Printer Buffer?
    a. Stack
    b. Queue
    c. Linked List
    d. Tree

Ans)B

10. Which One of the following is a hierarchical data structure?
    1. Linked list
    2. Stack
    3. Tree
    4. None
        a. 1 or 3
        b. 2 or 4
        c. Only 2
        d. Only 4

Ans) a, Both are hierarchical structure

11. Complexity in terms of machine cycles of a data structure is measured in terms of
    a. Time Complexity
    b. Space Complexity
    c. Mean Complexity
    d. A and B

Ans)a

12. Which data structure is used in evaluating mathematical expressions with parentheses?
    a. Stack
    b. Queue
    c. Tree
    d. Graph

Ans)A

13. Which Of the following occupies more memory with same number of elements?
    a. Array
    b. Single Linked list
    c. Doubly Linked List
    d. Queue

Ans) c

14. Recursive function implements which mechanism?

1) Queue
2) Lifo
3) Filo
4) Fifo

    a. Only 1
    b. 2 or 3
    c. 1 or 4
    d. All

Ans) b

15. Which of the following abstract data types cannot be used to represent a many to many relation?

1) Binary Tree
2) Graph
3) Stack

    a. 1 and 2
    b. 2 and 3
    c. 1 and 3
    d. All

Ans)C

16. An Example of linear Data structures ?

1) Array
2) Stack
3) Linked List

    a. 1 and 2
    b. 2 and 3
    c. 1 and 3
    d. All

Ans)D

17. The logical picture of data type plus the specification of operations required to create & manipulate objects of this type is known ___

    a. Structure
    b. Pointer
    c. ADT
    d. Class

Ans)C

18. In Quick sort & Radix sort except array _____data structure is used?
    a. Pointer
    b. Link list
    c. Double link list
    d. Tree

Ans)A

19. In Counter index generation _____ data structure is used
    a. Deque
    b. Priority Queue
    c. Circular Queue
    d. Linear Queue

Ans)C

20. Simulations are implemented using _____ data structure.
    a. Stack
    b. Queue
    c. Linked list
    d. Tree

Ans)B

21. The data structures you will use if you want to go to first record from the last and vice versa_____
    a. Tree
    b. Linked list
    c. Stack
    d. Doubly linked circular list

Ans)D

22. In RDBMS, the efficient data structure used in the Internal storage representation is
    a. Binary tree
    b. Stack
    c. B+Tree
    d. Graph

Ans)C

23. Pick the appropriate statement for the data structures from the following options
    a. May be helpful to develop efficient algorithms in different phases of data processing
    b. Need not give relationship between data items
    c. Is programming language dependent
    d. None

Ans)A

24. Suppose you opened a notepad, a music player, an excel sheet,
and also you are doing your data structure programming simultaneously.
Your OS implements which data structure for it.

a. Stack
b. Queue
c. Tree
d. Linked list

Ans)B

25. Which of the following abstract data types
can't be used to represent a many to many
1)Tree
2)Stack
3)Graph

a. 2 and 3
b. 1 and 3
c. 1 and 2
d. None

Ans)C

26. The Linear properties of data structure are estimated on the bases of ?
1. adjecency
2. Linearity
3. Levels

a. 2 and 3
b. 1 and 2
c. 1 and 3
d. ALL

Ans)B

27. The following are the examples of Linear Data Structures?
1. Polynomial 2. Graph 3. Trees

a. 1 and 2
b. 2 and 3
c. 1 and 3
d. None

Ans)D

28. List out the areas in which data structures are applied extensively?
1)Numerical Analysis
2)Graphics
3)Artificial Intelligence

a. 1 and 2
b. 1 and 3
c. 2 and 3
d. 1,2 and 3

Ans)D

29. Which of the following combination of data structures used in the areas : RDBMS, Network data model and Hierarchical data model are correct
1)RDBMS– Array (i.e. Array of structures)
2)Network data model – Graph
3)Hierarchical data model – Trees
a. and 2
b. 1 and 3
c. 2 and 3
d. None
Ans)C

30. Polynomials in memory may not be maintained through
1)Linked list with header node
2)One dimensional array
3)Stack
a. 2 and 3
b. 1 and 3
c. 1 and 2
d. None
Ans)C

General Questions on Data Structures-02.

1. What is the most suitable data structure to represent a dictionary of word?
(a) Binary Search Tree
(b) Heap
(c) Sorted doubly linked list
(d) AVL tree
Ans : a

2. Which sorting method(s) runs fastest for file which is already sorted?
(a) selection sort
(b) insertion sort
(c) bubble sort
(d) quick sort
Ans : b
3. A table can be organized as a
(i) Linked list
(ii) Tree
(iii) Arrays of records
(iv) Graph
(v) File
(a) (i) and (ii) only
(b) (i), (iii) and (iv) only

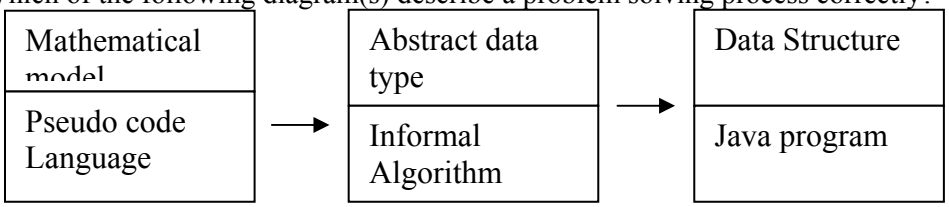
(c) (i), (ii), (iii) and (v) only
(d) All of above.
(e) None of above
Ans : b

4. Consider the following operations.
(i) Determines whether a table is empty or not
(ii) Insert new table entry, provided table is not already full.
(iii) Delete an entry from a table, provided table is null.
(iv) Given a search key, retrieve the information from a table.
(v) Given information, retrieve the search key.
Table abstract data types defines:

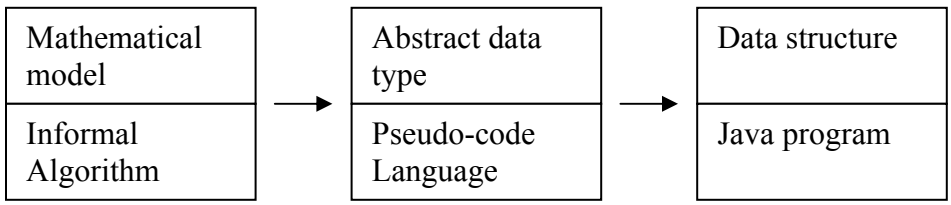
(a) (i), (ii), (iii) only
(b) (ii), (iii) and (iv) only
(c) (i), (ii) and (iv) only
(d) All above
(e) None of above
Ans : c

5. Which of the following diagram(s) describe a problem solving process correctly?

a.

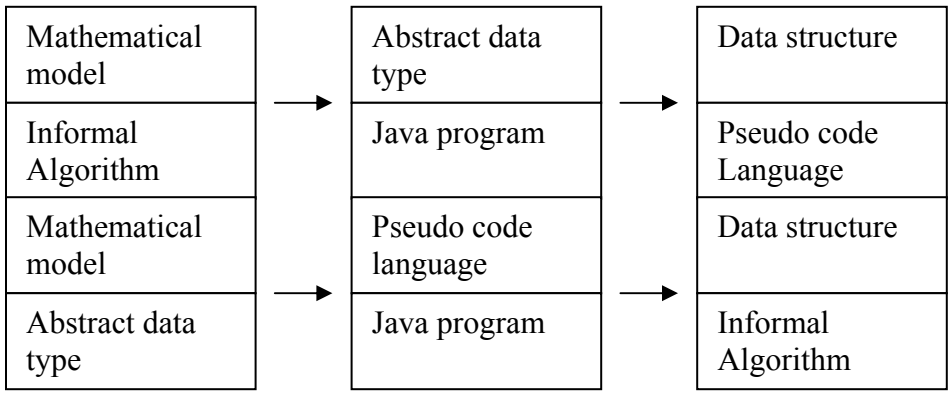


b.



c.

d.



e. None of above

Ans : b

6.Consider the following program segment:

```
 public void swap()
{
 int x, y, z;
 …… (i) ……
 …… (ii) ……
 …… (iii) ……
  }
```

Identify suitable statements to fill in the blank lines of the above algorithm so that it will interchange the values of the two variables x and y.

(a) (i) x = y; (ii) z = y; (iii) y = z;
(b) (i) z = x; (ii) x = y; (iii) y = z;
(c) (i) z = x; (ii) z = y; (iii) y = x;
(d) (i) z = y; (ii) y = x; (iii) x= z;
(e) (i) y = z; (ii) z = x; (iii) x = z;

Ans :b,d

7.Consider the following characteristics connected with a program.
(i) The input to the program
(ii) The time complexity of the algorithm underlying the program
(iii) The quality of the Compiler
(iv) The nature and speed of the machine
The knowledge of which of the above is needed to calculate the exact running time of a program ?

(a) (i) and (ii) only
(b) (i), (ii) and (iii) only
(c) (i), (ii) and (iv) only
(d) (i), (iii) and (iv) only
(e) All of these

Ans : a , Running time depends on the time complexity and number of inputs(for example O(n), where n is the number of inputs)
8. The following are operations regarding a data structure.
(i) Traversing: accessing each record exactly once so that certain items in the record may be processed
(ii) Searching: finding the location of the record with a given key value
(iii) Inserting: appending a new record to a structure only in the end.
(iv) Deleting: removing a record from the structure
Which of them are correctly described?

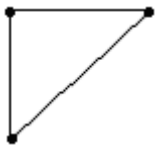
(a) (i) and (iii) only
(b) (ii), (iii), (iv) only
(c) (i), (ii) and (iv) only
(d) (i) and (iv) only
(e) (i), (ii) and (iii) only
Ans : c

9. {2,8,6,1,10,15,3,12,11} is a set of integers. If you create a maximum heap and store it in an array, what would be the final values in the array?
(a)1,2,3,6,8,10,11,12,15
(b)15,12,11,10,8,6,3,2,1
(c) 15,12,6,11,10,2,3,8,1
(d) 15,12,6,10,11,2,3,1,8
(e)15,12,10,11,2,6,3,1,8
Ans : e

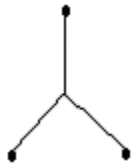
10. Consider the following polynomial.
f (n) = n2 + 100n + Log10 n +1000
What would be the Big –O value of the above polynomial?
(a) n
(b) Log n
(c) n2+log n
(d) n2
(e) Constant
Ans : d

11. There exists one path between every pair of vertices in a tree.(True or False)
Ans : TRUE

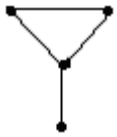
12. Which of the following graphs is a tree?
a.



b.



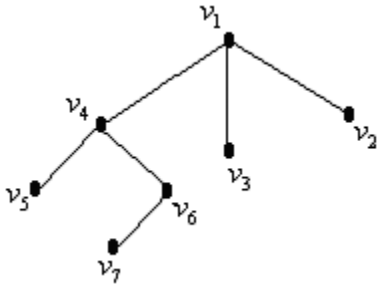
c.



d. Both B and C

Ans : b

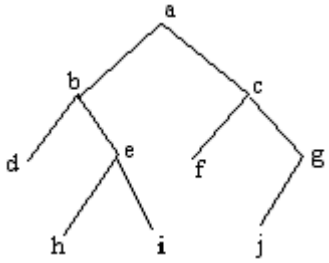
13. Given the rooted tree below, which of the following is FALSE?



a. The root of the tree is v_1.
b. The height of the tree is 3.
c. v_7 is a descendent of v_4.
d. Both B and C

Ans : b

14.Given the binary tree below, the preorder traversal is _____.



a. abehidcgjf
b. dbheiafcjg
c. jgfcihedba
d. abdehicfgj

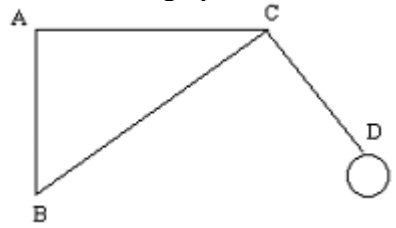
Ans : d

____ 15. Given the fully parenthesized expression $\big((A+B)-C\big)$, the prefix form of this expression would be _____.

a. +-ABC
b. –A+BC
c. A_B+C
d. -+ABC

Ans : d

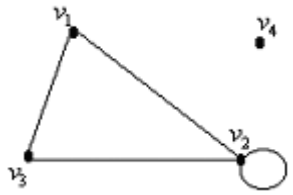
____ 16. Based on the graph below, which of the following is NOT true?



a. There are 5 edges
b. A is adjacent to D
c. There are 2 loops
d. Both B and C
e. None of the above

Ans : d

____ 17. Based upon the graph below, which of the following is true?

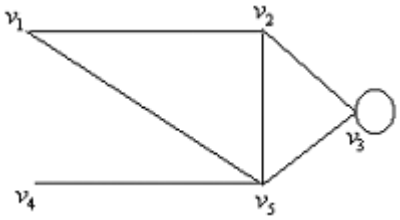


a. $\deg(v_1) > \deg(v_3)$
b. $\deg(v_2) = 3$
c. v_4 is an isolated vertex
d. Both B and C
e. Both A and C
Ans : e

____ 18. A complete graph *G* is known to have 10 edges. Then the number of vertices must be

a. 20
b. 11
c. 5
d. 6
Ans : c

____ 19. Consider the graph below. Which of the following is the correct adjacency matrix for this graph?



a. $\begin{pmatrix} 1 & 0 & 1 & 1 & 0 \\ 0 & 1 & 0 & 1 & 0 \\ 1 & 0 & 0 & 1 & 0 \\ 1 & 1 & 1 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}$ b. $\begin{pmatrix} 0 & 1 & 0 & 0 & 1 \\ 1 & 0 & 1 & 0 & 1 \\ 0 & 1 & 1 & 0 & 1 \\ 0 & 0 & 0 & 0 & 1 \\ 1 & 1 & 1 & 1 & 0 \end{pmatrix}$ c. $\begin{pmatrix} 0 & 1 & 0 & 0 & 1 \\ 1 & 0 & 1 & 0 & 1 \\ 0 & 1 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 1 \\ 1 & 1 & 1 & 1 & 0 \end{pmatrix}$ d. $\begin{pmatrix} 2 \\ 3 \\ 3 \\ 1 \\ 4 \end{pmatrix}$

Ans : b

20. The output of the following program is?

```
main ()
{
Char p[]="string";
Char t;
Int i,j;
for (i=0,j=strlen(p);i<j;i++)
{
t=p[i];
p[i]=p[j-i];
p[j-i]=t;
}
printf("%s",p);
}
```

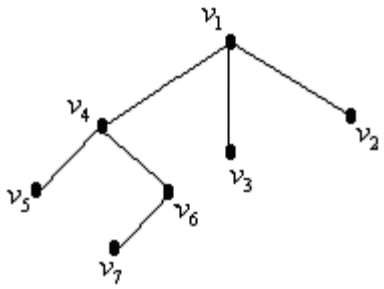
a. Gnirts
b. String
c. Nothing is printed
d. Gnirt

Answer: Nothing is printed - since the reversed string has the null character ('n0') in the 1st place.

21. The number of unique binary trees that can be constructed with 3 nodes is:
a. 5
b. 30
c. 10
d. 6

Answer: a; There are 5 permutations possible, each giving

22. Given the rooted tree below, v_6 is both a child and a descendent of v_4 .(TRUE or FALSE)



Ans : TRUE

ARRAYS (DATA STRUCTURES…ARRAYS)

1. An array of n elements will be declared in c as:
   a. array[n]
   b. array[n-1]
   c. array[n+1]
   d. array
   Ans : a. array[n]

2. The first element of a 0 based array can be accessed by :
   a. array
   b. array[0]
   c. array[n-1]
   d. array[n]
   Ans. : a. & b. array[0] is obvious.. and array is actually pointing toward the first element of the array.

3. What will the piece of code reveal…
   int a[] = {1,2,3,4,5,6,7,8,9,0};
   printf("%d",a[2]);
   printf("%d",2[a]);
   ** Regarding the fact that there are no syntax errors..
   a. 3 8
   b. Logical error
   c. 3 3
   d. 3 <Garbage Value>
   Ans. c. both will be resolved as (address of a + 2), so both will yield the same address.
4. Memory is allocated in an array in :
   a. Non Continues Way
   b. Continues fashion
   c. It may be any way, does not matter
   d. Random but in some logical manner according to some algorithm.
   Ans. : b.. Memory is indeed allocated in a continues manner, that is the reason why arrays can offer random access while linked lists cant.
5. A 'n' sized 1 based array indexed from:

a. [1] – [n]
b. [0] – [n]
c. [1] – [n-1]
d. [0] – [n-1]

Ans. : a An array may be 0 based, 1 based or n based. Now whichever it is based on that number decides its starting and ending index.

6. How is this resolved.. Arr[2];
   a. *(&Arr + 2)
   b. Arr[0] + 2
   c. The Second position from Arr[0]
   d. *(Arr + 2)

   Ans. : a. Arr always refers to the first element of the array.. and the index is added to the base address of the array to get the result.

7. Lower bound and Upper bound of an Array represent the following element..
   a. Largest and Smallest Resp.
   b. Smallest and Largest + 1
   c. Smallest and Largest – 1
   d. Smallest and Largest Resp.

   Ans.: d., Lower bound represents the first element of the array and upper bound represents the last element of the array.

8. In an Array the range specifies…
   e. Scope of the Array
   f. Nos. of Elements in the Array
   g. The Group of the Array
   h. Size – 1 of the Array

   Ans. : b., Range Specifies the total nos of elements in an Array.

9.If Array's upper bound is specified by 'U' and lower bound is specified by 'L' then the range of the array will be.
   a. U – L +1
   b. L + U – 1
   c. U – L – 1
   d. L – U + 1

   Ans. :a The range of the array will be Upper - Lower + 1

10 . If Upper bound is represented by 99 and lower bound by 0 in a o based array, then the range of the array is..

   a. 0
   b. 99
   c. 100
   d. 101

   Ans. : c., Range is given by Upper – Lower + 1

11. A string is ended by…

a. The Last Character
b. The Null Character
c. The Dot Character
d. The First Character

Ans. : b, A string in C is Always Ended by a Null Character.

12. Suppose that you want to declare an array of characters to hold a C++ string with exactly 9 letters. Which declaration is best?

a. `char s[8];`
b. `char s[9];`
c. `char s[10];`
d. `char s[11];`
e. `char s[12];`

Ans : c, you will need 10 cells, 9 to hold the 9 characters and the last one cell to hold the end of the string

13. Which of the following can be used to describe arrays as well as hard disks?

a. static
b. dynamic
c. direct access
d. linked access
e. linked

Ans. : c.

14. Of the following, which would access an element of an array of records?

a. Data[i]
b. Data(i)
c. Data(i,j)
d. Data.i
e. Data[i].f

Ans. : a

15. Arrays are also called as

1) Dense lists
2) Predefined variables
3) Static data structures

a. 1 and 2
b. 2 and 3
c. 1 and 3 d)All

Ans. : c

16. If a is an array (which actually is a pointer as such) and a pointer p;
The statement a = p, yields
    a. Address of p copied on a
    b. Address remains unchanged
    c. Leads to an error
    d. Address of a is copied on p instead.

Ans. : c, Leads to an error, since array a, is a pointer but a constant pointer.

POINTERS

1. An element of structure can be a Pointer; Which Points to a structure of the same type is called ___.
    a. referential pointer
    b. structure pointer
    c. pointer structure
    d. Self-Referential Structure

    Ans. : d

2.Consider the following statements:

```
int *p;
int i;
int k;
i = 42;
k = i;
p = &i;
```

After these statements, which of the following statements will change the value of i to75?

a. K = 75
b. `*k = 75;`
c. `p = 75;`
d. `*p = 75;`

Ans. : d, Indirection operator will yield the value of the variable i.

3.Consider the following statements:

```
int i = 42;
int j = 80;
int *p1;
int *p2;
p1 = &i;
p2 = &j;
*p1 = *p2;
printf(“%d%d",i,j);
```

What numbers are printed by the output statement?

a. 42 and then another 42
b. 42 and then 80
c. 80 and then 42
d. 80 and then another 80

Ans. : d, since the last statement will change the values of i, as the *p2 which is actually j value will be copied to *p1 i.e. i.

4. . void main()

```
{
        int *p1,*p2;
        p1=(int *)malloc(sizeof(int));
        p2=(int *)malloc(sizeof(int));
        *p1=17;
        *p2=153;
1st O/p printf("\n%d.......%d..",*p1,*p2);
        free( p1);
        p1=p2;
2nd O/p printf("\n%d.......%d..",*p1,*p2);
        *p1=253;
3rd O/p printf("\n%d.......%d..",*p1,*p2);
        *p2=355;
4th O/p printf("\n%d.......%d..",*p1,*p2);
}
```

What will be the O/p at O/p 4.

a. 17….153
b. 253….253

c. 253….353
d. 353….353

Ans. : d, Since both p1 and p2 point to the same location, so when indirection of p2 is modified, the actual value gets changed, and both the pointers indirection will yield the same value.

5.What is printed by these statements?

```
int i = 1;
int k = 2;
int *p1;
int *p2;
p1 = &i;
p2 = &k;
p1 = p2;
*p1 = 3;
*p2 = 4;
printf("%d",i);
```

a. 1
b. 2
c. 3
d. 4

Ans. : a, Since the line p1 = p2, makes both of the pointers to point at k, so the next two lines changes the value of k.

6.What is printed by these statements?

```
int i = 1;
int k = 2;
int* p1;
int* p2;
p1 = &i;
p2 = &k;
p1 = p2;
*p1 = 3;
*p2 = 4;
printf("%d",k);
```

a. 1
b. 2
c. 3
d. 4

Ans. : d, Since the line p1 = p2, makes both of the pointers to point at k, so the next two lines changes the value of k and the last changed value is 4.

7.What is printed by these statements?

```
int i = 1;
int k = 2;
int* p1;
int* p2;
p1 = &i;
p2 = &k;
*p1 = *p2;
*p1 = 3;
*p2 = 4;
printf("%d",i);
```

a. 1
b. 2
c. 3
d. 4

Ans. : c, Last but one line changes the value stored in i to 3.

8.In which location do dynamic variables reside?

a. The code segment.
b. The data segment.
c. The heap.
d. The run-time stack.

Ans. : c, All the dynamic memory allocation is done from the heap of the program.

9.Suppose you have the following function prototype and variable declaration:

```
void goop(int z[ ]);
int x[10];
```

Which is the correct way to call the goop function with x as the argument:

a. goop(x);
b. goop(x[ ]);
c. goop(x[10]);
d. goop(&x);
e. goop(&x[ ]);

Ans. : a,

10. What's wrong with this code?

```
char *p;
*p = malloc(10);
```

a. No Error
b. Logical Error
c. Syntax Error
d. All of the above

Ans.: c, Memory is allocated to the pointer and not to indirection of the pointer.

11. Is there a problem with this code…if yes then what

```
typedef struct {
        char *item;
            NODEPTR next;
        } *NODEPTR;
```

a. No Problem
b. The struct ptr cannot be defined inside the same struct
c. Problem with typedef
d. The struct has to be defined first

Ans. : c, the problem is with typedef,

```
struct node{
    char *item;
    struct node *next;
} *NODEPTR; would be correct
```

12. Does *p++ increment p, or what it points to
    a. equivalent to *(p++)
    b. equivalent to (*p)++
    c. Gives Error
    d. Equivalent to *(++p)

    Ans. : a

13.Suppose that the goop function from the previous question changes the value of z[1]. Does this change effect the value of the actual argument?

a. Yes
b. No

Ans. : Yes, it will change.

14.Here is a function declaration:

```
void goo(int* x)
   {
       *x = 1;
   }
```

Suppose that a is an int* variable pointing to some integer, and *a is equal to zero. What is printed if you print *a after the function call goo(a)?

a. 0
b. 1
c. address of a
d. address of x
e. None of the above

Ans. : b, The value is changed to 1 in the function by the indirection operator.

15.A variable b if represents its value, what does &b represent…

a. Another way to access value of b
b. Address of b
c. Pointer to b
d. Pointer on b

Ans. : b, The operator '&' as such says at the address of, it is not a separate variable to be a pointer.

16. What is the problem if any…

```
int array[5], i, *ip;
for(i = 0; i < 5; i++) array[i] = i;
ip = array;
printf("%d\n", *(ip + 3 * sizeof(int)));
```

a. No Error
b. Prints 3
c. Prints Garbage(Logical Error)
d. Syntax Error

Ans. : c, When ip+3 is calculated, since it is an int pointer it automatically traverses to the 3rd element in the array, size of is not required.

17. What will go wrong if any,

```
…….<Executable stmts>
void *p1, *p2;
*p1++ …
*p2--…..
…….<Executable stmts>
```

a. No error
b. Pointers Cannot have Additions and subtractions
c. Void Pointers cannot undergo any arithmetic operation
d. Syntax Logic is correct But syntax is a problem

Ans. : c, Void pointers cannot undergo **ANY** because the size of the pointing object is unknown.

18. In the statement

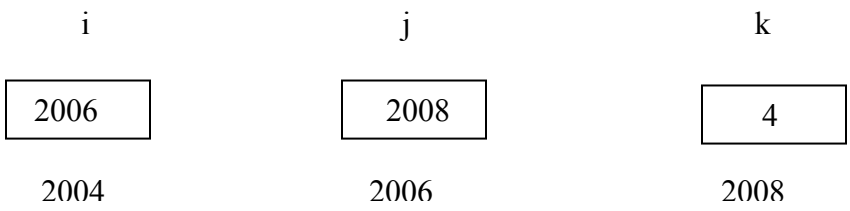
```
Char * p1, p2;
```

a. Both are pointers
b. Only p1 is a char pointer but p2 is not

c. Neither p1 nor p2 are pointers
d. Syntax Error
Ans. : b.

19. What is NULL…
a. Practically = 0
b. A Macro defined in stdio.h
c. Some Garbage Value
d. A pointer Pointing to Nothing
Ans. : b.

Fig Pointers1.1




```
int     *i, *j, k;
        k = 4;
        j = &k;
        i = &j;
```

20. printf("%d",j);

a. 4
b. 2006
c. 2008
d. Error

Ans. : c

21. printf("%d",*j);

a. 4
b. 2006
c. 2008
d. Error

Ans. : a

22 . printf("%d",*i);

a. 4
b. 2006

c. 2008
d. Error

Ans. : c

23. printf("%d",**i);

a. 4
b. 2006
c. 2008
d. Error

Ans. : a

24. printf("%d",&k);

a. 4
b. 2006
c. 2008
d. Error

Ans. : c

25. printf("%d",&j);

a. 4
b. 2006
c. 2008
d. Error

Ans. : b

26. printf("%d",&i);

a. 2004
b. 2006
c. 2008
d. Error

Ans. : a

27. The pointer that may point to a structure of same type as the structure is called as_____

a. Referential pointer
b. Self-Referential Pointer
c. Structure pointer
d. Pointer structure

Ans)B

28. Assume Memory location = 100 (decimal). What happens when we write:

ptr + 1;(ptr is pointing to an integer variable)

a. ptr points 101
b. ptr point to 102
c. ptr point to 104
d. Gives an error

Ans. : b, when a pointer variable is incremented it's incremented by the size of the data type it is pointing to, in this case int.

29. What will *++p yield:

a. 1
b. 23
c. Garbage
d. Error

Ans. : b, Since it is ++p, it will be de-referencing to the second place directly.

30. What will *p+1 yield:

a. 1
b. 23
c. 2
d. Error

Ans. : c, Since it is p+1, first p will be de- referenced then the value got will be incremented, so 2.

31. What will *(p+1) yield:

a. 1
b. 23
c. Garbage
d. Error

Ans. : b, The pointer value will be incremented first then it will be de – referenced so to the second location yields 23.

32. What's wrong if any :

```
struct abc{

        int a =40;

        struct abc *n;

    };
```

a. Nothings Wrong
b. Error because of initialization
c. Error because of the pointer
d. Syntax Error

Ans. : b, initialization is not allowed inside a structure

33. What is true for calloc:

a. calloc initializes memory after allocating it.
b. calloc does not initialize after allocating it
c. calloc is not used to allocate memory
d. calloc takes in only one argument.

Ans. : a, One of the difference between calloc and malloc is that calloc initializes the allocated memory.

34. What is False for calloc:

a. Calloc takes in two arguments
b. Calloc returns a pointer to the reserved memory
c. Calloc is a function defined in alloc.c
d. Calloc always initializes to 0.

Ans. : d, The second argument in calloc is the one which determines what the allocated space is supposed to be initialized to.

35. What is true for malloc:

a. Malloc initializes memory after allocating it.
b. Malloc does not initialize after allocating it
c. Malloc is not used to allocate memory
d. Malloc takes in two arguments.

Ans. : b, One of the difference between calloc and malloc is that malloc does not initialize the allocated memory.

36. What is False for Malloc:

    a. Malloc takes in one argument.
    b. Malloc returns a pointer to the reserved memory
    c. Malloc is a function defined in alloc.c
    d. Malloc always initializes memory to some value specified in the call.

    Ans. : d, Malloc never initializes the memory in the first place.

37. The command to free the memory reserved during the running of the program is:

    a. realloc()
    b. calloc()
    c. malloc()
    d. free()

    Ans. : d, free actually frees the memory or returns the memory back to the heap.

38. The '&' is known as _____.

    a. Referencing Operator
    b. Dereferencing Operator
    c. Memory Allocation Operator
    d. Memory freeing operator

    Ans. : a, Referencing Operator or at the address of operator

39. The '*' is known as _____.

    a. Referencing Operator
    b. Dereferencing Operator
    c. Memory Allocation Operator
    d. Memory freeing operator

    Ans. : b, Dereferencing Operator or value at operator

40. Consider the code

```
int A;
int * ptr = &A;
int** ptp = &ptr;
```

ptp will yield:

    a. The same value as in ptr
    b. Value of A
    c. The address of ptr
    d. Will give an error, a pointer cannot be pointed

    Ans. : c, &ptr will return the address of variable ptr.

41. int a = 77;
    int *d,*f,*i,*g,*t;
    d = &a;
    f = &a;
    i = &a;
    g = &a;
    t = &a;
    a. Error not more than one pointer can point to a single location.
    b. d,f,i,g,t will have the same address of 77
    c. d,f,i,g,t will have the value 77
    d. Error due to assignment operator
    Ans. : b, It is absolutely fine with as many number of links to the same address.
42. int a = 77;
    int *g,*u;
    g = &a;
    u = g;
    a. Error due to copying to two pointers
    b. g will have the address of a and u will have the value of a
    c. g and u will have the same address
    d. u will have the address of g
    Ans. : b, pointers can be copied the contents that is the address will be copied
43. int a = 60, b = 70;
    int *i,*j,*k;
    *k = i * j / 10;
    a. K will have the value 4200
    b. Error, multiplication is not possible on pointers
    c. Syntax error
    d. K will have the product of the addresses held in i and j
    Ans. : b, pointers can only undergo addition and subtraction not multiplication and division.
44. void *i;
    int k = 55;
    i = &k;
    a. Creates an error
    b. No problem with this
    c. Logical error
    d. It is ok, but pointer arithmetic cannot be performed
    Ans. : a, void pointer is a generic pointer, it cannot be directly pointed to any variable, since in a void pointer the size of the datatype it will be pointing to is unknown.

45. void *i;
    int k = 55;
    (int *) i = &k;

a. Creates an error
b. No problem with this
c. It will create a logical error since void pointer.
d. The address will be stored but the pointer will anyways be of one byte.

Ans. : b, No problem with this because although a generic pointer but is type casted.

46. int func(int a, float b);

This is a prototype of which argument passing type,

a. Pass by Value
b. Pass by Reference
c. Call by Reference
d. It generates an Error.

Ans. : a, This is an example of pass by value

47. int func(int *a, float *b);

This is a prototype of which argument passing type,

a. Pass by Value
b. Pass by Reference
c. Call by Reference
d. It generates an Error.

Ans. : b, This is an example of pass by value

48. The term pointee in pointer assignment is used to indicate _____.

a. The pointed location
b. The location of the pointer
c. There is no term as pointee
d. The term does not deal with pointers.

Ans. : a, pointee is basically the location which the pointer is pointing to.

Refn. : http://cslibrary.stanford.edu/102/PointersAndMemory.pdf

49. What are two pointers pointing to the same location called.

a. Multiple Pointers
b. Sharing Pointers
c. Sharing Pointees
d. Multiple Pointees

Ans. : b, two pointers sharing the same pointee are known as sharing pointers.

Refn. : http://cslibrary.stanford.edu/102/PointersAndMemory.pdf

50. What is the solution called if two functions share the same copy of memory without actually copying the memory into their respective space allocated.(In 'C')

a. Pass by reference
b. Pass by value
c. Deep Copying
d. Shallow Copying

Ans. : d, Shallow copying is a technique in which more than one function refer to the same location by using a pointer each, both of which point to the same pointee. Refn. : <Same .pdf used in as previous one.>

51. What is the technique known as in which the complete memory location is passed to the functions, where each function has its own copy of the memory it wants to access and is even free to edit, which was not available with shallow copying.

a. Pass by reference
b. Pass by value
c. Deep Copying
d. Shallow Copying

Ans. : c, Deep Copying, Refn. Is the same pdf as above.

52. What is a bad pointer?
    a. A pointer which do not have any pointee, initially.
    b. It's similar to dangling pointer
    c. No term as bad pointer exists
    d. A pointer pointing to a corrupt location

    Ans. : a, Every pointer when initialized is actually a bad pointer, because it does not point to any location and bad pointers differ from dangling pointers by, the fact that dangling pointers first points to a location and then without dereferencing the location if deleted, the pointer becomes dangling.
53. What is a dangling pointer?
    a. A pointer which do not have any pointee, initially.
    b. It's similar to bad pointer
    c. No term as dangling pointer exists
    d. A pointer pointing to a location, which does not exist anymore.

    Ans. : d, Explanation is same as of the bad pointer.
54. Consider the code snippet,

```
void eg( )
    {
      int *p;
      *p = 45;
      printf("%d",*p);
     }
```

    a. Program has a syntax error.
    b. It generates an error on runtime.
    c. It works perfectly fine with 45 being printed on the screen.
    d. The pointer does not get dereference in the printf statement

    Ans. : b, it generates a runtime error, pointer cannot point to data as such, it can only point to locations.
55. What will be the o/p

```
void main()
{
        int *x,*y;
        x = (int *)malloc(sizeof(int));
        *x = 42;
        y = x;
        *y = 24;
        printf("%d",*x);
}
```

    a. Generates a syntax error
    b. Generates a runtime error

c. Prints 42 on console
d. Prints 24 on console

Ans. : d, prints 24 on console.

56. Consider the code..

```
void main()
{
        int *x,*y;
        x = (int *)malloc(sizeof(int));
        *x = 42;
        y = x;
        printf("%d",*y);
}
```

a. Generates a syntax error
b. Generates a runtime error
c. Prints 42 on console
d. Prints 24 on console

Ans. d,Prints 42 on console.

57. Consider the code..

```
void main()
{
        int *x,*y;
        x = malloc(sizeof(int));
        *x = 42;
        y = x;
        *y = 24;
        printf("%d",*y);
}
```

a. Generates a syntax error
b. Generates a runtime error
c. Prints 42 on console
d. Prints 24 on console

Ans. : a, Generates a syntax error, malloc will return a void pointer, it has to be typecasted.

58. Consider the code…

```
void main()
{
        int *x,*y;
        x = (int *)malloc(sizeof(int));
        *x = 42;
        y = x;
        *y = 24;
        printf("%d,%d”,x,y);
}
```

a. 42, 24
b. 24 , 24
c. 409863, 409863
d. 409863, 409865

Ans. : c, both will print the same address on the console, that in this case is 409863.

59. What is wrong with the code if any .

```
int *  tab()
        {
        int temp;
        temp = 24;
        return (&temp);
        }
```

```
void victim()   {
```

```
int *ptr;

ptr = tab();

printf("%d",*ptr);

}
```

a. Generates a syntax Error
b. Generates a Runtime Error
c. Prints 24 on the console.
d. Prints Garbage.

Ans. : b, Generates a runtime Error, since temp is only a local pointee.

60. What happens when a memory is allocated in a pointer and then without de-allocating the function exits…

a. Nothing Happens
b. A runtime Error occurs
c. Memory Leak
d. Automatic de allocation happens

Ans. : c, memory leak will occur, i.e. the function will exit for that time but the memory will not be allocated for any further requirements.

61. Memory to the pointer is allocated from

a. Program Heap allocated to the program
b. Borrowed from secondary Memory
c. Borrowed from primary Memory
d. No memory is allocated, since it does not store any value

Ans. : a, memory newly allocated is always allocated from the program heap.

Consider the piece of code :

```
void main()

    {

        int *p1,*p2;

        p1=(int *)malloc(sizeof(int));

        p2=(int *)malloc(sizeof(int));
```

```
                *p1=17;

                *p2=153;

1st O/p         printf("\n%d.......%d..",*p1,*p2);

                free( p1);

                p1=p2;

2nd O/p         printf("\n%d.......%d..",*p1,*p2);

                *p1=253;

3rd O/p         printf("\n%d.......%d..",*p1,*p2);

                 *p2=355;

4th O/p          printf("\n%d.......%d..",*p1,*p2);

        }
```

62. What will be the output at O/p 1.

    a. 17 ……153
    b. 17…….<Garbage>
    c. <Garbage>….153
    d. <Garbage>…….<Garbage>

    Ans. : a, It at no time on the 1st output give garbage value, both the pointers have been assigned proper values.

63. What will be the O/p at O/p 2.
    a. 17……153
    b. 153……153
    c. Results into a runtime error, because p1 has been freed
    d. 17…….17

    Ans. : b, there wont be any error because the pointer has been freed but has not been eliminated from the program, so on p1, p2's address is copied, resulting in p1 and p2 both pointing to the same location.

64. What will be the O/p at O/p 3.

a. 17…..153
b. 153…..153
c. 253…..253
d. 253…..153

Ans. : c, Since both p1 and p2 point to the same location, so when indirection of p1 is modified, the actual value gets changed, and both the pointers indirection will yield the same value.

65. Assume Memory location = 2022 (decimal). What happens when we write:

ptr + 1;(ptr is pointing to an double variable)

a. ptr points 2023
b. ptr point to 2024
c. ptr point to 2030
d. ptr points to some garbage location

Ans. : c, when a pointer variable is incremented it's incremented by the size of the data type it is pointing to, in this case double, so 8.

66. Consider this code

```
int a[] = {1,23,17,4,-5,100};

int *p = a;
```

What will *p++ yield :

a. 1
b. 23
c. Garbage
d. Error

Ans. : a, first de-referencing will take place then increments will happen. Since it is p++, the value of the pointer will be incremented in the next stmt.

LINEAR DATA STRUCTURES (STACKS)

1. A Stack is a _____ DS

   a. LIFO
   b. FIFO
   c. LILO
   d. FILO

   Ans. : a, d : A Stack is a Data Structure behaving Last in And First out or First In and Last Out.. They are one and the Same...

2. In a Stack the elements are entered from _____.
   a. End
   b. Top
   c. Random
   d. Bottom

   Ans. : b. , The elements are entered and deleted from the stack from the top only.

3. The basic Operations on the Stack are
   a. Push & Pop
   b. Insert & Delete
   c. Enter & Remove
   d. Add & Subtract

   Ans. : a, Push and Pop are the terminologies used in use of the stack.

4. Condition Checked before Pushing
   a. Stack Overflow
   b. Stack Underflow
   c. No Condition to be checked
   d. Both the conditions

   Ans . : a. : Check Stack Overflow before pushing.

5. Condition Checked before Poping
   a. Stack Overflow
   b. Stack Underflow
   c. No Condition to be checked
   d. Both the conditions

   Ans . : b. : Check Stack Underflow before poping.

6. The total nos of pair of brackets in an expression is called _____
   a. Open Scopes
   b. To be closed Scopes
   c. Nesting Depth
   d. Depth Sequence

   Ans. : c Nesting Depth is the total nos. of open brackets in an expression at any time to be closed.

7. Stacks are implemented using _____.
   a. Arrays
   b. Linked Lists
   c. Static Variables
   d. Register Variables

   Ans. : a, b, Stack are implemented using arrays as well as linked list.

8. Recursive function call uses _____ Data Structure.
    a. Stacks
    b. Queues
    c. Linked Lists
    d. Trees

    Ans. : a, Recursive Function Calls uses Stacks.

9. Entries in a stack are "ordered". What is the meaning of this statement?

    a. A collection of stacks can be sorted.
    b. Stack entries may be compared with the '<' operation.
    c. The entries must be stored in a linked list.
    d. There is a first entry, a second entry, and so on.

    Ans. : b, That is the reason it is used by infix and prefix expressions.

10. The operation for adding an entry to a stack is traditionally called:

    a. add
    b. append
    c. insert
    d. push

    Ans. : d, Push is the operation traditionally used.

11. The operation for removing an entry from a stack is traditionally called:
    a. delete
    b. peek
    c. pop
    d. remove

    Ans. : c, pop is the operation used for removing an entry.

12. Which of the following stack operations could result in stack underflow?
    a. is empty
    b. Continuously poping
    c. Continuously pushing
    d. This can never happen

Ans. : b, Continuously poping can result in stack underflow.

13. Which of the following applications may use a stack?
    a. A parentheses balancing program.

b. Keeping track of local variables at run time.
c. Syntax analyzer for a compiler.
d. All of the above.

Ans. : d, All of the above use a stack because they need kinda ordering.

14. Consider the following pseudo code:

```
declare a stack of characters
while ( there are more characters in the word to read )
 {
   read a character
   push the character on the stack
 }
 while ( the stack is not empty )
 {
   write the stack's top character to the screen
   pop a character off the stack
 }
```

What is written to the screen for the input "carpets"?

a. serc
b. carpets
c. steprac
d. ccaarrppeettss

Ans. : c, After working out it comes out to be “steprac” since stack is a last in first out system.

15. Here is an INCORRECT pseudo code for the algorithm which is supposed to determine whether a sequence of parentheses is balanced:

```
declare a character stack
while ( more input is available)
{
   read a character
   if ( the character is a '(' )
      push it on the stack
   else if ( the character is a ')' and the stack is not empty )
      pop a character off the stack
   else
      print "unbalanced" and exit
 }
 print "balanced"
```

Which of these unbalanced sequences does the above code think is balanced?

a. ((( ))
b. ( ))(( )
c. (( )( )))
d. (( )))( )

Ans. : a, (-> push => top = 0

(-> push => top = 1

(-> push => top = 2

) -> pop => top = 1

) -> pop => top = 0

While loop ends, and balanced is printed, but exp is unbalanced.

16. Consider the usual algorithm for determining whether a sequence of parentheses is balanced. What is the maximum number of parentheses that will appear on the stack AT ANY ONE TIME when the algorithm analyzes: (()(())(())))?
    a. 1
    b. 2
    c. 3
    d. 4
    e. 5 or more

    Ans. : c, Max number of parentheses at a time will not be more than 3.

17. Suppose we have an array implementation of the stack, with ten items in the stack stored at data[0] through data[9]. The CAPACITY is 42. Where does the push member function place the new entry in the array?
    a. data[0]
    b. data[1]
    c. data[9]
    d. data[10]

    Ans. : d, the next data is stored in data[10]

18. Consider the implementation of the stack using a partially-filled array. What goes wrong if we try to store the top of the stack at location [0] and the bottom of the stack at the last used position of the array?
    a. Both peek and pop would require linear time.

b. Both push and pop would require linear time.
c. The stack could not be used to check balanced parentheses.
d. The stack could not be used to evaluate postfix expressions.

Ans. : b, because both push and pop will be required to be done on the top of the stack.

19. In the linked list implementation of the stack , where does the push member function place the new entry on the linked list?
    a. At the head
    b. At the tail
    c. After all other entries those are greater than the new entry.
    d. After all other entries those are smaller than the new entry.

    Ans. a, The head acts as the top.

20. In the array version of the stack (with a fixed-sized array), which operations require linear time for their worst-case behavior?
    a. is_empty
    b. peek
    c. pop
    d. push

    Ans. : c, Pop uses linear time.

21. In the linked-list version of the stack class, which operations require linear time for their worst-case behavior?
    a. is_empty
    b. peek
    c. pop
    d. push

    Ans. : c, Pop would require linear time.

22. What is the value of the postfix expression 6 3 2 4 + - *:
    a. Something between -15 and -100
    b. Something between -5 and -15
    c. Something between 5 and -5
    d. Something between 5 and 15

    Ans. : a, ans works out to be -18 and the infix expr. being 6*(3-(2+4))

23. Here is an infix expression: 4+3*(6*3-12). Suppose that we are using the usual stack algorithm to convert the expression from infix to postfix notation. What is the maximum number of symbols that will appear on the stack AT ONE TIME during the conversion of this expression?

a. 1
b. 2
c. 3
d. 4
e. 5

Ans . c, works out to be 3 at the max.

24. The operation on stack that increments the top is called
a. Overflow
b. Push
c. Pop
d. Underflow

Ans)B

25. The situation of deleting an element from a stack which doesn't have elements is called
a. Overflow
b. Push
c. Pop
d. Underflow

Ans)D

26. The time complexity of adding an element to a stack of n elements is?
a. O(1)
b. O(n)
c. O(n*n)
d. None

Ans)A

27. The time complexity of deleting an element from a stack of n elements is?
a. O(n+1)
b. O(n)
c. O(1)
d. None

Ans)C

28. A stack is said to be Full when it is _____
a. Unsorted
b. Underflow
c. Over flow
d. Sorted

Ans)C

29. B(i) represents the bottom of I the stack and T(i) represents the top of I the stack. When a Stack I will becomes full?
a. B(i)=T(i)
b. B(i+1) = T(i)+1

c. B(i-1) = T(i+1)
d. B(i-1) = T(i-1)

Ans)B

30. what type of storage is used to represent stacks and queues
    a. Random
    b. Sequential
    c. Dynamic
    d. Logical

    Ans : b , page 186 Tenenbaum 2nd edition(2002)

31. Drawbacks of sequential storage in stacks
    a. Fixed amount of storage remains allocated to the stack
    b. No more than fixed amount of storage can be allocated to the stack
    c. Both a) and b)
    d. None

    Ans : c, page 187 Tenenbaum 2nd edition(2002)

32. what is the infix expression of the given prefix expression : +A*BC

    a. A*B+C
    b. A+B*C
    c. (A+B)*C
    d. A*(B+C)

    Ans : b, Page no 242.Tenenbaum 1994 edition

33. what is the infix expression of the given prefix expression : *+ABC
    a. A*B+C
    b. A+B*C
    c. (A+B)*C
    d. A*(B+C)

    Ans : c, Page no 242.Tenenbaum 1994 edition

34. what is the infix expression of the given prefix expression :

    +A*-BC$D*EF

    a. ((A+B-C)*D)$(E*F)
    b. A+B-C*D$E*F
    c. A+(B-C)*D$(E*F)
    d. ((A+B)-C*D)$E*F

    Ans : c, Page no 242.Tenenbaum 1994 edition

35. what is the infix expression of the given prefix expression :

    $+A*BC*+ABC

a. (A*B+C)$(A+B)*C
b. (A+B*C)$((A+B)*C)
c. A+(B*C)$A+(B*C)
d. (A+B)*C$A+(B*C)

Ans : b, Page no 242.Tenenbaum 1994 edition

36. what is the postfix expression of the given prefix expression : +A*BC
    a. ABC*+
    b. AB+C*
    c. AB*C+
    d. ABC+*

    Ans : a, Page no 242.Tenenbaum 1994 edition

37. what is the postfix expression of the given prefix expression : *+ABC
    a. ABC*+
    b. AB+C*
    c. AB*C+
    d. ABC+*

    Ans : b, Page no 242.Tenenbaum 1994 edition

38. what is the postfix expression of the given prefix expression :

    +A*-BC$D*EF

    a. ABCDEF-*$*+
    b. ABC-DE*F$*+
    c. AB-CDEF$**+
    d. ABC-DEF*$*+

    Ans : d, Page no 242.Tenenbaum 1994 edition

39. what is the postfix expression of the given prefix expression : $+A*BC*+ABC
    a. ABCABC*++*$
    b. ABC+*AB+C*$
    c. ABC*+AB+C*$
    d. AB+C*AB+C*$

    Ans : c, Page no 242.Tenenbaum 1994 edition

40. what is the infix expression of the given postfix expression : ABC*+
    a. A*B+C
    b. A+B*C
    c. (A+B)*C

d. A*(B+C)

Ans : b, Page no 242.Tenenbaum 1994 edition

41. what is the infix expression of the given Postfix expression : AB+C*
    a. A*B+C
    b. A+B*C
    c. (A+B)*C
    d. A*(B+C)

    Ans : c, Page no 242.Tenenbaum 1994 edition

42. what is the infix expression of the given Postfix expression : ABC-DEF*$*+
    a. ((A+B-C)*D)$(E*F)
    b. A+B-C*D$E*F
    c. A+(B-C)*D$(E*F)
    d. ((A+B)-C*D)$E*F

    Ans : c, Page no 242.Tenenbaum 1994 edition

43. what is the infix expression of the given Postfix expression : ABC*+AB+C*$
    a. (A*B+C)$(A+B)*C
    b. (A+B*C)$((A+B)*C)
    c. A+(B*C)$A+(B*C)
    d. (A+B)*C$A+(B*C)

    Ans : b, Page no 242.Tenenbaum 1994 edition

44. what is the postfix expression of the given Infix expression : A+B*C
    a. ABC*+
    b. AB+C*
    c. AB*C+
    d. ABC+*

    Ans : a, Page no 242.Tenenbaum 1994 edition

45. what is the postfix expression of the given Infix expression : (A+B)*C
    a. ABC*+
    b. AB+C*
    c. AB*C+
    d. ABC+*

    Ans : b, Page no 242.Tenenbaum 1994 edition

46. what is the postfix expression of the given Infix expression : A+(B-C)*D$(E*F)
    a. ABCDEF-*$*+

b. ABC-DE*F$*+
c. AB-CDEF$**+
d. ABC-DEF*$*+

Ans : d, Page no 242.Tenenbaum 1994 edition

47. what is the postfix expression of the given Infix expression (A+B*C)$((A+B)*C)
a. ABCABC*++*$
b. ABC+*AB+C*$
c. ABC*+AB+C*$
d. AB+C*AB+C*$

Ans : c, Page no 242.Tenenbaum 1994 edition

48. what is the Prefix expression of the given postfix expression : ABC*+
a. +A*BC
b. +AB*C
c. +*ABC
d. *+ABC

Ans : a, Page no 242.Tenenbaum 1994 edition

49. what is the Prefix expression of the given Postfix expression : AB+C*
a. +A*BC
b. +AB*C
c. +*ABC
d. *+ABC

Ans : d, Page no 242.Tenenbaum 1994 edition

50. what is the Prefix expression of the given Postfix expression : ABC-DEF*$*+
a. +*-$*ABCDEF
b. A+*-BCD$*EF
c. +A*-BC$D*EF
d. +*-ABC$*DEF

Ans : c, Page no 242.Tenenbaum 1994 edition

51. what is the Prefix expression of the given Postfix expression : ABC*+AB+C*$
a. $+**+ABCABC
b. $+A*BC*+ABC
c. $+*ABC*+ABC

d. +*ABC$*+ABC

Ans : b, Page no 242.Tenenbaum 1994 edition

52. what is the Prefix expression of the given Infix expression : A+B*C
    a. +AB*C
    b. +*ABC
    c. *+ABC
    d. +A*BC

    Ans : d, Page no 242.Tenenbaum 1994 edition

53. what is the Prefix expression of the given Infix expression : (A+B)*C
    a. *+ABC
    b. +A*BC
    c. +AB*C
    d. +*ABC

    Ans : a, Page no 242.Tenenbaum 1994 edition

54. what is the Prefix expression of the given Infix expression : A+(B-C)*D$(E*F)
    a. +*-$*ABCDEF
    b. A+*-BCD$*EF
    c. +*-ABC$*DEF
    d. +A*-BC$D*EF

    Ans : d, Page no 242.Tenenbaum 1994 edition

55. what is the Prefix expression of the given Infix expression :(A+B*C)$((A+B)*C)
    a. $+**+ABCABC
    b. $+*ABC*+ABC
    c. $+A*BC*+ABC
    d. +*ABC$*+ABC

    Ans : c, Page no 242.Tenenbaum 1994 edition

56) Consider the following statements.
(i) A stack is a list with the restriction that items are inserted or removed/deleted only at one position, namely the end of the list.
(ii) The general model is that one where there is some element that is at the top of the stack, and it is the only element that is visible.
(iii) A pop or top on an empty stack is generally considered an error in the stack ADT.
(iv) The fundamental operations on stacks are push and pop, where push is relevant to the removal of the most recently inserted element and pop is equivalent to an insertion.
(v) A stack is a list; insertion and deletion can be performed from both ends.
Which of the above statements is/are valid for stacks?

a. (i), & (ii) only
b. (i), (ii) & (iv) only
c. (i), (ii), (iii) & (iv) only
d. (i), (ii) & (iii) only
e. (i), (ii) & (v) only

Ans) D

57) Consider the following algorithm.
(i) Make an empty stack.
(ii) Read characters until end of the file.
(iii) If the character is an opening symbol, push it into the stack.
(iv)If it is a closing symbol, then if the stack is empty, report an error.
(v)Otherwise, pop the stack. If the symbol popped is not the corresponding opening symbol, then, report an error.
(vi)At end of the file, if the stack is not empty, report an error.
Identify, what the above algorithm intends to do.

a. Evaluating a mathematical expression
b. Check for balancing of parentheses, brackets and braces and ignore any other character that appears
c. Eliminating un-matched parentheses, brackets and braces and ignoring any other character that appears
d. Checking compiler errors
e. Determination of syntax errors

Ans) B

58)The following shows a series of stack operations.

i. Push(5)
ii. Push(8)
iii. Isempty( )
iv. Pop( )
v. Push(3)
vi. Pop( )
vii. Pop( )
viii. Pop( )
ix. Isfull( )
x. Push(3)

If the above series of operations is performed, what would be the set returned values?

a. {false, 8, 3, 5, error, false, 3}
b. {5, 8, false, 8, 3, 5, error, false, 3}
c. {false, 8, 3, 5, error, false}
d. {false, 8,3, 5, false}
e. {false, 8, 3, 5, error, true}

Ans) C

59) Consider the following operations and their definitions.

(i) Clear( ) :– Clear the stack.
(ii) Is_Empty( ) :– Remove all items from the stack.

(iii) Insert(x) :- Insert element x in to any location of the stack.
(iv) Delete(p) :- Delete the element from the position p.
(v) Top( ) :- Return and remove the topmost element from the stack.
Which of the above operations is/are valid in stacks according to the basic definitions?

a. (i), (ii) and (v) only
b. (i)and (v) only
c. (i)only
d. (i)and (ii) only
e. (i), (ii), (iii), (iv) and (v)

Ans) C

60) Consider the following infix expression. ((A+B)*C-(D-E))^(F+G)
Note: ^ denotes the power.
Equivalent postfix and prefix expressions are respectively

a. AB+C*DE--FG+^, ^-*ABC-DE+FG
b. AB+C*DE-FG+^, ^-*+ABC-DE+FG
c. AB+C*DE--FG+^, ^-*+ABC-DE+FG
d. AB+C*DE-FG+^, ^-*+ACB-DE+FG
e. AB+C*DE--FG+^, ^-*+CBA-DE+FG

Ans) C

LINEAR DATA STRUCTURES(STACKS-2)

1. The basic stack operations and definitions are as follows.

Part A

(i) Clear( )
(ii) Makeempty( )
(iii) Insert (x)
(iv) Delete ( )

PartB

Clear the stack.

(p) Insert item X into the stack.
(q) Delete item from the stack.
(r) Construct the empty stack.

Choose the best definition from Part B for the above four operations respectively in Part A.

(a) (i)->p (ii)->r (iii)->q (iv)->s
(b) (i)->s (ii)->q (iii)->r (iv)->p
(c) (i)->s (ii)->p (iii)->q (iv)->r
(d) (i)->p (ii)->s (iii)->q (iv)->r
(e) (i)->p (ii)->r (iii)->s (iv)->q

Ans : d

2. The following postfix expression S and the initial values of the variables are.
S = A B - C + D E F - + ^
Assume that A=3, B=2, C=1, D=1, E=2, F=3
What would be the final output of the stack?
(a) 1
(b) 2
(c) 0
(d) -1
(e) 3
Ans : a

3. Which of the above data structure(s) is/are more suitable to implement polynomials?
   a. Singly linked lists
   b. Hash tables.
   c. Binary search trees and AVL trees.
   d. Priority queues.
   Ans : a

4. Consider the following arithmetic expression P written in postfix notation.
P: 5,6,2,+,*,12,4,/,-
Equivalent infix expression is
(a) 5*6+2-3
(b) 5*(6+2)-12/4
(c) 12/4-(6+2)+5
(d) 5*6+2+12/2
(e) None of these
Ans : a,b

5. Evaluate the following postfix expression (P).
P=6,2,3,+,-, 3,8,2,/,+,*,2,$,3,+
(Commas are used to separate the elements of P so that 6,2,3 is not interpreted as the number 623)
Final answer is?
a) 49
b) 51
c) 52
d) 7
e) None of these.

Ans : c

6. Transform the following expression into postfix
((A-B+C)) *D) $ (E+F)
Basic operations are

+ Addition
- Subtraction
* Multiply
/ Division
$ Exponential
Correct postfix string is?
(a) A+BC-D*EF$+
(b) ABC-=D*EF=$
(c) ABC=-D*EF=$
(d) A+B-CD*E+F$
(e) AB-C+D*EF+$
Ans : e

7. Consider the following arithmetic expression P written in postfix notion
P=5, 6, 2, +, *, 12, 4 , /, -
(Commas are used to separate the elements of p so that 5,6,2 is not interpreted as the number 562)
Which of the following statement(s) is/are correct?
(a) Equivalent infix is 5*(6+2)-12/4
(b) Final stack value is 37
(c) There is one stack intermediate value. It is equal to 40
(d) One of the stack intermediate value is 32
(e) Equivalent infix is 95*(6+2)-12)/4
Ans : a b
8. Consider the following stack of characters, where STACK is allocated N=8 memory cells:
STACK : A, C, D, F, K, --, --, --
(For notational convenience, we use "--" to denote an empty cell).
What is the final STACK after performing the following operations?
POP(STACK,ITEM)
POP(STACK,ITEM)
PUSH(STACK,L)
PUSH(STACK,P)
POP(STACK,ITEM)
PUSH(SATCK,R)
PUSH(STACK,S)
POP(STACK,ITEM)
(a) A, C, D, L, R, S -- ,--
(b) A, C, D, L, R ,-- , --, --
(c) A, ITEM, ITEM, L, P, R , S
(d) --, --, L, P, --, R, S, --
(e) None of these
Ans : b
9.A stack is defined in terms of operations. The stack operations and definitions are as follows:
(i) clear() – clear the stack

(ii) isempty() – initialize a stack
(iii) isfull() – check to see if the stack is full
(iv) push(d) – put the element d on the top of the stack
(v) pop() – take the topmost element from the stack
(vi) top() – return and remove the topmost element
Which of the above definitions are correct?
(a) (i) and (iv) only
(b) (i), (ii) and (iv) only
(c) (i), (iii), (iv) and (v) only
(d) (i), (ii) and (v) only
(e) All of these.
Ans : c

10. The following steps are involved in Evaluating a Postfix expression.

(i) If token is a number, push it into the stack
(ii) Pop the answer of the stack
(iii) Else, if token is an operator, pop two tokens off the stack, apply the operator and push the answer back into the stack
(iv) Initialise an empty stack
(v) While tokens remain in the input stream
(vi) Read next token

What is the correct order of the above steps for Evaluating a Postfix expression.?
(a) (vi), (v), (i), (iv), (iii), (ii)
(b) (iv), (vi), (v), (i), (iii), (ii)
(c) (iv), (v), (vi), (i), (iii), (ii)
(d) (iv), (vi), (i), (iii), (iv), (ii)
(e) (iv), (vi), (i), (iii), (ii), (v)
Ans : c

11. ABC +* CBA-+* is a postfix expression with the assumption A = 1, B = 2, and C = 3. If the above postfix expression is evaluated, the final stack value is?

(a) 9
(b) 20
(c) 10
(d) 10, 20
(e) 6
Ans : b

12.It is required to give top element and pop a stack under the linked list implementation of stacks using the following steps.
(i) {

(ii) }
(iii) return topItem ;
(iv) if (isempty ( ))
(v) object topItem = topOfStack.element ;
(vi) topOfStack = topOfStack.next ;
(vii) return null ;
(viii) public objectTopAndPop( )
What is/are the correct order of the routine?
(a) (i), (iii), (ii), (iv), (vi), (v), (ii), (vii)
(b) (viii), (i), (iii), (iv), (vi), (v), (ii), (vii)
(c) (viii), (i), (iv), (vii), (vi), (v), (iii), (ii)
(d) (viii), (i), (iv), (vii), (v), (vi), (iii), (ii)
(e) (i), (viii), (iv), (i), (vii), (v), (vi), (iii), (ii)
Ans : c,d

13. Compilers check your programs for syntax errors; but frequently a lack of one symbol (such as a missing brace or comment starter) will cause the compiler to spill out a hundred lines of diagnostics without identifying the real error. For simplicity, we will just check for balancing of parentheses, brackets, and braces and ignore any other characters that appear. Then, the following steps are involved.
(i) Read characters until end of the file
(ii) Push it into the stack
(iii) Make an empty stack
(iv) If it is a closing symbol, then if the stack is empty report an error
(v) Report an error
(vi) At the end of file, if stack is not empty, report an error
(vii) If character is an opening symbol
(viii) Otherwise, pop the stack. If the symbol popped is not the corresponding opening symbol, then
What is the correct order of the balancing symbols algorithm?
(a) (iii), (i), (vii), (iv), (ii), (viii), (v), (vi)
(b) (i), (iii), (iv), (vii), (ii), (v), (viii), (vi)
(c) (iii), (i), (vii), (ii), (iv), (v), (viii), (vi)
(d) (i), (iii), (vii), (ii), (iv), (viii), (v), (vi)
(e) (iii), (i), (vii), (ii), (iv), (viii), (v), (vi)
Ans : e

14. Which of the following is correct in respect of the above statements regarding stacks?
(a) (i) only
(b) (ii) only
(c) (i) and (iii) only
(d) (i) ,(ii)and (iv) only
(e) (i) and (iv) only Ans : d
15. Consider the following infix expression:
(A+B)*(C-D)
Equivalent (i) postfix (ii) prefix expression(s) is/are

(a) (i) *+AB-CD (ii) AB+CD-*
(b) (i)AB+CD-* (ii) *AB-+CD
(c) (i)AB+CD-* (ii) *+ABC-D
(d) (i)AB+CD*- (ii) *+AB-CD
(e) (i)AB+CD-* (ii) *+AB-CD
Ans: e

16. Consider the following postfix expression (P): P=5,5,6,*,-,4,4,/+,4

If the P above is evaluated using a stack, what is the final output value on the top of the stack?
(a) 26
(b)26,4
(c)4
(d) 12
(e) 5
Ans : c

17. Consider the following four statements.
(i) A stack is an ordered collection of items into which new items may be inserted and from
which items may be deleted at the one end called top of the stack.
(ii) A stack is an ordered collection of items into which new items may be inserted into an
arbitrary location.
(iii) Dynamic implementation stacks using Java language are practically impossible.
(iv) One of the stack applications is used in complier design.
Which one of the following is correct in relation to the stacks?
(a) (i) and (iv) only
(b) (i), (ii) and (iii) only
(c) (i) only
(d) (iv) only
(e) (i), (ii) and (iv) only
Ans : a
18. Consider the following infix expression:
((A+B) * C – (D-E)) ^(F + G)
Which of the following is a / are correct equivalent expression(s) for the above?
(a) ^ - * + A B C – D E F G+
(b) ^ - * + A B C – D E F+ G
(c) ^ - * + A B C – D E + F G
(d) - ^ * + A B C – D E + F G
(e) ^ - * + A B C – D E + F G
Ans : c, e
19. Which of the following statements is/are correct in connection with stacks?

(a) Return and remove the most recently inserted item from the stack, if stack is not empty.
(b) Insert a new item to the top of the stack, if stack is full.
(c) Elements can be deleted from both ends.
(d) Linked list based stack implementations are more convenient than array based implementations.
(e) Return and remove the least recently inserted item from the stack, if stack is not empty.
Ans : a,d

20. Which of the following is a / are possible operation(s) in connection with stacks?

(a) Reverse the order of elements on stack S using two additional stacks.
(b) Reverse the order of elements on stack S using additional variables.
(c) Reverse the order of elements on stack S using one stack and some additional queues.
(d) Sort the elements of stacks using one additional stack.
(e) Reverse the order of elements on stack S using one additional queue.
Ans : a, b, c, e

21)The following postfix expression S and the initial values of
the variables are.
S = A B - C + D E F - + ^
Assume that A=3, B=2, C=1, D=1, E=2, F=3
If the above S is evaluated using a stack, what is/are the intermediate value(s) on the top of the stack?
(a) 3
(b) 0
(c) 2
(d) -1
(e) -2
Ans : a, b, c, d

LINEAR DATA STRUCTURES(QUEUES-1)

1. One difference between a queue and a stack is:
    a. Queues require dynamic memory, but stacks do not.
    b. Stacks require dynamic memory, but queues do not.
    c. Queues use two ends of the structure; stacks use only one.
    d. Stacks use two ends of the structure, queues use only one.

    Ans : c, Because queues are double in ending while stacks do not, they have only one end.

2. If the characters 'D', 'C', 'B', 'A' are placed in a queue (in that order), and then removed one at a time, in what order will they be removed?
    a. ABCD

b. ABDC
c. DCAB
d. DCBA

Ans : d, Queue works on the idea of first in last out, so the order is reversed.

3. Suppose we have a circular array implementation of the queue class, with ten items in the queue stored at data[2] through data[11]. The CAPACITY is 42. Where does the push member function place the new entry in the array?
    a. data[1]
    b. data[2]
    c. data[11]
    d. data[12]

    Ans. : d since it is in an array implementation, data will be stored in the next free index, i.e. 12^{th}.

4. Consider the implementation of the queue using a circular array. What goes wrong if we try to keep all the items at the front of a partially-filled array (so that data[0] is always the front).
    a. The constructor would require linear time.
    b. The get_front function would require linear time.
    c. The insert function would require linear time.
    d. The is_empty function would require linear time.

    Ans. :c, The insert function will require linear time, because the deletion has always to happen from the front and to maintain the front on data[0].

5. In the circular array version of the queue (with a fixed-sized array), which operations require linear time for their worst-case behavior?
    a. front
    b. push
    c. empty
    d. None of these operations require linear time.

    Ans. : b, Since it is a circular queue, it will first check whether the queue is actually empty, which might not be the case always.

6. If data is a circular array of CAPACITY elements, and last is an index into that array, what is the formula for the index after last?
    a. (last % 1) + CAPACITY
    b. last % (1 + CAPACITY)
    c. (last + 1) % CAPACITY
    d. last + (1 % CAPACITY)

Ans. : c, This expression will point to the field after last that will be the first field.

7. I have implemented the queue with a circular array, keeping track of first, last, and count (the number of items in the array). Suppose first is zero, and last is CAPACITY-1. What can you tell me about count?
    a. count must be zero.
    b. count must be CAPACITY.
    c. count could be zero or CAPACITY, but no other values could occur.
    d. None of the above.

    Ans. : b, count is nothing but indicates CAPACITY, i.e. it has CAPACITY nos. of elements.

8. I have implemented the queue with a linked list, keeping track of a front pointer and a rear pointer. Which of these pointers will change during an insertion into a NONEMPTY queue?
    a. Neither changes
    b. Only front_ptr changes.
    c. Only rear_ptr changes.
    d. Both change.

    Ans. : c, since in a queue the entry is made from only the rear end, on insertion of an element the rear pointer will move forward.

9. I have implemented the queue with a linked list, keeping track of a front pointer and a rear pointer. Which of these pointers will change during an insertion into an EMPTY queue?
    a. Neither changes
    b. Only front_ptr changes.
    c. Only rear_ptr changes.
    d. Both change.

    Ans. : d, Since it is an empty queue the front and rear are initialized to -1, so on insertion both the pointers will change and will point to 0.

10. Suppose top is called on a priority queue that has exactly two entries with equal priority. How is the return value of top selected?
    a. The implementation gets to choose either one.
    b. The one which was inserted first.
    c. The one which was inserted most recently.
    d. This can never happen (violates the precondition)

    Ans. : d, A priority queue is created keeping the fact in mind that two elements should not have the same priority.

11. Which of the following is/are **not** (a) valid queue application(s)?
(a) When printing jobs are submitted to printer
(b) Lines at tickets counters
(c) Evaluating a mathematical expression
(d) Calls to large companies, when all lines are busy
(e) When there are many network set-ups of personal computers in which the disk is allocated to one machine, known as the file server and users on the other machine are given access to the file.
Ans) C

12. A queue in which we can insert or delete elements from both ends is called
    a. Circular Queue
    b. Deque
    c. Double
    d. single

Ans)B

13. In which queue we can utilize location of deleted element again is called
    a. Circular Queue
    b. Tree
    c. Stack
    d. None

Ans)A

14. The time complexity of adding an element to a queue of n elements is?
    a. O(1)
    b. O(n)
    c. O(n+1)
    d. None

Ans)A

15. The time complexity of Deleting an element from a queue of n elements is?
    a. O(1)
    b. O(n)
    c. O(n*n)
    d. None

Ans)B

16. A Queue can be implemented by using the following ?
1) Tree
2) Array
3) Single Linked list
    a. 1 and 2
    b. 2 and 3
    c. 1 and 3
    d. All

Ans)C

17. Pick the appropriate match for the Queue form the following options
    a. Can be created by setting up an ordinary contiguous array to hold the items
    b. Can take care of delete operation automatically
    c. Need a pointer to handle addition and deletion of an item
    d. None.

Ans)C

18. A Circular queue is empty if?
    a. front=rear-1
    b. rear=front-1
    c. front=rear+1
    d. rear=front

Ans)D

19. A queue is empty if?
    a. front=rear-1
    b. rear=front-1
    c. front=rear
    d. front=rear=0

Ans)A

20. In which of the following types a priority queue can be constructed

1)Ascending priority queue
2)Descending priority queue
3)Top-Down priority queue

    a. 2 and 3
    b. 1 and 2
    c. 1 and 3
    d. All

Ans)B

21. Suppose u opened a notepad, a music player, an excel sheet, and also u are doing your data structure programming simultaneously. Your Windows-XP implements _____ data structure for it
    a. tree
    b. stack
    c. linked list
    d. QUEUE

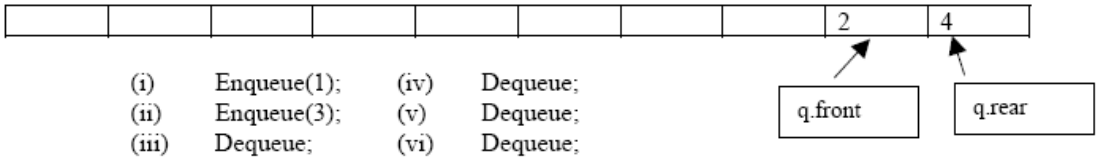
Ans)D

22) What happens when wraparound is implemented for a queue?

(a) If Front advances past the last array position, it is reset to the first array position.

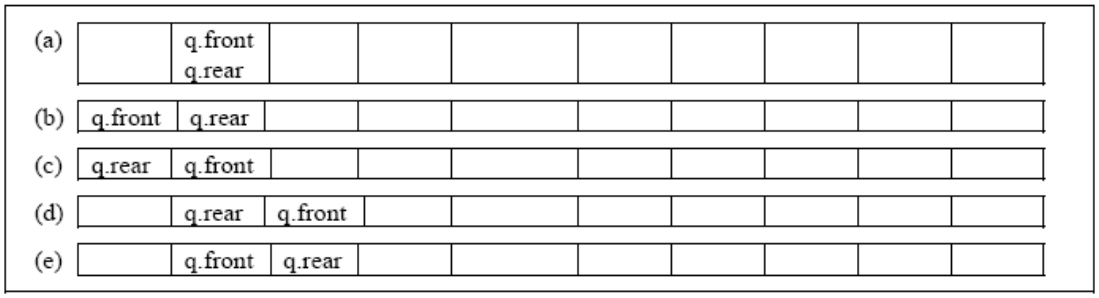
(b) If Rear advances past the last array position, it is reset to the first array position.
(c) Both (a) and (b)
(d) Neither (a) nor (b)
Ans) C

23)Consider the following queue with the indicated initial states and series of queue operations



(i) Enqueue(1);
(ii) Enqueue(3);
(iii) Dequeue;
(iv) Dequeue;
(v) Dequeue;
(vi) Dequeue;

If the above series of operations is performed, what is the final status of the queue?



Ans) D

LINEAR DATA STRUCTURES(QUEUES-2)

1. Consider the following queue of characters, where QUEUE is a circular array which is allocated six memory cells:
FRONT=2,REAR=4 QUEUE=--,A,C,D,--,--
(For notational convenience, we use "--" to denote an empty cell).
What is the state of the queue after performing the following operations?
F is added to the queue
two letters are deleted
K,L,M are added to the queue
Two letters are deleted
R is added to the queue
Two letters are deleted
S is added to the queue
Two letters are deleted
One letter is deleted
One letter is deleted

(a) FRONT=2 REAR=4 QUEUE=--,MR,S,--,--
(b) no deletion can take place. That is underflow has occurred
(c) no insertion can take place. That is overflow has occurred

(d) FRONT=0,REAR=0, QUEUE=--,--,--,--,--
(e) None of these

Ans : b

2. Consider the following queue of characters where DEQUE is a circular array which is allocated six memory cells:
LEFT=2, RIGHT=4 DEQUE:= --, A, C, D, --, --
(For notational convenience, we use "--" to denote an empty cell).
What is the state of the queue after performing the following operations?
F is added to the right of the deque
Two letters on the right are deleted
K,L and M are added to left of the deque
One letter on the left is deleted
R is added to the left of the deque
S is added to the right of the deque
T is added to the right of the deque

(a) LEFT=0,RIGHT=0, QUEUE=--,--,--,--,--
(b) No deletion can take place. That is underflow has occurred
(c) No insertion can take place. That is overflow has occurred
(d) LEFT=5 RIGHT=4 DEQUE=K,A,C,S,R,L
(e) LEFT=5 RIGHT=3 DEQUE=K,A,C,--,R,L

Ans : c

3. Consider the queue (q) of characters where it is a straight queue which is allocated 8 characters:
front=2 rear=5 q = -, -, A,B,C,-,-,-
(For notational convenience "-" is used to denote an empty cell)

The following operations have to be performed.
(i) D is added to the queue
(ii) Two characters are deleted from the queue
(iii) E and F are added to the queue
(iv) One character is deleted from the queue
(v) G and H are added to the queue.

What are the intermediate correct front and rear values when the above operations are performed?

(a) front=5, rear=8
(b) front=3 rear=6
(c) front =2, rear=6
(d) front=4 rear=7

(e) front=4, rear=6

Ans :a,c,e

4. Consider the following thirteen (xiii) statements:

```
(i) void abc(Vertex s) {
(ii) queue q;
(iii) Vertex v,w;
(iv) q=new Queue( );
(v) q.enqueue(s);s.dist=0;
(vi) while (!q.isempty( )){
(vii) v=q.dequeue( );
(viii) v.known=true
(ix) for each w adjacent to v
(x) if(w.dist= = INFINITY){
(xi) w.dist=v.dist+1;
(xii) w.path=v;
(xiii) q.enqueue( w );}}}
```

What is the above pseudocode intended to do?

(a) Implementing the queue operations.
(b) Determination of adjacency matrix.
(c) Calculate the shortest path for an un-weighted graph.
(d) Determination of connected nodes in an un-weighted graph.
(e) Calculate the shortest path for an un-directed d graph.
Ans :c

5. The following are statements related to queues.

(i) The last item to be added to a queue is the first item to be removed
(ii) A queue is a structure in which both ends are not used
(iii) The last element hasn't to wait until all elements preceding it on the queue are removed
(iv) A queue is said to be a last-in-first-out list or LIFO data structure.
Which of the above is/are related to normal queues?

(a) (iii) and (ii) only
(b) (i), (ii) and (iv) only
(c) (ii) and (iv) only
(d) All of these
(e) None of these

Ans : e

6. Consider the following paragraph.
In a large university where the resources are limited, students must sign a waiting list if all the terminals are occupied. The student who has been waiting at a terminal the longest

is forced off first, and the student who has been in the waiting list the longest is the next user to be allowed on.
Identify the more suitable data structure to apply to the above phenomena from among the following:

(a) Stacks
(b) Queues
(c) Tables
(d) Graphs
(e) Binary search trees
ans : b

7. Consider the following statements:
(i) The queue can be implemented by a linked list.
(ii) The queue can be implemented only by stack.
(iii) There are references kept at both the front and the back of the list.
(iv) The Queue can be implemented only by an array-based method.
Which of the above statement(s) is/are valid for the queues?
(a) (i) only
(b) (i),(ii) and (iii) only
(c) (i) and (iii) only
(d) (i),(iii) and (iv) only
(e) (ii) and (iv) only
Ans : c

8. Consider the following paragraph in connection with priority queues.

The priority queue is a ……(i)…… in which the intrinsic ordering of elements does determine the result of its basic operations. An ascending/descending priority queue is a collection of items which can be inserted ……(ii)… and from which only the…….(iii)……item can be removed.
Correct answers for the blank positions are
(a) (i) tree (ii) highest (iii) smallest
(b) (i) data structure (ii) arbitrary (iii) largest
(c) (i) data structure (ii) arbitrary (iii) smallest
(d) (i) data structure (ii) largest (iii) smallest
(e) (i) tree (ii) arbitrary (iii) smallest
Ans : b, c

9. The following shows a series of queue operations:
(i) enqueue(5);
(ii) enqueue(3);
(iii) dequeue( );
(iv) enqueue(7);
(v) dequeue( );
(vi) front();

(vii) dequeue( );
(viii) dequeue( );
(ix) isempty( );
(x) enqueue(9);
(xi) enqueue(7);
(xii) size( );
(xiii) enqueue(3);
(xiv) enqueue(5)
(xv) dequeue( );

If the above series of operation is executed, what is/are the intermediate output values(s) that is/are not returned?
(a) 11
(b) Error
(c) False
(d) True
(e) 6
Ans : a, c, e

10. Which of the following operation(s) is/are supporting Priority queues?
(a) Remove the largest item.
(b) Replace the largest with a new item (unless the new item is the largest).
(c) Change the priority of an item.
(d) Remove any item.
(e) Insert any item.
Ans : a, b, c, e

11. The basic queue operations are given in List A and a larger number of definitions is given in List B as follows:

List A	**List B**
(i) Makeempty( )	(p) Construct the empty queue
(ii) enqueue(x)	(q) Delete item from the front of the queue
(iii) dequeue( )	(r) Insert item x to back end of the queue
(iv) getfront( )	(s) Return the back element of the queue
	(t) Return the front element of the queue
	(u) Delete element from the back end of the queue

Choose the best definition from List B for each of the above four operations respectively in List A.
(a) (i)-->p, (ii)-->r, (iii)-->q, (iv)-->t
(b) (i)-->p, (ii)-->r, (iii)-->u, (iv)-->s
(c) (i)-->p, (ii)-->r, (iii)-->u, (iv)-->t
(d) (i)-->p, (ii)-->r, (iii)-->q, (iv)-->s
(e) (i)-->p, (ii)-->r, (iii)-->u, (iv)-->t
Ans : a

12. **Consider the following straight queue which can be allocated eight integers and five operations.**
front = 3 rear= 5

Queue = - , - , 2 , 4 ,5, - , - , -
(for notational convenience " – " used to denote an empty cell)

The following operations have to be performed.
(i) 6 is added to the queue.
(ii) Two elements are deleted from the queue.
(iii) 10 and 12 are added to the queue.
(iv) Two elements are deleted from the queue.
(v) 2 and 3 are added to the queue.

What are the final front and rear values when the above operations are performed into a straight queue?
(a) front = 7 rear=2
(b) front = 2 rear=7
(c) front = 2 rear=8
(d) front = 5 rear=8
(e) front = 7 rear=8
Ans : e

13) **Consider the following straight queue which can be allocated eight integers and five operations.**
front = 3 rear= 5
Queue = - , - , 2 , 4 ,5, - , - , -
(for notational convenience " – " used to denote an empty cell)

The following operations have to be performed.

(i) 6 is added to the queue.
(ii) Two elements are deleted from the queue.
(iii) 10 and 12 are added to the queue.
(iv) Two elements are deleted from the queue.
(v) 2 and 3 are added to the queue.
What are the final front and rear values when the above operations are performed into a circular queue?

(a) front = 7 rear=2
(b) front = 2 rear=7
(c) front = 2 rear=8
(d) front = 5 rear=8
(e) front = 7 rear=8

Ans :a

LINEAR DATA STRUCTURES(CIRCULARQUEUE)

1. The Deque in which input is allowed at one end is called _____

a. Linear Queue
b. Priority Queue
c. Circular Queue
d. Input restricted Deque

Ans)D

2. The Deque in which deletion is allowed at one end is called ____
   a. Priority Queue
   b. Output restricted Deque
   c. Circular Queue
   d. Linear Queue

Ans)B

3. To Implement the Priority Queue Minimum_____ no of Queues are required?
   a. 1
   b. 3
   c. 2
   d. 0

Ans)C

LINKED ALLOCATION(SINGLY LINKED LIST-1)

1. Suppose cursor points to a node in a linked list. What statement changes cursor so that it points to the next node?
   a. cursor++;
   b. cursor = link( );
   c. cursor += link( );
   d. cursor = cursor->link( );

   Ans. : d, this statement will change the current position of the cursor.

2. Suppose cursor points to a node in a linked list. What Boolean expression will be true when cursor points to the tail node of the list?
   a. `(cursor == NULL)`
   b. `(cursor->link( ) == NULL)`
   c. `(cursor->data( ) == NULL)`
   d. `(cursor->data( ) == 0.0)`
   e. None of the above.

   Ans. : b, On the last node, the last node's link will be pointing toward NULL, so cursor->link() = > Last_node->link

3. Suppose that p is a pointer variable that contains the NULL pointer. What happens if your program tries to read or write *p?
   a. A syntax error always occurs at compilation time.
   b. A run-time error always occurs when *p is evaluated.

c. A run-time error always occurs when the program finishes.
d. The results are unpredictable.

Ans. : b, when p is evaluated, a runtime error occurs.

4. Suppose that f is a function with a prototype like this:

```
void f(________ head_ptr);
  // Precondition: head_ptr is a head pointer for a linked list.
  // Postcondition: The function f has done some computation with
  // the linked list, but the list itself is unchanged.
```

What is the best data type for head_ptr in this function?

a. node
b. const node
c. node*
d. const node*

Ans. : c, since the linked list is not changing, it does not matters if we accept the node ptr as a formal argument

5. Suppose that f is a function with a prototype like this:

```
 void f(________ head_ptr);
// Precondition: head_ptr is a head pointer for a linked list.
// Postcondition: The function f has done some manipulation of
// the linked list, and the list might now have a new head node.
```

What is the best data type for head_ptr in this function?

a. node
b. node&
c. node*
d. node*&

Ans. : d, since the linked list might change, we have to accept it's address rather than the node pointer as such.

6. What is the expression for generating a pseudorandom number in the range 1...N?
   a. rand() % N;
   b. rand() / N;
   c. rand() % (N + 1);
   d. rand() / (N + 1);
   e. (rand() % N) + 1;

Ans. : e, it will work out as that always.

7. Which expression computes a pseudorandom integer between -10 and 10 using rand() from stdlib.h?
    a. (rand( ) % 20) - 10
    b. (rand( ) % 21) - 10
    c. (rand( ) % 22) - 10
    d. (rand( ) % 20) - 11
    e. (rand( ) % 21) - 11

    Ans. : a, b, Both give numbers between -10 and 10.

8. What kind of list is best to answer questions such as "What is the item at position n?"
    a. Lists implemented with an array.
    b. Doubly-linked lists.
    c. Singly-linked lists.
    d. Doubly-linked or singly-linked lists are equally best

    Ans. : a, the list implemented using an array, because array only gives instant access.

9. Linear order linked list is provided through _____
    a. variables
    b. arrays
    c. Pointer
    d. strings

Ans)C

10. In a Single Link List_____ node contains no links.
    a. First
    b. Last
    c. last but one
    d. middle

Ans)B

11. A linked list is which type of data structure.
    a. Linear
    b. Non Linear
    c. Hierarchical
    d. None

Ans)A

12. In Single Linked List a node contain minimum how many fields(assuming one for data).
    a. 2
    b. 3
    c. 1

d. None

Ans)A

13. Implementation of priority queue

1) Tree
2) Linked list
3) Doubly linked list

a. 1 and 2
b. 2 and 3
c. 1 and 3
d. All

Ans)B

14. Null pointer is used to tell

1) End of the linked list
2) Empty pointer field of a structure
3) The linked list is empty

a. 1
b. 2 and 3
c. 1 and 3
d. All

Ans)A

15. Single link list performs which of the following methods

1) Insertion
2) Modification
3) Searching

a. 1 and 2
b. 2 and 3
c. 1 and 3
d. All

Ans)D

16. The list with no node is called as

1) Empty list
2) Null list
3) Zero list

a. 1 and 2
b. 2 and 3
c. 1 and 3
d. All

Ans)A

17. An application that make use of Multilinked Structures Is_____?

a. Sparse matrix
b. Linked list
c. Tree
d. Stack

Ans)A

18. Given a arbitrary pointer to an element in a singly linked list, the time complexity for its deletion _____.
    a. O(n/2)
    b. O(n*n)
    c. O(n)
    d. O(n*n/2)

Ans)C

19. In C language to implement the heterogeneous linked list_____ pointer is used.
    a. Void
    b. Null
    c. Int
    d. Structure

Ans)A

20. Searching a linked list requires linked list be created
    a. In sorted order only
    b. In any order
    c. Without under flow condition
    d. None

Ans)B

21. In linked list the logical order of elements –
    a. Is same as their physical arrangement
    b. Is not necessarily equivalent to their physical arrangement
    c. Is determined by their logical arrangement
    d. None

Ans)B

22. According to Storage strategies Linked list is a
        a. Nonlinear
        b. Linear
        c. Sequential
        d. dynamic

        Ans : a

23. Implementation of a list in a dynamic fashion is
    a. To call upon the system to allocate and free storage may not be time consuming
    b. A set of nodes not reserved in advance for use
    c. The address computation is complex
    d. None

Ans)B

24. If you are using C language to implement a heterogeneous linked list, the pointer type u will prefer is _____
    a. int*
    b. Null
    c. void*
    d. float*

Ans)C

25. Which of the following statement is true
    a. The next address field of the node can be empty
    b. A list can exist with no nodes
    c. In a singly linked list the starting address of the list is stored in the address field of the last node
    d. All of the above

Ans : b, A list with no nodes is called empty list or null list

26. Type of storage is used to represent Lists
    e. Random
    f. Sequential
    g. Dynamic
    h. Logical

    Ans : c , page 187 tenenbaum

27. The node in a singly linked list can be deleted,
    a. Without traversing the list
    b. By traversing the list from the head
    c. By traversing the list from the tail
    d. All of the above

    Ans: b

28. Which of the following operations is not efficiently supported by a singly-linked list?
    a. accessing the element in the current position
    b. insertion after the current position
    c. insertion before the current position
    d. moving to the position immediately following the current position

    Ans : c

29. What is an ordered list
    a. where the address is ordered
    b. where the smaller items precede the larger ones
    c. both a and b
    d. none

    Ans : b

30. According to Access strategies Linked list is a
    a. Nonlinear
    b. Linear
    c. Sequential
    d. dynamic

Ans : b

31. How many nodes are accessed, on the average, in inserting a new element into an ordered list with n nodes
    a. (n+1)/2
    b. n/2
    c. 1/(n+1)
    d. None

Ans : b, page 200 of Tenenbaum 2nd edition

32.A priority Queue implemented as an ordered linked list requires examining an average of approximately _____ nodes for insertion

a. (n+1)/2
b.1/(n+1)
c.n/2
d.one

Ans : c, page 200 of Tenenbaum 2nd edition

33.A priority Queue implemented as an ordered linked list requires examining an average of approximately _____ nodes for deletion

a. (n+1)/2
b.1/(n+1)
c.n/2
d.one

Ans : d, page 200 of Tenenbaum 2nd edition

34.The advantage of lists over an array for implementing a priority queue is

a.Extra space should be left empty in the end to achieve this
b.Lists will take less time compared to arrays
c.No shifting of elements or gaps are necessary in a list
d.Lists don't have direct access

Ans : c, page 200 of Tenenbaum 2nd edition

35. An item can be inserted into _____,without moving any other items

a. List
b. an array if extra space is left empty
c. both a and b
d. none

Ans : b, page 200 of Tenenbaum 2nd edition

36. An extra node at the front of the list, which doesnot represent an item in the list is Called

a. header node
b. List node
c. List header
d. Both a and c

Ans : d, page 200 of Tenenbaum 2nd edition

38) A _____is a self-referential data type because it contains a pointer or link to another data of the same type.

a. Stack
b. Linked list
c. Queue
d. Priority queue

Ans) B

Exp) A Linked list is a self-referential data type because it contains a pointer or link to another data of the same type.
For more refer to http://en.wikipedia.org/wiki/Linked_list

39) Linked lists, at any point in the list in constant time, does not allow _____.

a. Random access.
b. Insertion
c. Deletion
d. Insertion at end

Ans)A

Exp) Linked lists permit insertion and removal of nodes at any point in the list in constant time, but do not allow random access.For more refer to http://en.wikipedia.org/wiki/Linked_list

40) _____ permits insertion and removal of nodes at any point in the list in constant time, but do not allow random access

a. Stack
b. Linked list
c. Queue
d. Priority queue

Ans)B

Exp) Linked lists permit insertion and removal of nodes at any point in the list in constant time, but do not allow random access.For more refer to http://en.wikipedia.org/wiki/Linked_list

41) To traverse a_____, you begin at any node and follow the list in either direction until you return to the original node.

a. Doubly linked list
b. Two way linked list
c. Circular linked list
d. Singly linked list

Ans) C

You begin at any node and follow the list in either direction until you return to the original node, to traverse a circular linked list. Doubly linked lists and two way linked lists are the same. For more refer to http://en.wikipedia.org/wiki/Linked_list

42) The pointer, in case of a circular linked list, pointing to the whole list is usually called the_____.

a. Double pointer
b. List pointer
c. Circular pointer
d. End pointer

Ans)D

The pointer, in case of a circular linked list, pointing to the whole list is usually called the end pointer. For more refer to http://en.wikipedia.org/wiki/Linked_list

43) In a _____, each node has one link, similarly to an ordinary singly-linked list, except that the next link of the last node points back to the first node.

a. Doubly linked list
b. Singly-circularly-linked list
c. Doubly circular linked list
d. Two way linked list

Ans) B

Each node has one link, similarly to an ordinary singly-linked list, except that the next link of the last node points back to the first node, in a singly circularly linked list. For more refer to http://en.wikipedia.org/wiki/Linked_list

44) In a_____, each node has two links, similarly to doubly-linked list, except that previous link of the first node points to the last node and the next link of the last node points to the first node.

a. Doubly-circularly-linked list
b. Doubly linked list
c. Singly-circularly-linked list
d. Two way linked list

Ans) A

Each node has two links, similarly to *doubly-linked list*, except that previous link of the first node points to the last node and the next link of the last node points to the first node in a doubly-circularly-linked list. For more refer to http://en.wikipedia.org/wiki/Linked_list

45) In a _____, insertions and removals can be done at any point with access to any nearby node.

a. Doubly-circularly-linked list
b. Doubly linked list
c. Singly-circularly-linked list
d. Two way linked list

Ans) B

For more refer to http://en.wikipedia.org/wiki/Linked_list

46) _____are most useful for describing naturally circular structures, and have the advantage of regular structure and being able to traverse the list starting at any point.

a. Doubly linked list
b. Two way linked list
c. Singly linked list
d. Circular linked list

Ans) D

47)Which of the following operations is not efficiently supported by a singly-linked list?

a. Accessing the element in the current position
b. Insertion after the current position
c. Insertion before the current position
d. Moving to the position immediately following the current position
e. All of the above are efficiently supported

Ans.: c, To insert before the current position another pointer has to be made to point to the position before the current position.

48) The header node of a linked list

(a) Simplifies deletion
(b) Simplifies insertion
(c) Points to null
(d) Both (a), (b)

Ans) D

49) If a header node is used, which of the following indicates a list L with one item?
(a) L.Header.Next = null
(b) L.Header.Next /= null
(c) L.Header.Next /= null and then L.Header.Next.Next /= null
(d) L.Header.Next /= null and then L.Header.Next.Next = null
(e) None of the above
Ans)D
50) Insertion of a node into a doubly linked list requires how many changes to various Next and Prev pointers?
(a) No changes
(b) 1 Next, 1 Prev
(c) 2 Next, 2 Prev
(d) 3 Next, 3 Prev
(e) None of the above
Ans)C

51)What operation is supported in constant time by the doubly linked list, but not by the singly linked list?
(a) Advance
(b) Move back
(c) First
(d) Retrieve
(e) All of the above are always constant time
Ans)B, Doubly linked list has two pointers pointing to forward and backward Simultaneously

52) Consider the following statements.
(i) A linked list consists of a series of structures, which are necessarily adjacent in memory.
(ii) In a singly linked list, each structure contains an element and a reference to a record containing its successor.
(iii) In an array-based list, even if the array is dynamically allocated, an estimate of the maximum size of the list is required.
(iv) In an array based list, inserting at position 0 requires first pushing the entire array down one spot to make room.
(v) In an array-based list, deleting elements from the middle can be performed without shifting the remaining elements.
Which of the above statements is/are valid for a list?

a. (ii) & (iv) only
b. (ii), (iii) & (iv) only
c. (iii), (iv) & (v) only
d. (ii) & (iv) only
e. (ii), (iii), (iv) & (v) only

Ans) B

53)Consider the following operations.

(i) Append an element to the end of a list.
(ii) Concatenate two lists.
(iii) Free all the nodes in a list.
(iv)Reverse a list, so that the last element becomes the first and so-on.
(v) Delete the last element from a list.
(vi)Delete the nth element from a list with at least n elements.
(vii) Combine two ordered lists into a single ordered list.
Which of the above are valid operations in singly linked lists?

a. (i), (ii), (iii), (v), (vi) & (vii)
b. (iii), (iv), (v), (vi) & (vii)
c. (i), (ii), (iii), (iv), (vi) & (vii)
d. (i), (ii), (iii), (iv) & (vii)
e. (i), (ii), (iii), (iv), (v), (vi) & (vii)

Ans) E

54) Consider the following algorithm.
(i) An empty node is created.
(ii) The node's information field is initialized to an integer e1.
(iii) The node is being included at the end of the list, and the next field is set to null.
(iv) The node is now included in the list by making the next field of the last node of the list a reference to the newly created node.
(v) The new node follows all the nodes of the list, but this fact has to be reflected in the value of the tail, which now becomes the reference to the new node.
Which of the following does the above algorithm describe?

a. The process of adding a new node to the last node of the tree
b. The process of adding a new node to any location of the list
c. The process of adding a new node to the end of the list
d. The process of deleting a node from the end of the list
e. The process of deleting a node from the beginning of the list

Ans) C

LINKED ALLOCATION(CIRCULAR LINKED LIST-1)

1. The _____node of a Circular Link List contains one links.

a. only middle
b. only first
c. only last
d. All

Ans)D

2. In Circular Doubly Linked List a node contain how many fields.

a. 1
b. 3
c. 2
d. None

Ans)B

3. Next pointer of last node in a circular linked list contains the address of.
   a. Last node
   b. Previous node
   c. First Node
   d. NULL

Ans)C

4. A linked list is called a circular list if
   a. There is a loop in a linked list
   b. If the last node contains a null pointer
   c. If the last node contains the pointer to the first node
   d. All

   Ans : c

5. Null pointer represents
   a. Empty stack
   b. Empty queue
   c. Empty circular list
   d. Empty tree

   Ans : c

6. A linked list is called a circular list if
   e. There is a loop in a linked list
   f. If the last node contains a null pointer
   g. If the last node contains the pointer to the first node
   h. All

   Ans : c

Null pointer represents
   e. Empty stack
   f. Empty queue
   g. Empty circular list
   h. Empty tree

   Ans : c

LINKED ALLOCATION(DOUBLY LINKED LIST-1)

1. Next pointer of last node in a double linked list contains the address of_____
   a. Last node
   b. Previous node
   c. First Node
   d. NULL

Ans)D

2. Having address of the node to be deleted in double linked list, the node can be deleted

1) Without traversing the list
2) Only after traversing the list from the head
3) Only traversing the list from the tail
   a. 1 and 2

b. 2 and 3
c. 1 and 3
d. All

Ans)B

3. Inserting a node after a given node in a doubly linked list requires
   a. One pointer changes
   b. Two pointer changes
   c. Four pointer changes
   d. None

Ans)C

4. Having address of the node to be deleted in double linked list, the node can be deleted
   a. Without traversing the list
   b. Only after traversing the list from the head
   c. Only traversing the list from the tail
   d. None if these

Ans)A

5. Having address of the node to be deleted in double linked list, the node can be deleted

   1)Without traversing the list
   2)Only after traversing the list from the head
   3)Only traversing the list from the tail

   a. 1 and 2
   b. 2 and 3
   c. 1and 3
   d. All

Ans)B

6. The node can be deleted in double linked list

   1) Without traversing the list,
   2) By traversing the list from the head,
   3) By traversing the list from the tail

      a. 1 and 2
      b. 2 and 3
      c. 1 and 3
      d. All

   Ans: b

7. If a pointer to that node, alone is given, the node can be deleted in

   a. Singly linked lists
   b. Doubly Linked lists
   c. Circular Linked lists
   d. All

   Ans : b

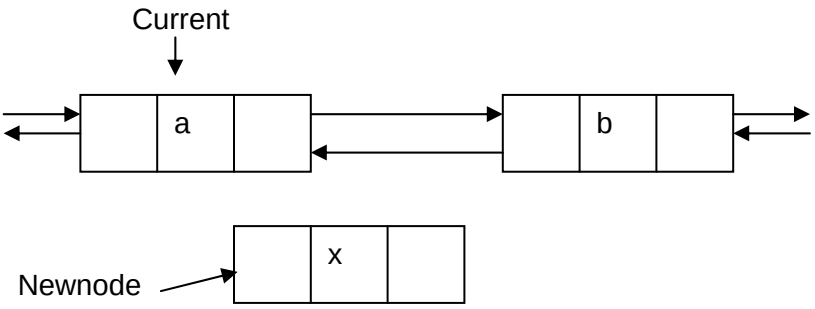
LINKED ALLOCATION(DOUBLY LINKED LIST-2)

1. Which of the following statement(s) is/are related to doubly linked list?

(a) The number of nodes in a list may vary dynamically when elements are inserted and removed
(b) Cannot traverse backward and forward directly.
(c) Each cell consists of two references and only one data element.
(d) It may either linear or circular.
(e) It may or may not have a header node

Ans : a, d, e

2. Consider the following doubly linked list. There are two references next, prev in both directions.



Which of the following correctly describes the steps in inserting element x immediately after the element a in the above doubly linked list?

(a) Newnode = new DoublyLinkedListNode(x)
Newnode.element = x;
Newnode.next = Current.next;
Current.next = Newnode ;

(b) Newnode = new DoublyLInkedListNode(x) ;
Current = NewNode
Newnode.prev = Current
Newnode.next= Current.next
Newnode.rev.next = Newnode;
Newnode.next.prev = Newnode ;

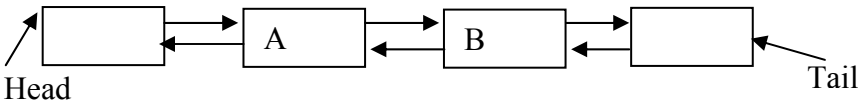
(c) NewNode = new DoublyLinkedListNode(x) ;
Current = NewNode
Newnode.prev = Current;
Newnode.next = Current.next;
Newnode.next.prev = Newnode ;
Newnode.prev.next = Newnode ;

(d) Newnode = new DoublyLinkedListNode(x) ;
Newnode.prev = Current ;
Newnode.next = Current.next ;
Newnode.prev.next = Newnode ;
Newnode.next.prev = Newnode ;
Current = NewNode ;

(e) NewNode = new DoublyLinkedListNode(x) ;
Current = NewNode
Newnode.prev = Current;
Newnode.next = Current.next;
Newnode.next.prev = Newnode.next ;
Newnode.prev.next = Newnode.next ;

Ans : d

3. Consider the following doubly linked list :

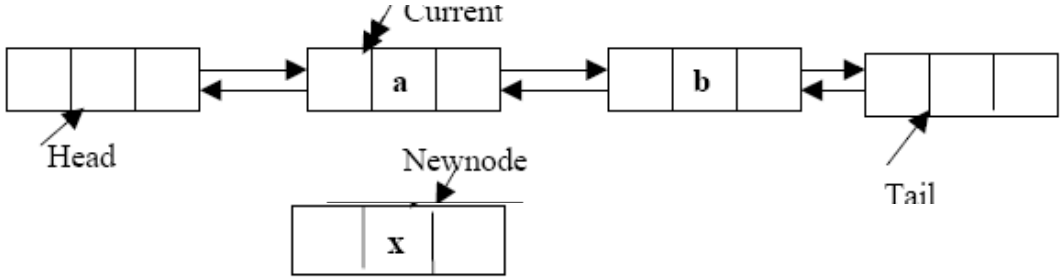


If the list is circular, and empty, which of the following statement(s) is/are valid?
Note: each node has two references such as next and previous.

(a) Head.next=null
(b) Tail.previous=Head
(c) Head.next=Tail
(d) Tail=Head
(e) Tail.next=null

Ans : b,c

4. Consider the following doubly linked list and its data structure.

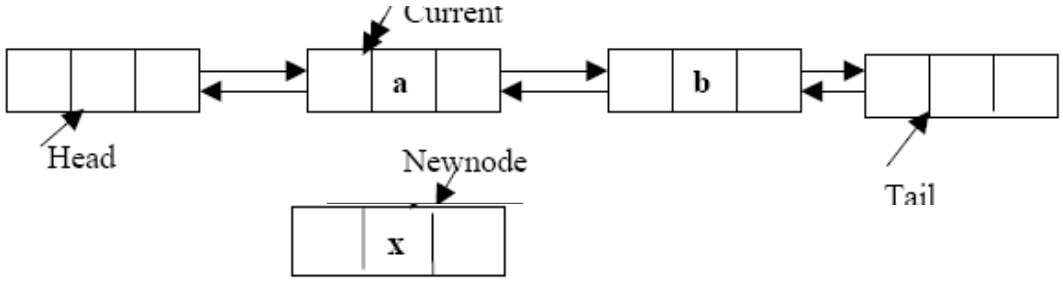


Class Listnode
{
Object element;
Listnode next;
Listnode prev;
}

What would be the correct statement(s), when the doubly linked list is empty?
(a) Head.next=tail
(b) Current.next=tail
(c) Current.prev=Head
(d) Tail.prev=Head
(e) Current=nill

Ans : a, d

5) Consider the following doubly linked list and its data structure.

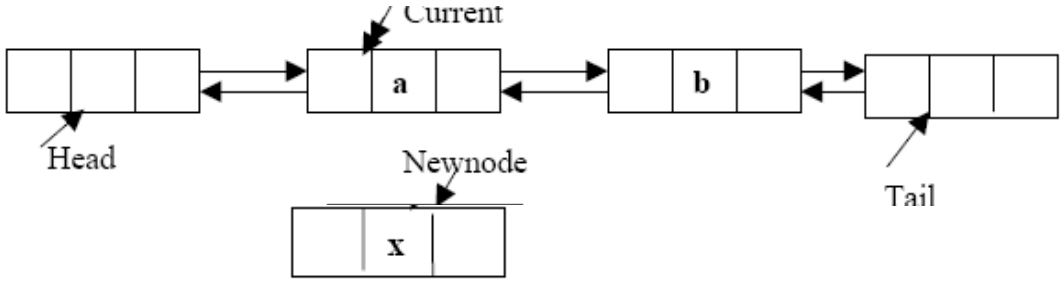


Class Listnode
{
Object element;
Listnode next;
Listnode prev;
}
Which of the following correctly describe(s) the steps to delete element b from the above doubly linked
list?
(a) Current.next.next.prev=Current.prev

Current.next = Current.next.next
(b) Current.next = Current.prev.next
Current.next.next.prev=Current.prev
(c)Current.next=Current.next.next
Current.next.next.prev=Current.next.prev
(d) Current.next=tail
Head.next=Current.next.prev
(e) Current = Current.next.next
Current.next.next.prev=Current.prev

Ans : c

6) Consider the following doubly linked list and its data structure.



Class Listnode
{
Object element;
Listnode next;
Listnode prev;
}
Which of the following correctly describe(s) the steps in inserting elements x immediately after the
element a in the above doubly linked list?
(a)current.next=x
x..prev=current
x.next=b
b.prev=x
(b) current.next=x
x..prev=current.prev
x.next=b
b.prev=x
(c) a.next=x
x..prev=current
x.next=b
b.prev=x
(d) Newnode.next= Current.next
Newnode.prev=Current

Newnode.prev.next=Newnode
Newnode.next.prev=Newnode
(e) Newnode.next= Current.next
Newnode.prev=Current.next.prev
Current.next=Newnode
Current.next.prev=Newnode

Ans : d, e

7) A set of basic list terms is given in Part A and some definitions are given in Part B as follows.

Part A

(i) Circular linked list
(ii) Doubly linked list
(iii) Header node
(iv) Iterator class
(v) Sorted linked list

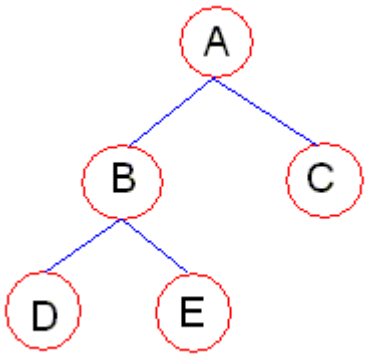
Part B

(p) A class that maintains a current position and performs all routines which depend on knowing the position in the list.
(q) A linked list that allows bidirectional traversal by storing two references per node.
(r) A list used to maintain items in a linked list in some arrangement.
(s) An extra node in the linked list that holds no data but serves to satisfy the requirement that every node has a previous node.
(t) A linked list in which the last cell's reference points to the first.
Choose the best definition from Part B for the above five terms in Part A.

(a) (i).. (t) (ii)..(q) (iii)..(r) (iv)..(p) (v)..(s)
(b) (i).. (p) (ii)..(t) (iii)..(s) (iv)..(p) (v)..(r)
(c) (i).. (t) (ii)..(q) (iii)..(s) (iv)..(p) (v)..(r)
(d) (i).. (q) (ii)..(t) (iii)..(s) (iv)..(p) (v)..(r)
(e) (i).. (t) (ii)..(s) (iii)..(p) (iv)..(p) (v)..(r)

Ans : c

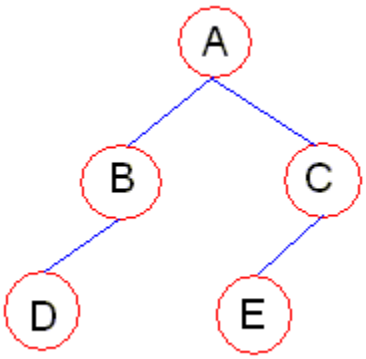
NON LINEAR DATA STRUCTURES(TREES-1)



1. Which option **best** describes this tree?

   a. Not a tree
   b. A tree
   c. A binary tree
   d. A proper binary tree
   e. A complete binary tree
   f. A perfectly balanced binary tree

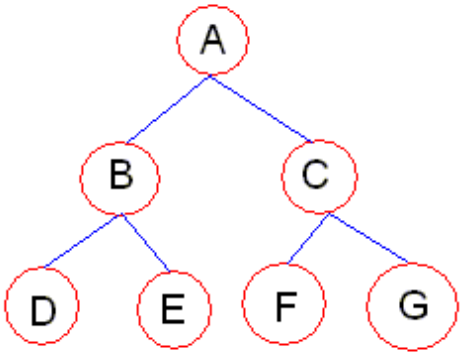
   Ans. : e



2. Which option **best** describes this tree?

   a. Not a tree
   b. A tree
   c. A binary tree
   d. A proper binary tree
   e. A complete binary tree
   f. A perfectly balanced binary tree

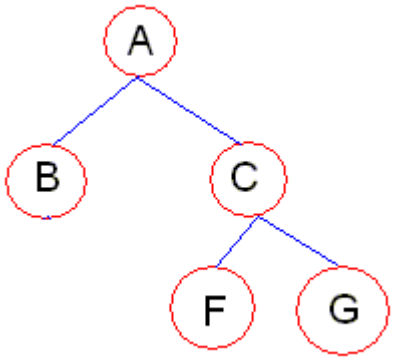
   Ans. : c



3. Which option **best** describes this tree

a. Not a tree
b. A tree
c. A binary tree
d. A proper binary tree
e. A complete binary tree
f. A perfectly balanced binary tree

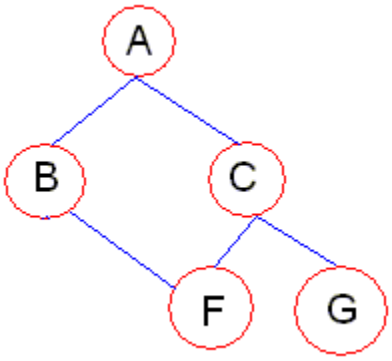
Ans. : f



4. Which option **best** describes this tree?

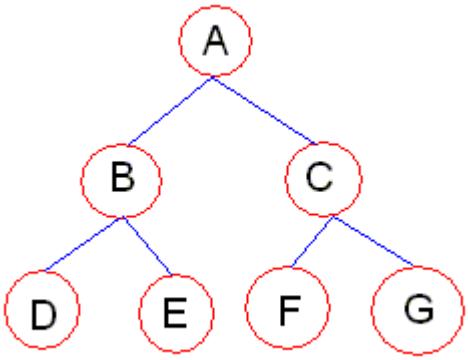
a. Not a tree
b. A tree
c. A binary tree
d. A proper binary tree
e. A complete binary tree
f. A perfectly balanced binary tree

Ans : d



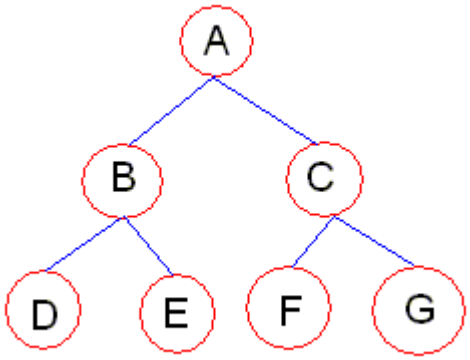
5. Which option **best** describes this tree?
    a. Not a tree
    b. A tree
    c. A binary tree
    d. A proper binary tree
    e. A complete binary tree
    f. A perfectly balanced binary tree

    Ans. : a



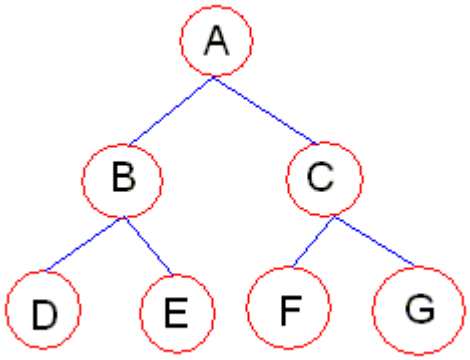
6. Which traversal around the tree will give the order D - E - B - F - G - C – A
    a. Pre-order traversal
    b. Post-order traversal
    c. In-order traversal
    d. None

    Ans. : b



7. Which traversal around the tree will give the order D - B - E - A - F - C – G
    a. Pre-order traversal
    b. Post-order traversal
    c. In-order traversal
    d. None

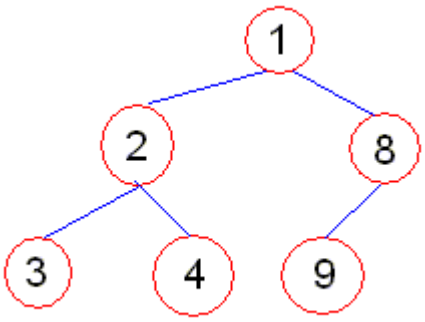
    Ans. : c



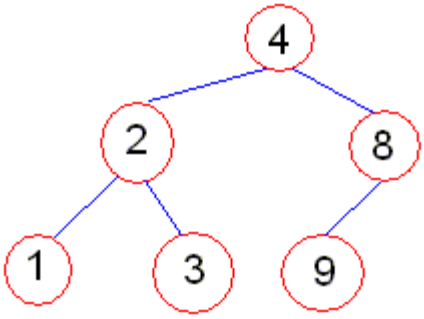
8. Which traversal around the tree will give the order A - B - D - E - C - F – G
    a. Pre-order traversal
    b. Post-order traversal
    c. In-order traversal
    d. None

    Ans. : a

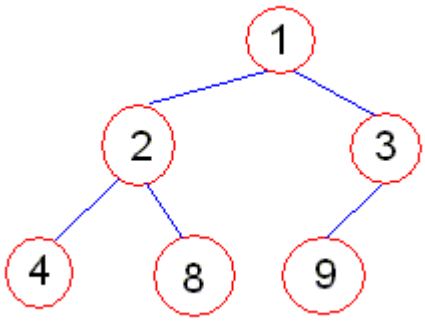
A. B.



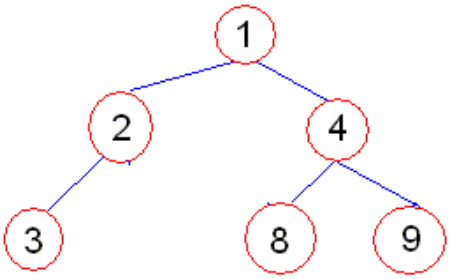
C.



D.



A.



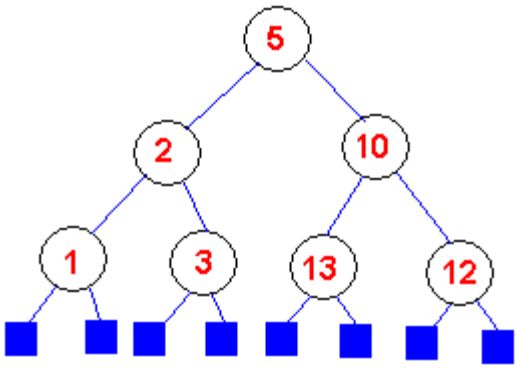
B.

9. Which trees are heaps, with the heap ordering taken as <= on integers
    a. A, B, C
    b. A, C
    c. A, C, D
    d. B

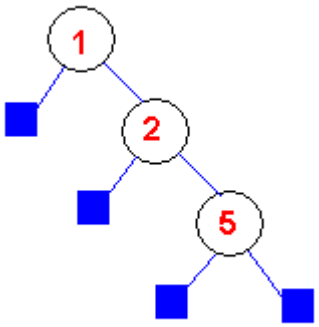
    Ans. : b

10. Which data structure has the fastest insertion procedure?
    a. Binary search tree
    b. Ordered array
    c. Heap
    d. Unordered linked list
    e. Ordered linked list

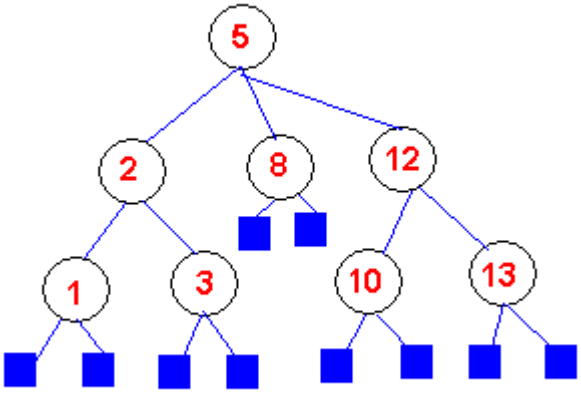
    Ans. : d

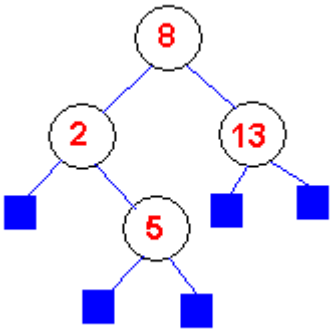


C.



D.





11. Which of the following are binary search trees?
    a. A,C
    b. B
    c. B,C
    d. B,D
    e. A,B,C,D

    Ans. : d

12. A Tree is a _____ type of Data Structure.
    a. sequential
    b. linear
    c. Non-Linear
    d. hybrid

Ans)C

13. A Pre Order Traversing of Non empty Binary Tree is called as a _____
    a. BFS
    b. Depth-First Order
    c. Linear
    d. Sequential

Ans)B

14. The Non leaf nodes of a tree are also known as _____ nodes.
    a. Internal
    b. external
    c. outer
    d. root

Ans)A

15. A Binary Tree of height h, that contains exactly 2h-1 is called a _____
    a. B tree
    b. complete binary tree
    c. Fully Binary Tree
    d. AVL tree

Ans)c

16. A collection of one or more trees is _____.
    a. Forest
    b. Graph
    c. complete binary tree
    d. full binary tree

Ans)A

17. A balanced order-n multi way search tree in which each non-root node contains as least (n-1)/2 keys is called as_____.
    a. B Tree
    b. complete binary tree
    c. full binary tree
    d. AVL tree

Ans)A

18. Height of a Complete Binary Tree that contains n elements is _____
    a. log(n*n)
    b. $\log_2(n+1)$
    c. log(n+1)
    d. log(n)

Ans)B

19. A node that does not have any child nodes is called.
    a. Empty
    b. Root
    c. Child
    d. Leaf

Ans)D

20. A tree having larger data than root in right sub tree and smaller data in left sub tree is called
    a. Search Tree
    b. Binary Tree
    c. Complete Tree
    d. AVL Tree

Ans)D

21. The drawing of every binary tree with n elements, n>0 has exactly how many edges
    a. n
    b. 2n-1
    c. n-1
    d. n *log n

Ans)A

22. When comparing to element degree, the degree of a tree is?
    a. Max
    b. Min
    c. NULL
    d. None

Ans)A

23. How many nodes do have an almost complete strictly Binary Tree.
    a. 2n-1
    b. 2n
    c. n-1
    d. n*n

Ans)A

24. If a Binary Tree of Height is h, then that Tree having at most how many elements?
    a. h-1
    b. 2h
    c. 2^(h-1)
    d. 2^h-1

Ans)D

25. Tree with a difference of one in height of left and right sub-trees is called
    a. Binary tree
    b. Binary search tree
    c. AVL tree
    d. Balanced binary tree

Ans)B

26. Traversing a tree in order of left, right and then root is called
    a. Inorder
    b. Preorder
    c. Postorder
    d. None

Ans)C

27. What is the Level of the Root of a Tree
    a. 0
    b. 1
    c. -1
    d. None

Ans)B

28. In Order Traversing of Non empty Binary Tree is called as
    a. Depth-first order
    b. breadth-first order
    c. Symmetric order
    d. non symmetric order

Ans)C

29. A node which is a parent of all the nodes is called as
    a. Empty
    b. Root
    c. Child
    d. Leaf

Ans)B

30. Of the following tree structure, which is efficient considering space and time complexities?
    a. Incomplete Binary Tree
    b. Binary Tree
    c. Full Binary Tree
    d. Complete Binary Tree

Ans)D

31. Traversing a tree in order of root, left and then right is called

1) Preorder
2) Depth-first order
3) Inorder

    a. 1 and 2
    b. 2 and 3
    c. 1 and 3
    d. All

Ans)A

32. Traversing a tree in order of left, root and then right is called

1) Symmetric order
2) Depth-first order
3) Inorder

    a. 1 and 2
    b. 2 and 3
    c. 1 and 3
    d. All

Ans)c

33. Which of the following remarks about tree indexing are true?
1) It is efficient in dealing with strings of variable length
2) It is efficient if there are few member of data items
3) The number of disk accesses can't exceed the length of the particular string that is searched

a. 1 and 2
b. 2 and 3
c. 1 and 3
d. All

Ans)C

34. In binary search tree which traversal is used for getting ascending order values _____.

a. Reverse order
b. Preorder
c. Postorder
d. Inorder

Ans)D

35. The numbers of null pointer are there in N number binary tree is _____.

a. N
b. N+1
c. N/2
d. N-1

Ans)B

36. The complexity of Binary search is _____

a. O(log n*n)
b. O(log (n+1))
c. O(log n)
d. O(log n/2)

Ans)C

37. The number of different trees are possible with n nodes are_____

a. n-1
b. n+1
c. n
d. n/2

Ans)A

38. B-tree (failure nodes at same level) of nodes in k-ary tree of depth n is _____.

a. 1/n
b. 1/k
c. I+k
d. 1+n

Ans)B

39. AVL trees achieve the goal that search, insertion and deletion in a tree with n nodes can all be achieved in the time that is _____

a. O(log n/2)
b. O(log (n+1))
c. O(log n*n)
d. O(log n)

Ans)D

40. Given a height balanced tree. If we add one more node, _____ nodes gets unbalanced.

a. TWO
b. THREE
c. ONE
d. ZERO

Ans)B

41. Children of the same node are called

a. Leaves
b. branches
c. siblings
d. terminals

Ans)C

42. In a binary tree which traversal will print the elements in ascending order?

a. preorder
b. Postorder
c. Inorder
d. depends on data

Ans)C

43. A class which is used to traverse through the objects maintained by a container class.

a. Protocol Class
b. maxin class
c. Concrete Class
d. Iterative Class

Ans)D

44. The header node in the link list sometime called as

1)base
2)anchor
3)footer

a. 1 and 2
b. 2 and 3
c. 1 and 3
d. None

Ans)A

45. what are the different traversal techniques available for trees
1)pre-order
2)postorder
3)inorder
   a. 1 and 2
   b. 2 and 3
   c. 1 and 3
   d. None
Ans)A

46. In an AVL tree, at what condition the balancing is to be done?
1)pivotal value greater than 1
2)pivotal value less than 1
3)pivotal value equal to 2
   a. 1 and 2
   b. 1 and 3
   c. 2 and 3
   d. All
Ans)D

47. Max or min tree i.e. also a complete binary tree known as
1)max heap
2)min heap
3)B+ tree
   a. 1 and 2
   b. 2 and 3
   c. 1 and 3
   d. None
Ans)A

48. A Full Binary Tree of height h contains exactly _____nodes
   a. 2^(h+1)
   b. 2^h-1
   c. 2^(h-1)
   d. 2h-1
Ans)D

49. The minimum balancing factor of an AVL tree is _____.
   a. 0
   b. -1
   c. 1
   d. -2
Ans)B

50. AVL trees achieve the goal that search, insertion and deletion in a tree with n nodes can all be achieved in the time that is

a. O(log(n+1))
b. O(log n^2)
c. O(log n/2)
d. O(log n)

Ans)D

51. In between threaded binary tree and lexical ordered binary tree the process of traversal is faster in _____ binary tree

a. Threaded
b. Lexial ordered
c. both are same
d. depends upon no. of nodes

Ans)B

52. A binary tree is a

a. A finite set of elements which is either empty or is partitioned into three disjoint subsets,which are again binary trees in themselves
b. A finite set of elements which is either empty or is partitioned into three disjoint subsets, which need not be a binary trees in themselves
c. A finite set of elements which is never empty and is partitioned into three disjoint subsets, which are again binary trees in themselves
d. None

Ans : a

53. A node that has no child is called

a. father
b. Leaf
c. Ancestor
d. descendant

Ans : b

54. If A is the root of a binary tree and B is the root of its left or right sub tree, then B is said to be, ____ of A

e. Left son
f. Right son
g. Both a and b
h. Either a or b

Ans : d

55. If A is the root of a binary tree and B is the root of its left or right sub tree, then A is said to be, ____ of B

a. Left son
b. Right son
c. Father
d. 0

Ans : c

56. Node n1 is an ancestor of node n2

a. If n1 is the father of n2
b. If n1 is the father of some ancestor of n2
c. Both a and b
d. Either a or b

Ans : c

57. Node n2 is a descendant of n1
    a. If n1 is the father of n2
    b. If n1 is the father of some ancestor of n2
    c. Both a and b
    d. Either a or b

    Ans : c
58. Two nodes are brothers if
    a. They are the left sons
    b. They are the descendents of the same node
    c. They are not the leaf nodes
    d. They are the left and right sons of the same father

    Ans : d

59. The tree is said to be strictly binary tree if
    a. Every level except possibly the deepest, in that binary tree is completely filled
    b. Every non leaf node in a binary tree has nonempty left and right subtrees
    c. If in that binary tree each node has exactly zero or two children
    d. A binary tree where every node's left subtree has keys less than the node's Key, and every right subtree has keys greater than the node's key
    e. If it has leaves on more than one level

    Ans : b,c

60. which of the following statement is true
    a. Root of the tree has a level 0
    b. The level of any node is one more than the level of its father
    c. The depth of binary tree is the maximum level of any leaf in the tree
    d. All the above

    Ans : d

61. A Complete binary tree is,
    a. A strictly binary tree
    b. A strictly binary tree with all the leaves having their level equal to depth
    c. Both a and b
    d. None

    Ans : b

62. If a binary tree contains m nodes at level L, then it contains atmost ____ nodes at level L+1
    a. 2^m

b. 2m
c. 2m+1
d. 2^m+1
Ans : b

63. The maximum number of nodes possible at level L is
a. 2^(L +1)
b. 2L
c. 2^L
d. 2^L+1
Ans : c

64. The total number of nodes in a complete binary tree of depth d is,
a. 2^(d+1)
b. 2^(d+1)-1
c. 2^(d+1)+1
d. None
Ans : b

65. A binary tree of depth d is an "almost complete binary tree", if it satisfies
a. Any node at level less than d-1 has two sons
b. Any node n1 in the tree with a right descendent at level d, n1 must have a left son and every left descendent of n1 is either a leaf at level d or has two sons
c. Both a and b
d. None
Ans : c

66. Preorder is also known as
a. Root-First order
b. Symmetric order
c. Depth first order
d. None
Ans : c

67. Inorder is also known as
a. Root-First order
b. Symmetric order
c. Depth first order
d. None
Ans : b

68. What is the correct order, to traverse a non empty binary tree in preorder
1. Traverse the left subtree in preorder 3. Traverse the right subtree in preorder
a. 1, 2, 3

b. 2, 3, 1
c. 2, 1, 3
d. 3, 2, 1
Ans : c

69. What is the correct order, to traverse a non empty binary tree in inorder
    1. Traverse the left subtree in inorder 2. Visit the root 3. Traverse the right subtree in inorder
    a. 1, 2, 3
    b. 2, 3, 1
    c. 2, 1, 3
    d. 3, 2, 1
    Ans : a

70. What is the correct order, to traverse a non empty binary tree in preorder
    1. Traverse the left subtree in postorder 2. Visit the root 3. Traverse the right subtree in postorder
    a. 1, 2, 3
    b. 2, 3, 1
    c. 1, 3, 2
    d. 3, 2, 1
    Ans : c

71. All the elements in the left subtree of a node n are less than the contents of n, and all elements in the right subtree of a node n are less than the contents of n. Binary tree with this property is called
    a. Complete binary tree
    b. Binary search tree
    c. Ordered binary tree
    d. Strictly binary tree
    Ans : b, A binary tree where every node's left subtree has keys less than the node's key, and every right subtree has keys greater than the node's key.

72. Which traversal does not use a stack?
    a. inorder
    b. level order
    c. postorder
    d. preorder
    e. all of these traversals uses a stack

Ans : b, Inorder, preorder, postorder traversal makes use of stack for implementing

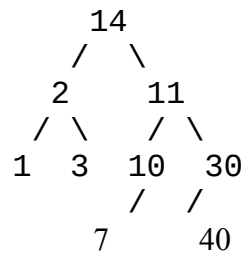


Fig 1.1

73. How many leaves does the tree in fig 1.1 have?

a. 2
b. 4
c. 8
d. 9

Ans : b

74. How many of the nodes have at least one sibling,in the tree of fig 1.1?

a. 5
b. 6
c. 7
d. 9

Ans : a

75. What is the value stored in the parent node of the node containing 30, in the tree of fig 1.1?

a. 10
b. 11
c. 14
d. None of the above

Ans : b

76. How many descendants does the root have, in the tree of fig 1.1?

a. 0
b. 2
c. 4
d. 8

Ans : d

77. What is the depth of the tree of fig 1.1?

a. 2
b. 3
c. 4
d. 8

Ans : b

78. How many children does the root have, in the tree of fig 1.1?

a. 2
b. 4
c. 6
d. 8

Ans : a

79. Which statement is correct, with regarding to the tree of fig 1.1?

a. The tree is neither complete nor full.
b. The tree is complete but not full.
c. The tree is full but not complete.
d. The tree is both full and complete.

Ans : a

80. What is the minimum number of nodes in a full binary tree with depth 3?

a. 3
b. 4
c. 8
d. 7
e. 15

Ans : d, A binary tree in which each node has exactly zero or two children is called a Full binary tree.

81. What is the minimum number of nodes in a complete binary tree with depth 3?

a. 3
b. 4
c. 11
d. 15

Ans : d, A complete binary tree is a binary tree in which every level, except possibly the deepest, is completely filled.

82. Which traversal computes the total size of each directory in the UNIX file system?

a. inorder
b. level order
c. postorder
d. preorder
e. two or more of the above traversals could be used

Ans : c,

83. Select the one true statement.

a. Every binary tree is either complete or full.
b. Every complete binary tree is also a full binary tree.
c. Every full binary tree is also a complete binary tree.
d. No binary tree is both complete and full.

Ans : b, every non-leaf node in a complete binary tree will have either 0 or 2

84. If T is a binary tree with 14 nodes. What is the minimum possible depth of T?

a. 0
b. 3
c. 4
d. 5

Ans : b, $2^{(n+1)}-1 = 14$, calculate n, n=2.906. so the depth is 3

85. Select the one FALSE statement about binary trees:

a. Every binary tree has at least one node.
b. Every non-empty tree has exactly one root node.
c. Every node has at most two children.
d. Every non-root node has exactly one parent.

Ans : a, Empty tree with 0 nodes is also a binary tree

86. Consider the node of a complete binary tree whose value is stored in data[i] for an array implementation. If this node has a right child, where will the right child's value be stored?

a. data[i+1]

b. data[i+2]
c. data[2*i + 1]
d. data[2*i + 2]

Ans : d

87. The total number of nodes in a complete binary tree of depth d will be

a. 2^d -1
b. 2^(d+1)- 1
c. 2^(d+1) + 1
d. 2^(d+1)

Ans : b

88. For a strictly binary tree with n leaves, and level(i) for i between 1 and n equal the level of the i^{th} leaf is

a. $\varepsilon^{n}_{i=0}$
b. $\varepsilon^{n}_{i=1}$
c. $\varepsilon^{n}_{0=1}$
d. $\varepsilon^{n}_{1=1,}$

Ans : b,page number 243 of tenenbaum 2^{nd} edition

89. a strictly binary tree with n leaves contains _____ nodes

a. 2n+1
b. 2n-1
c. 2n
d. None

Ans : b, page number 243 of tenenbaum 2^{nd} edition

90. Which of the following traversals requires more than linear time in the worst case?

a. inorder
b. level order
c. postorder
d. preorder
e. all of these traversals are linear time

Ans : e

91. In which of the following traversals is the node processed before the recursive calls to the children complete?

a. inorder

b. level order
c. postorder
d. preorder
e. none of the above

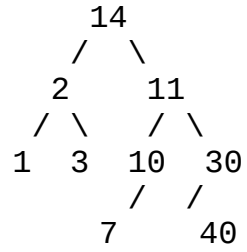
Ans : d

92. Suppose that a binary tree includes 7 animals. What is the minimum number of NONLEAF nodes in the tree?

a. 1
b. 3
c. 5
d. 7
e. 8

Ans : b

Fig 1.2



93. What is the order of nodes visited using a pre-order traversal, in the tree in fig1.2?

a. 1 2 3 7 10 11 14 30 40
b. 1 2 3 14 7 10 11 40 30
c. 1 3 2 7 10 40 30 11 14
d. 14 2 1 3 11 10 7 30 40

Ans : d

94. What is the order of nodes visited using an in-order traversal, in the tree in fig1.2?

a. 1 2 3 7 10 11 14 30 40
b. 1 2 3 14 7 10 11 40 30
c. 1 3 2 7 10 40 30 11 14
d. 14 2 1 3 11 10 7 30 40

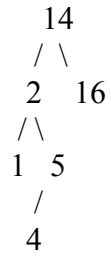
Ans : b

95. What is the order of nodes visited using post-order traversal, in the tree of fig1.2?

a. 1 2 3 7 10 11 14 30 40
b. 1 2 3 14 7 10 11 40 30
c. 1 3 2 7 10 40 30 11 14
d. 14 2 1 3 11 10 7 30 40

Ans : c

96. Consider this binary search tree: Suppose we remove the root,replacing it with something from the left subtree. that will be the new root? (preserving the subsets of the left and right subtrees)



a. 1
b. 2
c. 4
d. 5

Ans : d

97. Which of the following statement is true

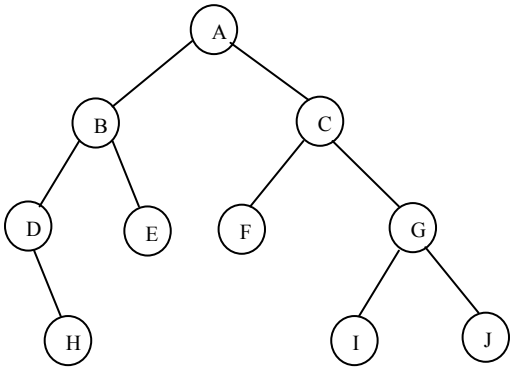


Fig 1.3

a. The inorder D H B E A F C I G J
b. The postorder H D E B F I J G C A
c. The preorder A B D H C E F G I J

d. The postorder H D E F B I J G C A
e. The inorder D H B E A F C G I J
f. The preorder A B D H E C F G I J
g. The postorder H D E B G I J F C A

Ans : a, b, f

98. Consider the node of a complete binary tree whose value is stored in data[i] for an array implementation. If this node has a left child, where will the left child's value be stored?

a. data[i+1]
b. data[i+2]
c. data[2*i + 1]
d. data[2*i + 2]

Ans : c

99. Traversing a binary expression trees in preorder yields _____ form of expression

a. prefix
b. postfix
c. infix
d. none

Ans : a, Page no 241.Tenenbaum 1994 edition

100. Traversing a binary expression trees in postorder yields _____ form of expression

a. prefix
b. postfix
c. infix
d. none

Ans : b, Page no 241.Tenenbaum 1994 edition

101. Traversing a binary expression trees in preorder yields _____ form of expression

a. prefix
b. postfix
c. infix
d. none

Ans : c, Page no 241.Tenenbaum 1994 edition

102. Traversing this binary expression tree in fig 1.3 in postorder yields

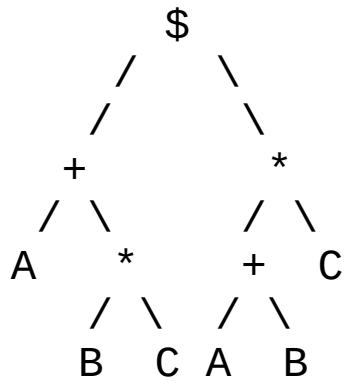


Fig 1.3

a. ABC*+ABC*+$
b. AB+*CAB+*C$
c. ABC*+AB+C*$
d. ABCABC+*+*$

Ans : c, Page no 242.Tenenbaum 1994 edition

103. Traversing this binary expression tree in fig 1.3 in Inorder yields
   a. (A*B+C)$(A*B)+C
   b. A+B*C$A+B*C
   c. (A+(B*C))$((A+B)*C)
   d. A+(B*C)$(A+B)*C

   Ans : c

104. Traversing this binary expression tree in fig 1.3 in preorder yields
   a. A+B*C$A+B*C
   b. $AB+*CAB+*C
   c. $+A*BC*+ABC
   d. $+*+*ABCABC

   Ans : c

105. The preorder traversing of the tree gives the expression ABCEIFJDGHKL. What is the Inorder expression
   a. ICEBJFKDGLHA
   b. ECFIKDGBJLHA
   c. EICFJBGDKHLA
   d. EIFCBJDKGHLA

   Ans : c, Page no 240.Tenenbaum 1994 edition

106. The preorder traversing of the tree gives the expression ABCEIFJDGHKL. What is the postorder expression
    a. ICEBJFKDGLHA
    b. FJEILKGCBDHA
    c. EICFJBGDKHLA
    d. IEJFCGKLHDBA

    Ans : d, Page no 240.Tenenbaum 1994 edition

107. The preorder traversing of the tree gives the expression ABDGCEHIF. What is the Inorder expression
    a. DBGHAEICF
    b. DGBAHEICF
    c. BGDEHACIF
    d. DGABEHICF

    Ans : b, Page no 240.Tenenbaum 1994 edition

108. The preorder traversing of the tree gives the expression ABDGCEHIF. What is the postorder expression
    a. GDBHIEFCA
    b. GBDHIEFCA
    c. GDBEIHCFA
    d. GBDEIHCFA

    Ans : a, Page no 240.Tenenbaum 1994 edition

109. The Inorder traversing of the tree gives the expression DGBAHEICF. What is the postorder expression
    a. GBDHIEFCA
    b. GDBEIHCFA
    c. GDBHIEFCA
    d. GBDEIHCFA

    Ans : c, Page no 240.Tenenbaum 1994 edition

110. The Inorder traversing of the tree gives the expression DGBAHEICF. What is the preorder expression
    a. ADBCGHEFI
    b. ABDGCEHIF
    c. ABDCGHEIF
    d. ADBGCEHFI

    Ans : b, Page no 240.Tenenbaum 1994 edition

111. The Postorder traversing of the tree gives the expression GDBHIEFCA. What is the preorder expression
    a. ADBCGHEFI
    b. ABDCGHEIF
    c. ADBGCEHFI
    d. ABDGCEHIF

    Ans : d, Page no 240.Tenenbaum 1994 edition

112. The Postorder traversing of the tree gives the expression GDBHIEFCA. What is the Inorder expression
    a. DBGHAEICF
    b. BGDEHACIF
    c. DGBAHEICF
    d. DGABEHICF

    Ans : c, Page no 240.Tenenbaum 1994 edition

113. The Postorder traversing of the tree gives the expression IEJFCGKLHDBA. What is the Inorder expression
    a. ICEBJFKDGLHA
    b. EICFJBGDKHLA
    c. ECFIKDGBJLHA
    d. EIFCBJDKGHLA

    Ans : b, Page no 240.Tenenbaum 1994 edition

114. The Postorder traversing of the tree gives the expression IEJFCGKLHDBA. What is the Preorder expression
    a. ABCIEFJDGKHL
    b. ACBFIEJDGHKL
    c. ABCEIFJDGHKL
    d. ABCEIFDJGHLK

    Ans : c, Page no 240.Tenenbaum 1994 edition

115. The Inorder traversing of the tree gives the expression EICFJBGDKHLA. What is the postorder expression
    a. ICEBJFKDGLHA
    b. IEJFCGKLHDBA
    c. FJEILKGCBDHA
    d. EICFJBGDKHLA

    Ans : b, Page no 240.Tenenbaum 1994 edition

116.The Inorder traversing of the tree gives the expression EICFJBGDKHLA. What is the Preorder expression

a. ABCEIFJDGHKL
b. ABCIEFJDGKHL
c. ACBFIEJDGHKL
d. ABCEIFDJGHLK

Ans : a, Page no 240.Tenenbaum 1994 edition

117) Consider the following paragraph.
A tree is a data structure consisting of nodes connected to each other with references. Each node in a tree may be connected to one or two nodes. Each node contains one or more data fields and two references.

Which of the following is/are properly describing the above paragraph?

a. Multiway search Trees

b. Binary Trees

c. Binary Search Trees

d. General Trees

e. AVL trees

Ans) B
118)Consider the following rules.
Rule 1: **For Loop**: The running time of a **for** loop is at most the running time of the statements inside the **for** loop (including test) times the number of iterations
Rule 2 : **Nested Loop**: The total running time of a statement inside a group of nested loops is the running time of the statement multiplied by the product of the sizes of all the loops.
Rule 3 : **IF/ELSE** : For the fragment
if(condition)
S1
else
S2
the running time of an if/else statement is never more than the running time of the test plus the larger of the two numbers namely, the running time of S1 and that of S2.
Which of the following is a / are valid rule(s) in connection with analysis of algorithms?

a. Rule 3 only

b. Rule 1 and Rule 3 only

c. Rule 2 and Rule 3 only

d. Rule 2 only

e. All

Ans) E

119) Consider the following four statements with blank positions.
If one finds a node with a/an ……. (i)……, he should stop the trace at that point. Consider the node with imbalance and …….(ii)…….. on the layers immediately below this point on the path back to the new node.If these three nodes lie in a ……(iii)…… apply a …….(iv)…… rotation.If these three nodes lie in a dog-leg pattern (bend in the path), apply ……(v)……. rotation to correct the imbalance. The above sentences are in connection with insertion of new nodes in to an AVL tree.

Which of the following are correct words for the above blank positions?

a. (i)balance (ii)two nodes (iii) straight line (iv) single (v) double

b. (i)imbalance (ii)three nodes (iii) straight line (iv) single (v) double

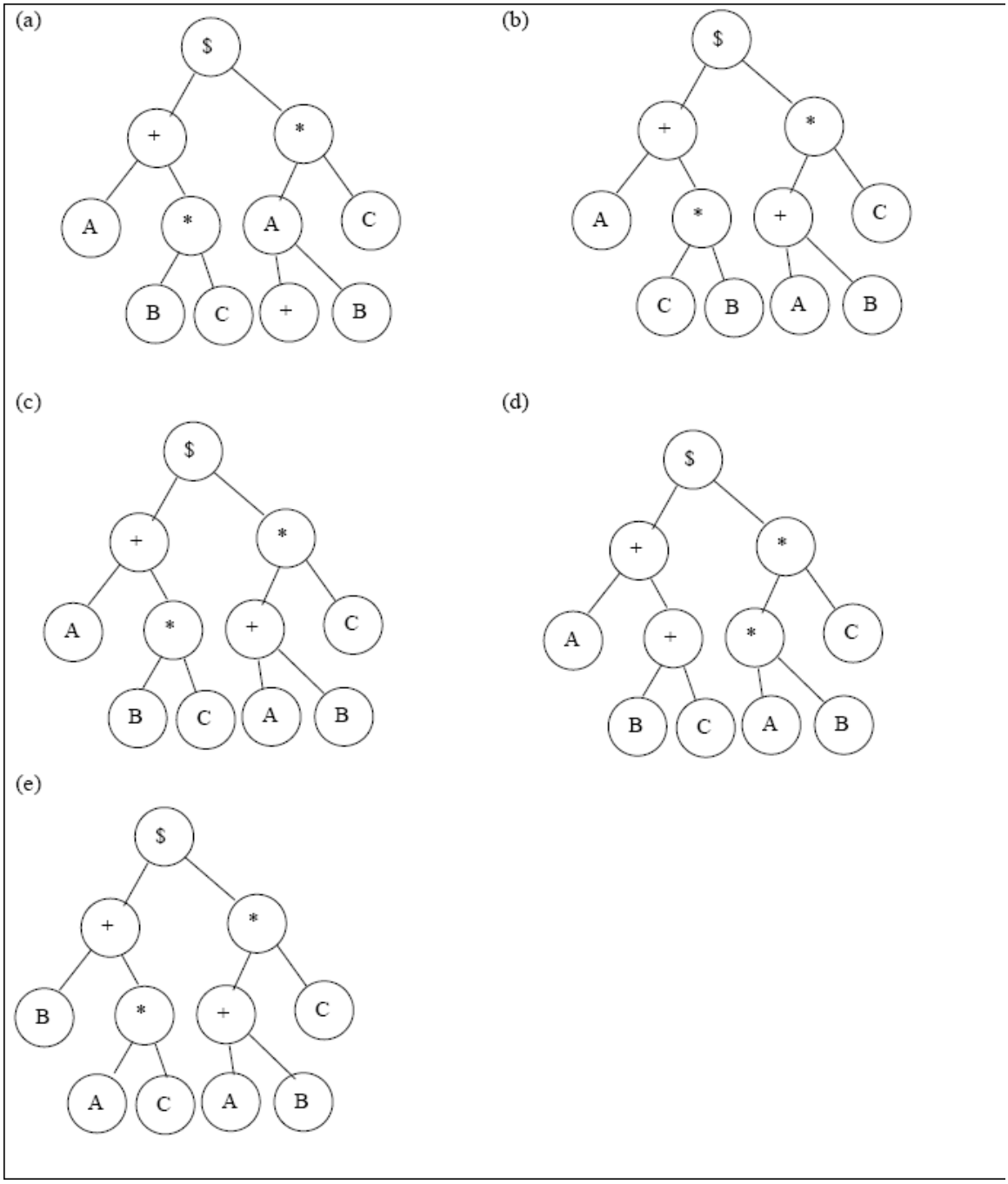
c. (i)imbalance (ii)two nodes (iii) dog-leg (iv) single (v) double

d. (i)imbalance (ii)two nodes (iii) straight line (iv) double (v) single

e. (i)imbalance (ii)two nodes (iii) straight line (iv) single (v) double

Ans) E

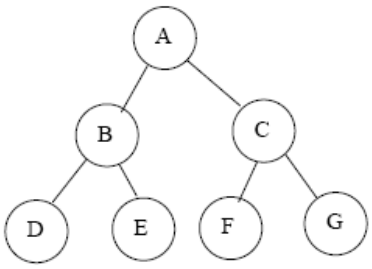
120) Consider the following expression.
(A+B*C)$((A+B)*C)
Which of the following trees show(s) the equivalent expression tree for the above expression? (Note: $ denotes power.)



Ans) C

121)

Consider the following AVL tree.



If one performs a left single rotation considering the Node A, what would be correct from among the following?

a. New root is Node C.

b. New root is Node B.

c. Node A's right child is Node F.

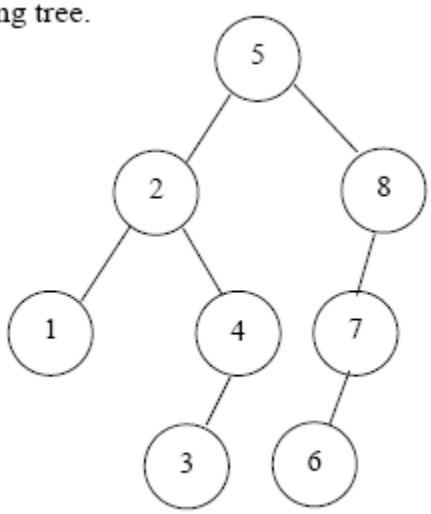
d. Node A's right child is Node C

e. Node G's left child and right child are null.

Ans)A, C, E

122)

Consider the following tree.



The above tree is a/an

a. AVL tree.

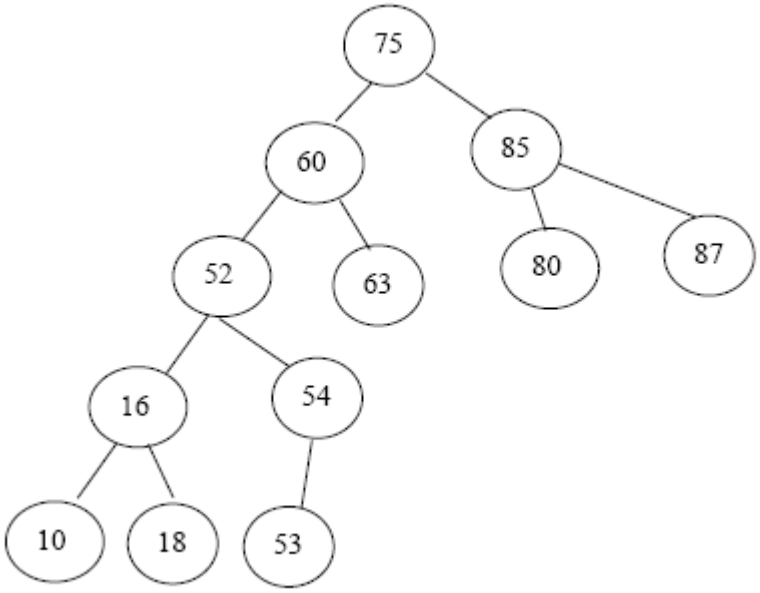
b. Binary Search Tree.

c. Binary Tree.

d. General Tree.

e. Multiway search Tree.

Ans) B, C



123) In above fig, if one wants to insert a new node p=55, what is the correct insertion point without violating the binary search property?

a. Right child of node number 18

b. Right child of node number 53

c. Left child of node number 63

d. Right child of node number 54

e. Left child of node number 54

Ans) D

124) In the above fig ,if one wants to insert a new node p= 84 after inserting the new node p=55, to the above tree, what is the correct insertion point without violating the binary search property?

a. Left child of node number 65

b. Left child of node number 63

c. Left child of node number 80

d. Right child of node number 63

e. Right child of node number 80

Ans) E

125) In the above fig ,if one wants to delete node number 60 from the tree after inserting the new node p=55 and thereafter another at p=84, what is/are the suitable replacing node(s) without violating the binary search properties?

a. Node number 63

b. Node number 54

c. Node number 52

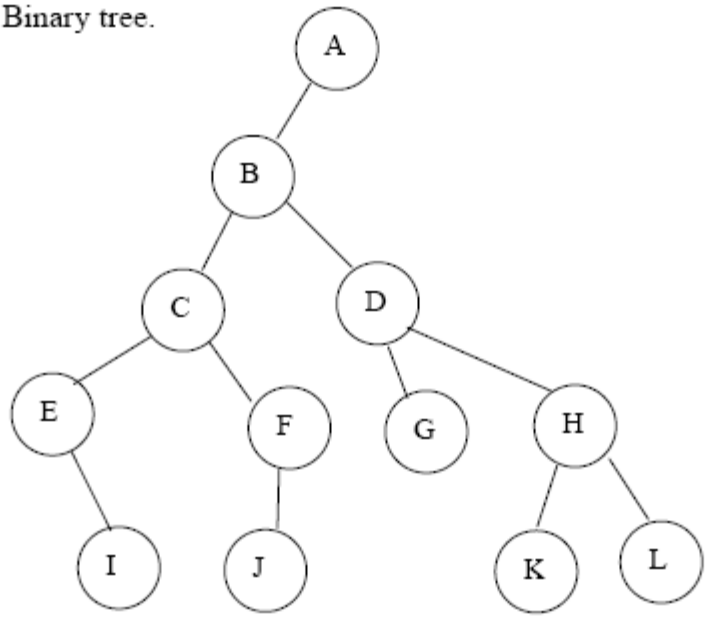
d. Node number 53

e. Node number 85

Ans) A

126)

Consider the following Binary tree.



Which of the following expressions shows the pre-order, in-order, post-order respectively of the above tree

a. ABCEIFJDHGKL, EICFJBGDKHLA, IEJFCGKLHDBA

b. ABCEIFJDGHKL, IEJFCGKLHDBA, EICFJBGDKHLA

c. ABCEIFJDGHKL, EICFJBGDKHLA, IEJFCGKLHDBA

d. EICFJBGDKHLA, ABCEIFJDGHKL, IEJFCGKLHDBA

e. ABCEIFJDGHKL, EICFJBGDKHAL, IEJFCGKLHDBA

Ans) C

NON LINEAR DATA STRUCTURES(TREES-2)

1. Consider a table represented as a Sorted Array and as an AVL tree. When retrieving a record, which representation is more efficient?

(a) Sorted Array
(b) AVL tree
(c) Both are same
(d) Data insufficient (data type is required)
(e) Data insufficient (number of entries required)
Ans : b

2. Tree traversal techniques are
Pre-order
In-order
Post-order
Which is the correct algorithm for above traversal techniques.

(a) Pre-order ->visit the root , traverse left sub tree, traverse the right sub tree
In-order -> traverse the left sub tree, visit the root, traverse the right sub tree.
Post-order -> traverse the left sub tree, traverse the right sub tree, visit the root.

(b) Pre-order- > visit the root, visit the left tree, visit the right sub tree
In-order -> visit the left sub tree, visit the right sub tree, visit the root
Post-order-> visit the left, visit the root, visit the right sub tree
(c) Pre-order -> traverse the left sub tree in pre-order, visit the root, traverse the right sub tree in pre-order
In-order -> visit the root, Traverse the left sub tree in in-order , traverse the right sub tree in in-order.
Post –order-> traverse the left sub tree in post–order, traverse the right sub tree in post-order, visit the root
(d) Pre-order -> traverse the left sub tree in pre-order, visit the root, traverse the right sub tree in pre-order
In-order -> visit the root, Traverse the left sub tree in in-order, traverse the right sub tree in in-order.
Post –order-> traverse the left sub tree in pre–order, traverse the right sub tree in in-order, visit the root

(e) None of these

Ans : e

3. Which of the following statements(s) describes a tree
(a) Each node in the binary tree can have at most 2 children.
(b) If every non leaf node in a binary tree has only one non empty left or right sub tree, the tree is termed as a strictly B-tree.
(c) If number of levels is equal to 3, then total number of nodes equal to 15.
(d) A tree is an almost complete B-tree if and only if, each leaf in the tree is either last level or level-1.
(e) Proper ancestor is defined as a node without itself.

Ans : a, e

4. What is the difference between Binary AVL trees and Balanced AVL trees?

(a) Each node in the Binary tree can have almost 2 sub-trees and each node in the Balanced AVL tree can have many sub-trees.
(b) Binary Trees: Root value is always less than or equal to its left sub tree value and greater than or equal to its right sub-tree value.
Balanced AVL Trees: Root value is always less than its left sub tree value and grater than or equal to its right sub-tree value.
(c) Binary Trees:Balance factor must be 0.
Balanced AVL – Trees:Balance factor should be –2,-1,0,+1 and +2
(d) Binary Trees: Each node can have almost two sub-trees
Balanced ALV – Trees: Each node can have almost two sub-trees, parent value always less than or equal to its left sub tree values and grater than or equal to its right sub tree values. Balance factor should be -1, 0, +1
(e) No suitable answer

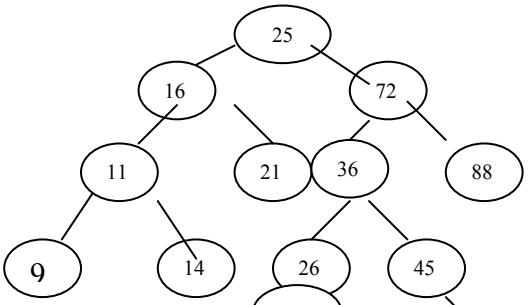
Ans : e

5. Which of the following statement(s) is/are related to trees
(a) The total number of nodes in a tree is called its degree.
(b) Children of the same parent is said to be siblings
(c) The length of a path is one less than the no. of nodes in the path
(d) The height of a node in a tree is the length of the longest path from the node to leaf
(e) The depth of a tree is the maximum levels of any leaf in a tree
Ans : b, c, d, e

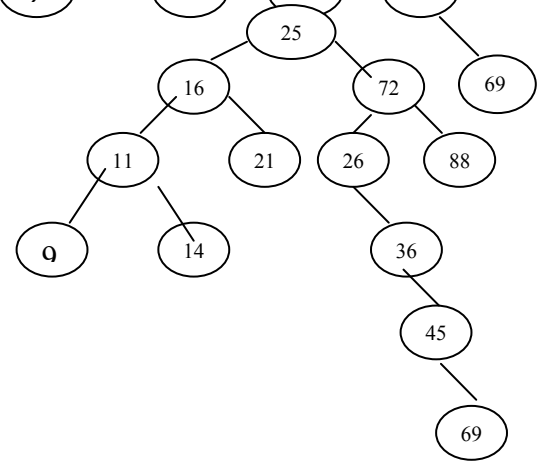
6. What would be the output if we enter the following data set (in the respective order) into a standard program to construct a Binary search tree?

25, 72, 16, 11, 88, 26, 9, 36, 21, 45, 14, 69

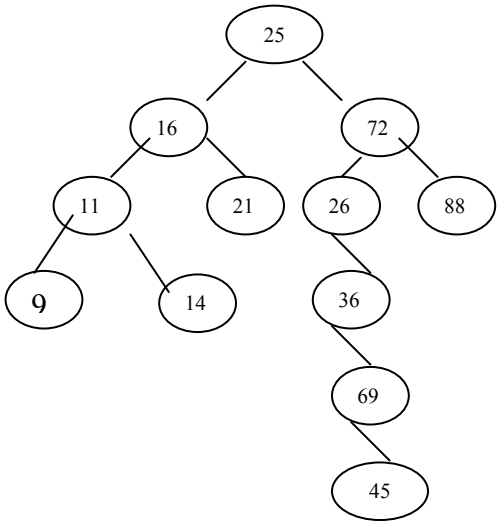
(a)


25
16
72
11
21
36
88
9
14
26
45

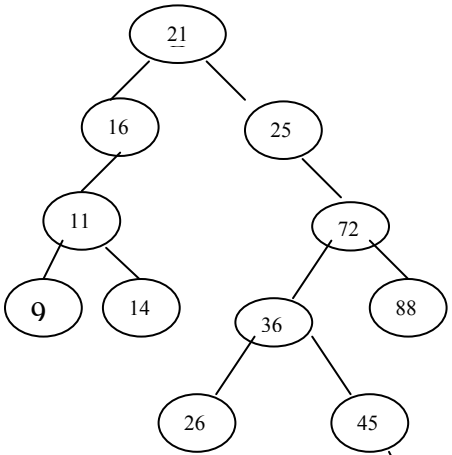
(b)


25
16
72
69
11
21
26
88
9
14
36
45
69

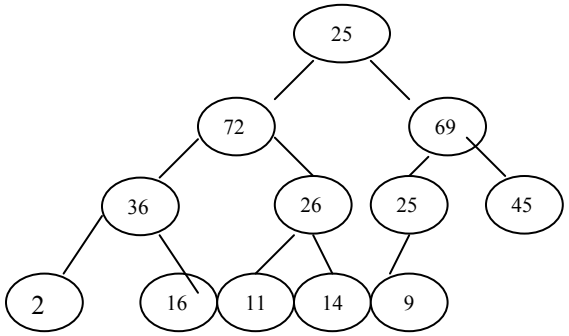
(c)


25
16
72
11
21
26
88
9
14
36
69
45

(d)


21
16
25
11
72
9
14
36
88
26
45

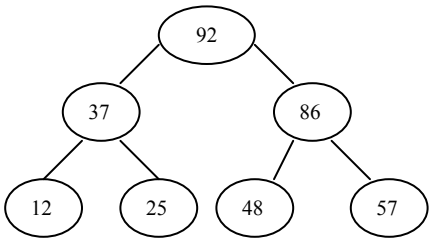
(e)



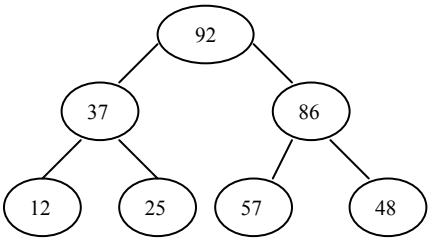
Ans : b

7. Create a heap using a following set of integers 25,57,48,37,12,92,86. The final heap is

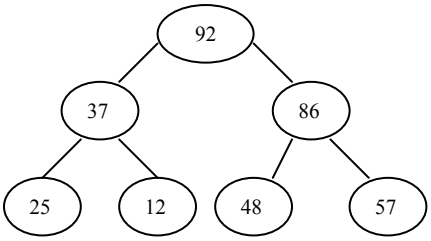
(a) .



(b)

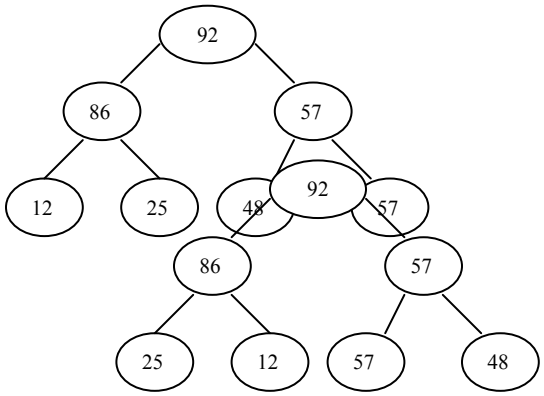


(c) .



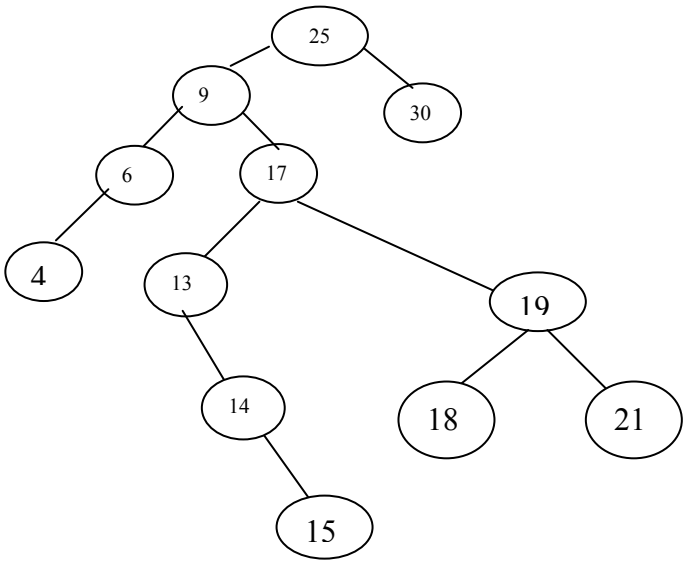
d)

(e)



Ans : c

8.



After deleting node number 17 of the above binary search tree, the resulting tree will be

(a) It is impossible to delete middle nodes in binary search tree
(b) Deleted node can be replaced by node number 19
(c) Deleted node can be replaced by node number 18
(d) Deleted node can be replaced by node number 15.

(e) Deleted nodes can be replaced by node number 13.

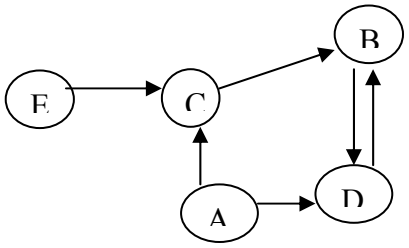
Ans : c,d

9. Consider the set of Integers given below,
   10, 20, 30, 25, 27, 7, 4, 23, 26, 21
   How many
   (i) Single rotations
   (ii) Double rotations do you need to construct a fully balanced AVL tree?

   (a) (i) 3 (ii) 0
   (b) (i) 3 (ii) 1
   (c) (i) 1 (ii) 2
   (d) (i) 0 (ii) 3
   (e) (i) 1 (ii) 1

   Ans : b

10. Consider the following directed graph



When the path of length is equal to 5, path matrix is

(a)

	A	B	C	D	E
A	0	0	0	1	1
B	0	0	0	1	1
C	0	0	0	1	1
D	0	0	0	1	0
E	0	0	0	0	1

(b)

	A	B	C	D	E
A	0	0	1	1	1
B	0	0	1	1	1
C	0	0	0	1	1
D	0	0	0	1	1
E	0	0	0	1	1

(c)

	A	B	C	D	E
A	0	0	1	0	1
B	0	0	1	1	1
C	0	0	0	1	1
D	0	0	0	1	1
E	0	0	0	1	1

(d)

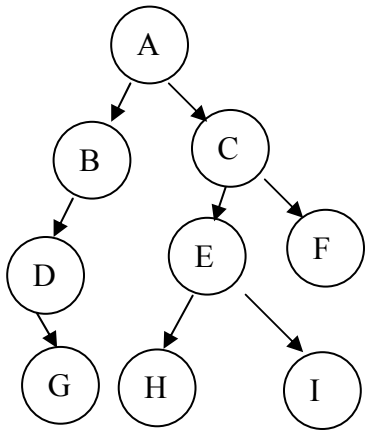
	A	B	C	D	E
A	0	1	1	1	0
B	0	1	0	1	0
C	0	1	0	1	0
D	0	1	0	1	0
E	0	1	1	1	0

(e)

	A	B	C	D	E
A	1	1	0	1	1
B	1	1	0	1	1
C	1	0	0	1	1
D	0	0	1	0	1
E	0	0	1	0	1

Ans : d

11.Consider the Binary tree given below.



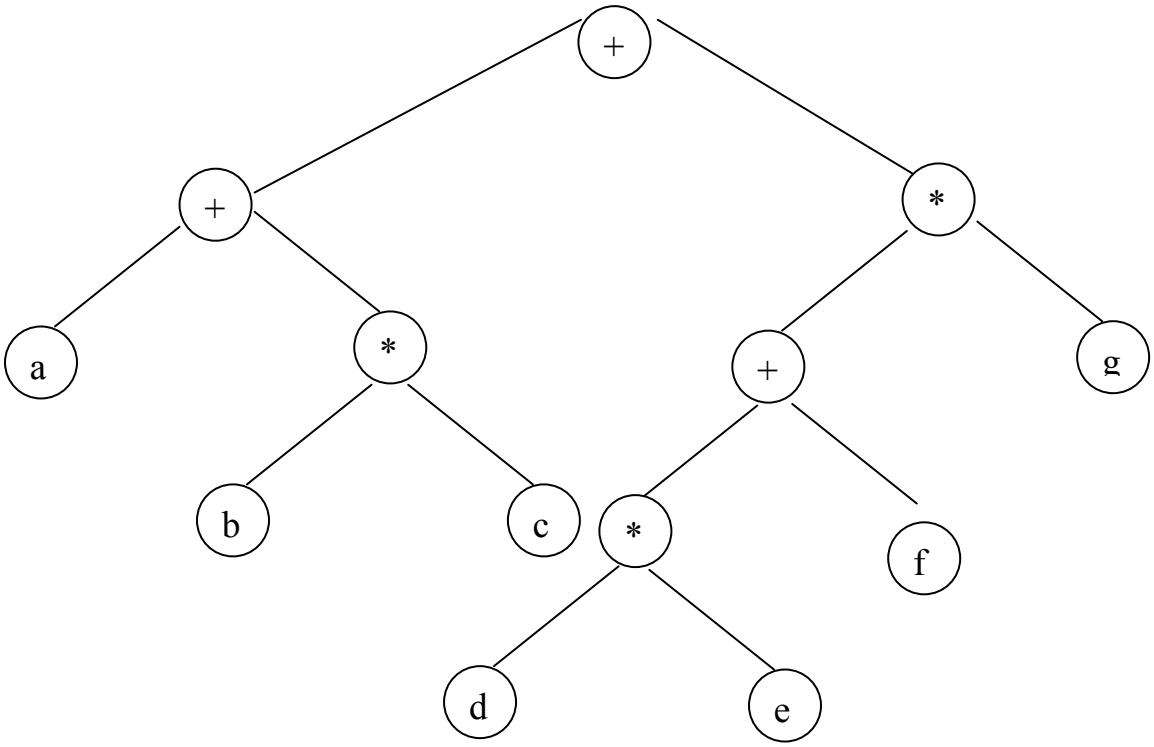
What is the order of nodes of tree if traverse in the following sequence?
Pre order

In order
Post order

(a) ABDGCEHIF, ADGBAHEICF, AGDBHIEFC
(b) ABDGCEHIF, DGBAHEICF, GDBHIEFCA
(c) ABDGCEHIF, DGBAHEICF, GDBIHECFA
(d) GDBAHECIF, DGBAHEICF, AGDBHIEFC
(e) ABDSCEHIF, DGBAHEICF, ASDBHIEFC

Ans : b

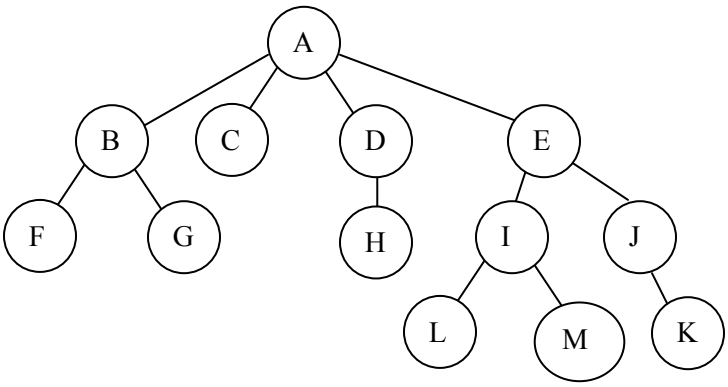
12. Which expression describes the pre-order traversal expression of the following tree.



(a) (a+(b*c))+(((d*e)+f)*g)
(b) abc*+de*f+g*+
(c) ++a*bc*+*defg
(d) (a+b*c)+((d*e+f)*g)
(e) None of these

Ans : a

13. Consider the following tree.



The following are (iv) statements about the above tree.

(i) Depth of the above tree is equal to 4.
(ii) Height of the above tree is equal to 3.
(iii) There is only one sibling belonging to Node B.
(iv) The proper ancestors of I are L and M only.
Which one of the following is correct in respect of the above statements?

(a) (i) and (iii) only
(b) (i), (ii) and (iii) only
(c) (iii) only
(d) (ii) only
(e) None of these

Ans : d

14.Consider the following (iv) statements.

(i) A binary tree can contain at least 2L Nodes at level L.
(ii) A complete binary tree of depth d is a binary tree that contains 2L Nodes at each level L between 0 and d, both inclusive.
(iii) The total number of nodes (Tn) in a complete binary tree of depth d is 2 d+1 - 1 .
(iv) The height of the complete binary tree can be written as h = log 2 (Tn+1)-1 where Tn is Total number of Nodes.

Which one of the following is correct in respect of the above statements regarding the Binary trees?

(a) (i) and (iii) only
(b) (i), (ii) and (iii) only

(c) (ii) and (iii) only
(d) (ii), (iii) and (iv) only
(e) All of these

Ans : d

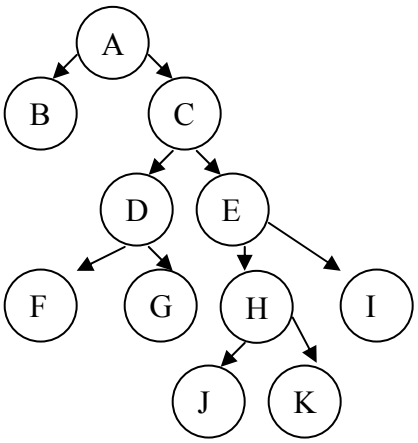
15. Consider the following four (iv) statements:
(i) Trees are used to implement the file systems in several operating systems.
(ii) Trees are used to organize information in the database systems and to represent the syntactic structure of source program in compiler.
(iii) Trees can be used to evaluate arithmetic expressions.
(iv) Trees are used to help analyse electrical circuits.

Which of the following is/are correct in respect of the above statements regarding the trees?

(a) (i), (ii) and (iii) only
(b) (i) and (iii) only
(c) (i) and (ii) only
(d) (i), (ii) and (iv) only
(e) All of these

Ans :e

16. Consider the following tree and the four (iv) statements which follow:



The above tree is a …… (i) …… tree.
Node H's parent node is …… (ii) …….
Node F's sibling(s) is/are …… (iii) …….
Node E's proper ancestor(s) is/are …… (iv) …….

Which of the following are correct answers for the blank positions?

(a) (i) AVL (ii) E (iii) F,G,H,I (iv) H,I,J,K
(b) (i) Binary (ii) E (iii) G (iv) H,I,J,K
(c) (i) Binary (ii) E (iii) G (iv) C, A
(d) (i) AVL (ii) E (iii) G (iv) C, A
(e) (i) Binary (ii) E (iii) G,H,I (iv) C,A

Ans : c

17.Consider the following four (iv) statements:
(i) A binary tree can contain at most 2L nodes at level L.
(ii) A binary search tree node should have at least three data fields.
(iii) The balance factor of an AVL must have –1,0 or 1 at any node.
(iv) A tree must be a graph.

Which of the above is/are true?

(a) (i), (ii) and (iv) only
(b) (i), (ii) and (iii) only
(c) (i) and (iv) only
(d) (i), (iii) and (iv) only
(e) All of these

Ans :d

18.Consider the following sequence of six (vi) instructions:

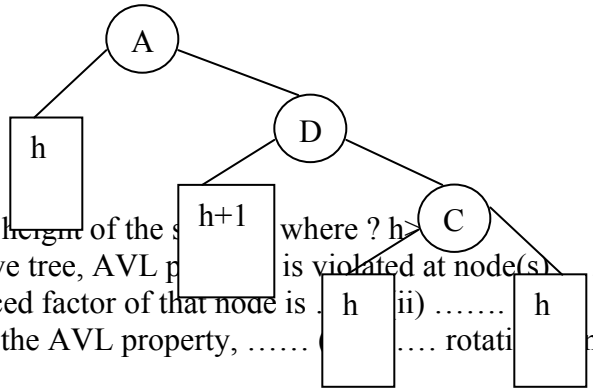
(i) Insert a node in the same way as in an ordinary binary search tree.
(ii) Beginning with the new node, trace a path back towards the root, checking the difference in height of the two subtrees at each node along the way.
(iii) If one finds a new node with an imbalance, the trace at this point is stopped.
(iv) Consider the node with the imbalance and the two nodes on the layers immediately below this point on the path back to the new node.
(v) If these three nodes lie in a straight line, apply a single rotation to correct the imbalance.
(vi) If these three nodes lie in a dog-leg pattern (that is, there is a bend in the path), apply a double rotation to correct the imbalance.

What is the above pseudo code algorithm intended to do?

(a) Inserting a new node into an AVL tree.
(b) Deleting a node from an AVL tree.
(c) Structural modification of a heap.
(d) Elimination of imbalance of an AVL tree.
(e) Construction of an AVL tree.

Ans :a,e

19.Consider the following tree and the statements that follow:



(Note: h = height of the s where ? h>
In the above tree, AVL p is violated at node(s) … (i) …….
The balanced factor of that node is . ii) ……. .
To restore the AVL property, …… …. rotati eeded.

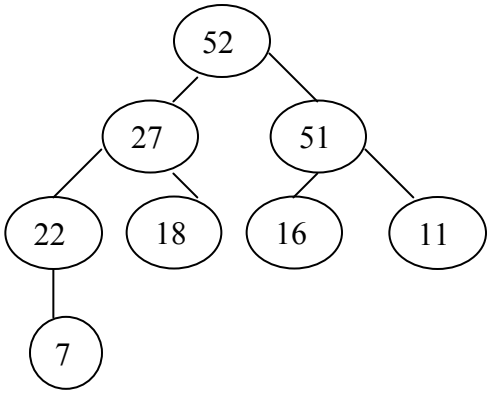
Which of the following are the correct terms for the blank positions?

(a) (i) D (ii) 3 (iii) double
(b) (i) A (ii) 2 (iii) single
(c) (i) C (ii) 2 (iii) single
(d) (i) A (ii) 2 (iii) double
(e) (i) D (ii) 2 (iii) single

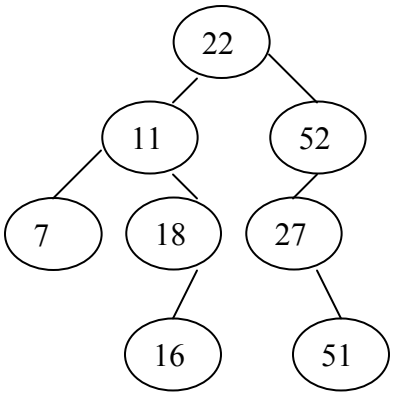
Ans : b

20. {22,11,18,52,16,27,51,7} is a set of 8 integers.
If the binary search tree is created using the above set of integers, what will the resulting tree be?

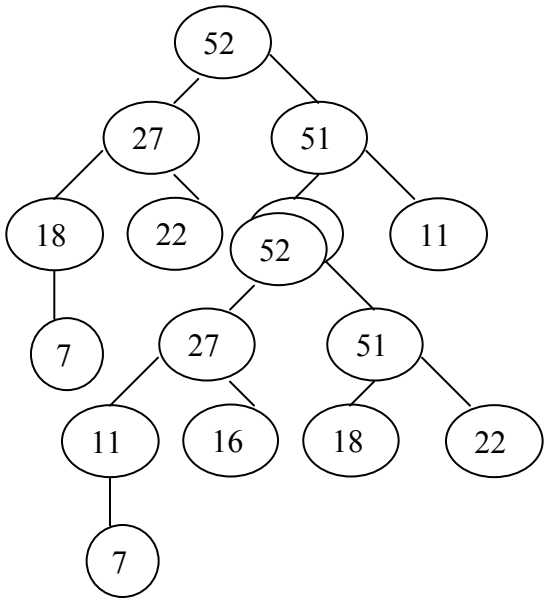
(a)



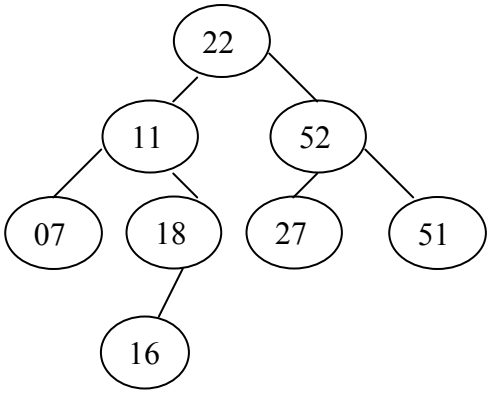
(b)



(c)



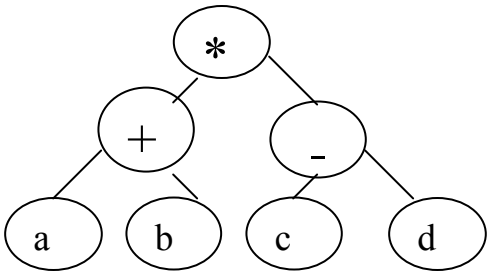
(d)



(e)

Ans :b

21.Consider the following expression tree:



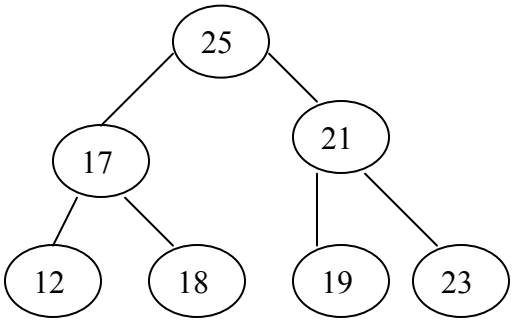
What is the equivalent expression for the above tree?

(a) ab+cd-*
(b) *+-abcd
(c)ab+*cd-
(d) (ab+)*(cd-)
(e) (a+b)*(c-d)

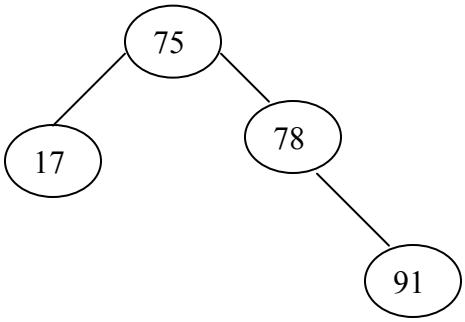
Ans :e

22.Consider the following four (iv) trees:

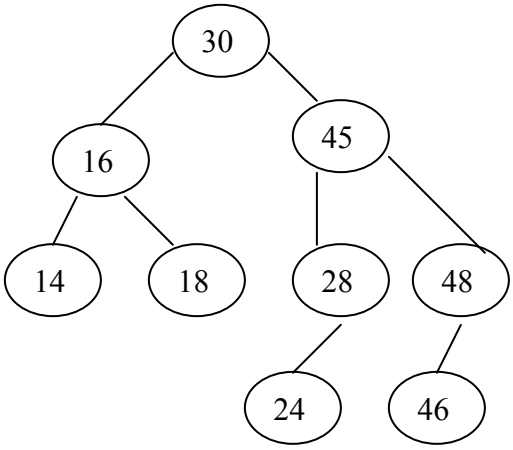
(i)



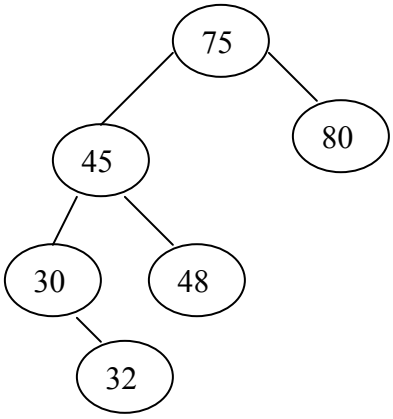
(ii)



(iii)



(iv)



Which of the following is an/are AVL (Adelson-Velsky-Landis) tree(s)?

(a) (i) and (iii)only
(b) (i), (ii) and (iii) only
(c) (i) and (ii) only

(d) (ii) only
(e) (i), (ii) and (iv) only

Ans :d

23. Consider the following statements:
(i) In a max heap, the value of each non-leaf node is strictly less than the values of its children.
(ii) A binary heap is a complete binary tree.
(iii) All complete binary trees are heaps.
Which of the above statement(s) is/are correct?

(a) (i) only
(b) (ii) only
(c) (iii) only
(d) (i) and (ii) only
(e) (ii) and (iii) only

Ans :b

24.Which of the following arrays represent descending (max) heaps?

(a) [10,7,7,2,4,6]
(b) [10,7,6,2,4,7]
(c) [10]
(d) [10,6,7,2,4,6]
(e) [6,6,7,2,4,10]

Ans :a,c,d

25.Which of the following statement(s) is/are correct in relation to AVL trees?

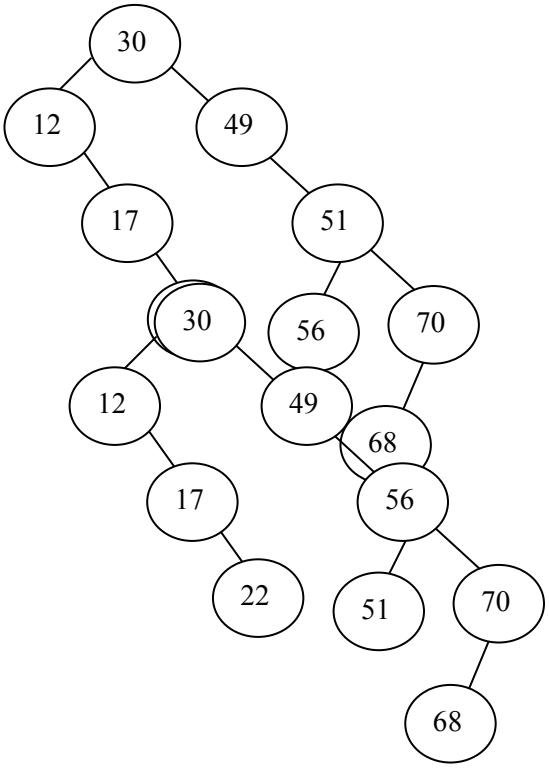
(a) If three nodes lie in a straight line, a double rotation is needed to restore the balance.
(b) If three nodes lie in a straight line, a single rotation is needed to restore the balance.
(c) If three nodes lie in a dog-leg pattern (that is, there is a bend in the path), you need to perform a double rotation to restore the balance.
(d) If three nodes lie in a dog-leg pattern (that is, there is a bend in the path), you need to perform a single rotation twice to restore the balance.
(e) A single rotation involves shifting the middle node up to replace the top node and the top node down to becomes the left child of the middle node.

Ans : b,c

26. {30, 12, 17, 49, 22, 65, 51, 56, 70, 68} is a set of 10 integers.

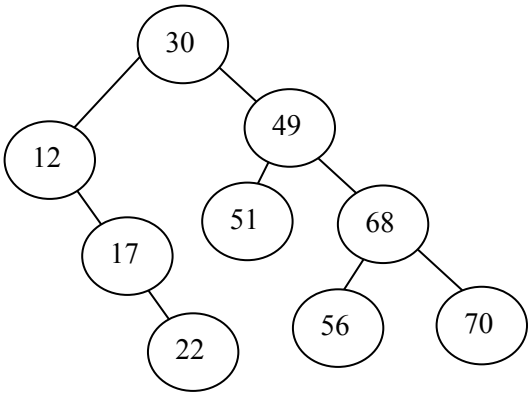
Create a Binary search tree using the above set of integers. After deleting node number 65 of the above created binary search tree, the resulting tree(s) will be

(a)

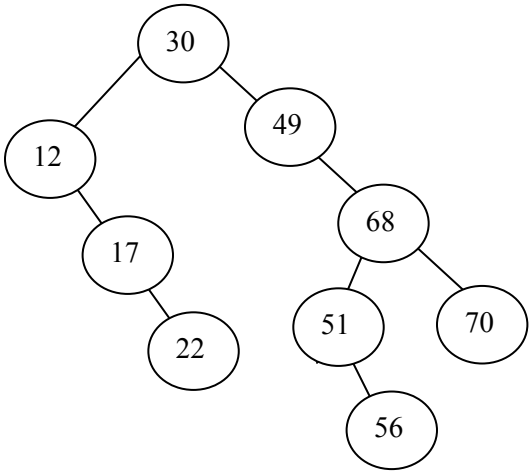


(b)

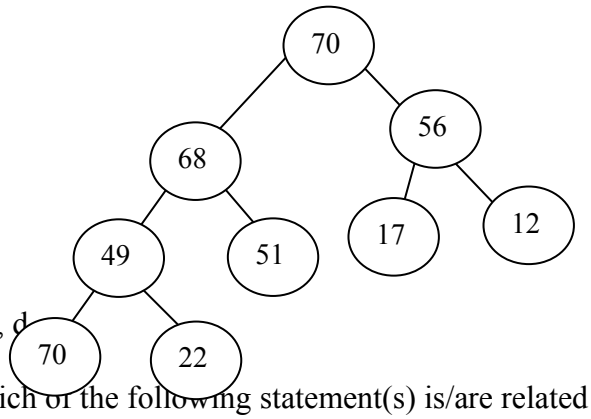
(c)



(d)



(e)



Ans : b, d

27. Which of the following statement(s) is/are related to deleting nodes from a binary search tree?

(a) The node to be deleted has no sons; the node can be deleted with very few adjustments to the tree.
(b) The node to be deleted has no sons; the node can be deleted without any adjustment. Delete the leaf node and set reference from its parent to null reference.
(c) The node to be deleted has two sub-trees. The method to be used is to replace the node being deleted by the rightmost child of its left sub-tree.
(d) The node to be deleted has two sub-trees. The method to be used is to replace the node being deleted by the leftmost child of its right sub-tree.
(e) The node to be deleted has one sub-tree; its only son can be moved up to take its place.

Ans : b, c, d, e

28. Consider the following (iv) statements.
(i) A given B-tree is a multi-way search tree with a maximum of M branches at each Node. The number M is called the order of the tree.
(ii) There is a single root node, which may have, as few as two children or none at all if the root is the only node in the tree.
(iii) At all Nodes, except at the root and leaf nodes there must be at least half the maximum number of children.
(iv) All leaves are on the same level.
Which one of the following is correct for the multi-way search trees?

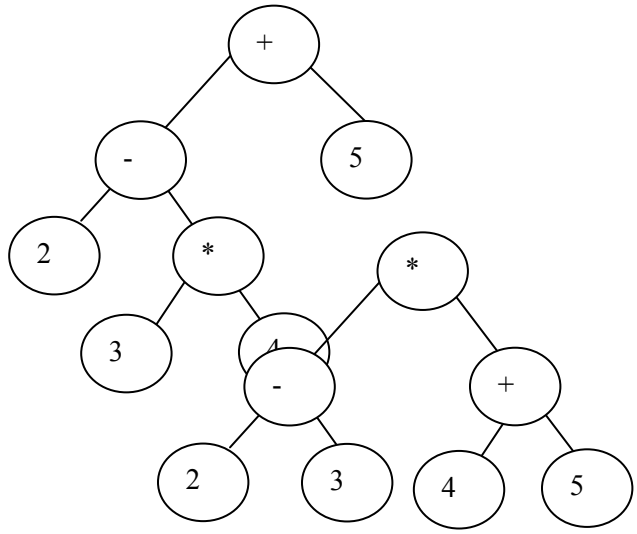
(a) (i), (iii) only.
(b) (ii), (iii) only.
(c) (i), (ii), (iii) only.
(d) All of these.
(e) None of these.

Ans : d

29.Consider the two expression trees given below.

(i)

(ii)



What is the order of nodes of tree if traverse in the following sequence Pre-order, In-order, Post-order?

(a) (i) + - 2 * 345, 234 * -5 +, 2-3 * 4 + 5
(ii) * - 23 + 45, 23 – 45 + *, 2-3 * 4 + 5

(b) (i) + - 2 * 345, 2 –3 * 4 + 5, 234 * - 5 +
(ii) * - 23 + 45, 2 – 3 * 4 + 5, 23 – 45 + *

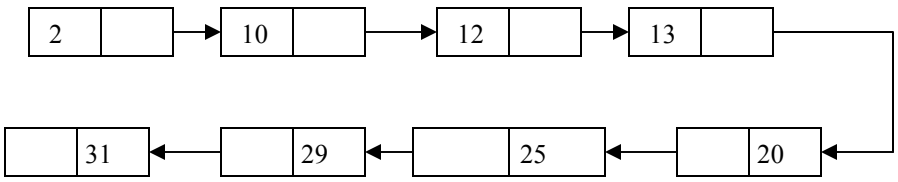
(c) (i) 234 * - 5 +, 2 – 3 * 4 + 5, + - 2 * 345
(ii) 23 – 45 + *, 2-3 * 4 + 5, * - 23 + 45

(d) (i) 3 * 4 – 2+5, 2 – 3 * 4 + 5, 234 * - 5 +
(ii) 23 – 45 + *, -*23 + 45, 2 – 3 * 4 + 5

(e) (i) -+ 2 * 345, 2 –3 * 4 + 5, 234 * - 5 +
(ii) -* 23 + 45, 2 – 3 * 4 + 5, 23 – 45 + *

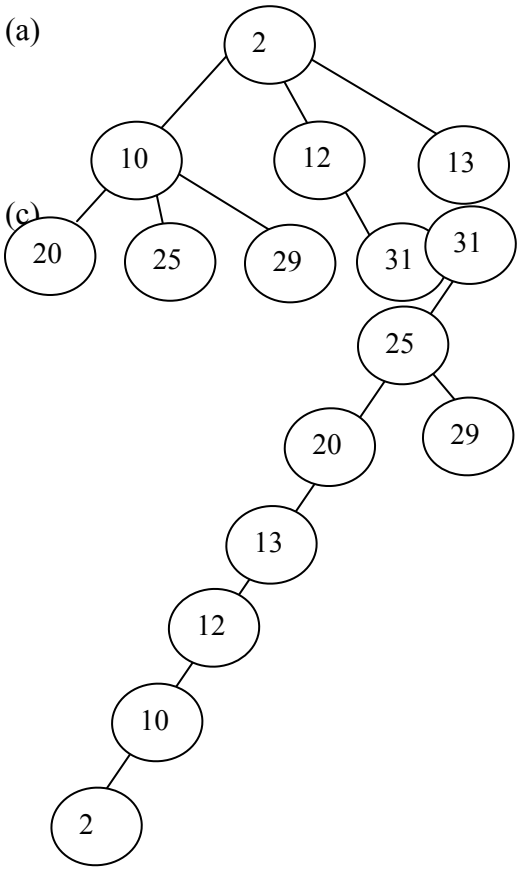
Ans : b

30.Consider the linked list given bellow.

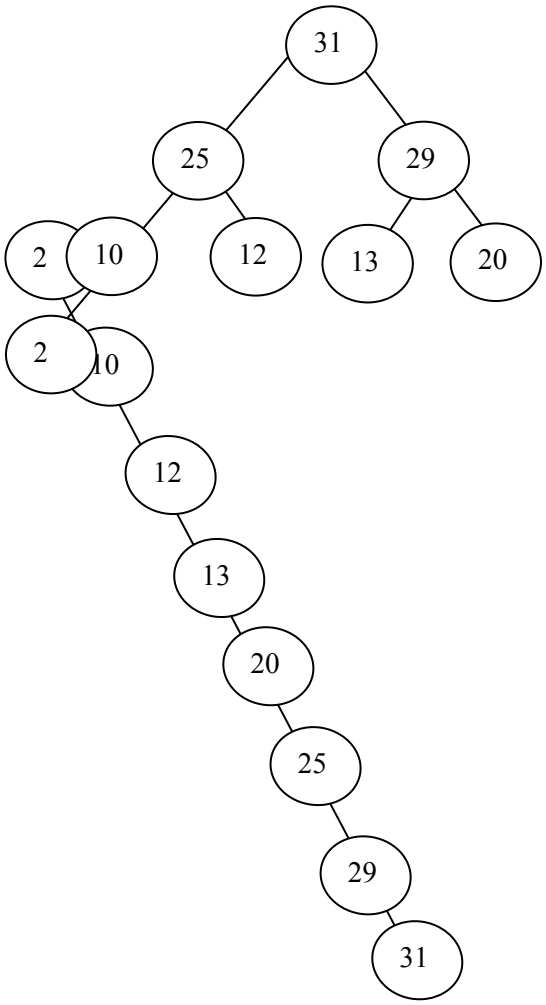


If the above linked list is transformed into a binary search tree, the resulting tree will be

(a)



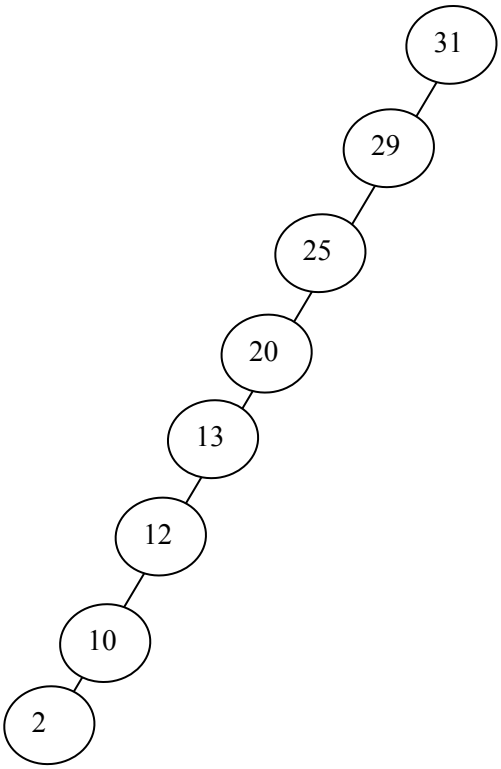
(b)



(c)

(d)

(e)



Ans : d

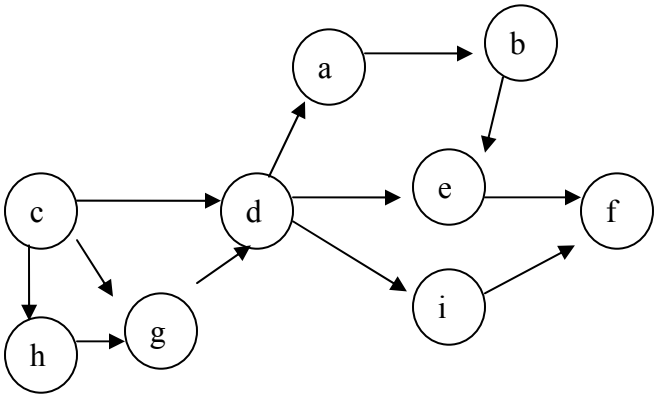
31. Consider the following pseudo code.

```
void PQR(Vertex v)
{ v.visited = true ;
  For each w adjacent to v
     if (!w.visited)
       PQR(w); }
```

Which of the following is/are it intended to do?
(a) Finding the adjacency matrix.
(b) Depth first traversal.
(c) Finding the path matrix.
(d) Breadth first traversal.
(e) Calculating the shortest path.

Ans : b

32. Consider the following directed graph.



The adjacency matrix of the above graph is

(a)

	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**
a	F	T	F	F	F	F	F	F	F
b	F	F	F	F	T	F	F	F	F
c	F	F	F	T	F	F	T	T	F
d	T	F	F	F	T	F	F	F	T
e	F	F	F	F	F	T	F	F	F
f	F	F	F	F	F	F	F	F	F
g	F	F	F	F	F	F	F	F	F
h	F	F	F	F	F	F	T	F	F

(b)

	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**
a	F	T	F	F	F	F	F	F	F
b	F	F	F	F	T	F	F	F	F
c	F	F	F	T	F	F	T	T	F
d	T	F	F	F	T	F	F	F	T
e	F	F	F	F	F	T	F	F	F
f	F	F	F	F	F	F	F	F	F
g	F	F	F	T	F	F	F	F	F
h	F	F	F	F	F	F	T	F	F
i	F	F	F	F	F	T	F	F	F

(c)

	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**
a	F	T	F	F	F	F	F	F	F
b	F	F	F	F	T	F	F	F	F
c	F	F	F	T	F	F	T	F	F
d	T	F	F	F	T	F	F	F	T
e	F	F	F	F	F	T	F	F	F
f	F	F	F	F	F	F	F	F	F
g	F	F	F	T	F	F	F	F	F
h	F	F	F	F	F	F	T	F	F
i	F	F	F	F	F	T	F	F	F

(d)

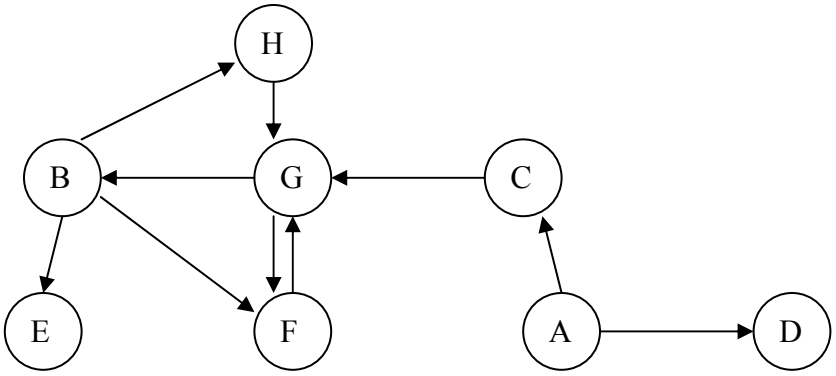
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**
a	F	T	F	F	F	F	F	F	F
b	F	F	F	F	T	F	F	F	F
c	F	F	F	T	F	F	T	F	F
d	T	F	F	F	T	F	F	F	T
e	F	F	F	F	F	T	F	F	F
f	F	F	F	F	F	F	F	F	F
g	F	F	F	T	F	F	F	F	F
h	F	F	F	F	F	F	T	F	F
i	F	F	F	F	F	T	F	F	F

(e)

	a	b	c	d	e	f	g	h	i
a	F	T	F	F	F	F	F	F	F
b	F	F	F	F	T	F	F	F	F
c	F	F	F	F	T	F	T	T	F
d	T	F	F	F	T	F	F	F	T
e	F	F	F	F	F	F	F	F	F
f	T	F	F	F	F	F	F	F	F
g	F	F	F	F	F	T	F	F	F
h	F	F	T	F	F	F	F	F	F
i	F	F	F	F	F	F	F	T	F

Ans : b

33. Consider the following directed graph.



The transitive closure of the above directed graph is

(a)

	A	B	C	D	E	F	G	H
A	0	0	1	1	0	0	0	1
B	0	0	0	0	1	1	0	1
C	0	0	0	0	0	0	1	1
D	0	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0	0
F	0	0	0	0	0	0	1	1
G	0	1	0	0	0	1	0	1
H	0	1	0	0	1	1	1	1

(b)

	A	B	C	D	E	F	G	H
A	0	1	1	1	0	1	1	1
B	0	1	0	0	1	1	1	1
C	0	1	0	0	1	1	1	1
D	0	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0	0
F	0	1	0	0	1	1	1	1
G	0	1	0	0	1	1	1	1
H	0	1	0	0	1	1	1	1

(c)

	A	B	C	D	E	F	G	H
A	0	1	1	1	1	1	1	1
B	0	1	0	0	1	1	1	1
C	0	1	0	0	1	1	1	1
D	0	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0	0
F	0	1	1	0	1	1	1	1
G	0	1	0	0	1	1	1	1
H	0	1	0	0	1	1	1	1

(d)

	A	B	C	D	E	F	G	H
A	0	1	1	1	1	1	1	1
B	0	1	0	0	1	1	1	1
C	0	1	0	0	1	1	1	1
D	0	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0	0
F	0	1	0	0	1	1	1	1
G	0	1	0	0	1	1	1	1
H	0	1	0	0	1	1	1	1

(e)

	A	B	C	D	E	F	G	H
A	0	1	1	1	1	1	1	1
B	0	1	0	0	1	1	1	1
C	0	1	0	0	1	1	1	1
D	0	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0	0
F	0	1	0	0	1	1	1	1
G	0	1	1	0	1	1	1	1
H	0	1	0	0	1	1	1	1

Ans : d

34. We store n values in a data structure. Which of the data structures below

GUARANTEES a worst case search time less than O(n)?
a) Complete tree
b) Binary search tree
c) heap
d) hash table
e) AVL tree
Ans : e

36. Given the following binary search tree, A:
Which of the following sequences represents a preorder traversal of a binary search tree, B which is obtained by first removing 60 from A, and then inserting 60 back into the resulting tree:
a) 70 40 20 30 80 60 90
b) 70 30 40 60 20 80 90
c) 70 40 20 30 60 80 90
d) 70 30 20 40 60 80 90
e) none of the above
Ans : d

37. We are designing a data structure for a library which holds *n* authors with an average of *k* books per author. The books are stored first by author, and then by title. That is, for each author there is a secondary data structure where that author's books are stored by title. Which of the following data structures would result in an average cost of O(log n)+O(log k) for the **insertion** of a new book (which could have a new author) ?
a) author : sorted array, books : AVL
b) author : unsorted array, books : AVL
c) author : hash table, books : sorted array
d) author : binary search tree, books : sorted array
e) author : AVL tree, books : AVL tree
ans : e

38. We are designing a data structure for a library which holds n authors with an average of k books per author. The books are stored first by author, and then by title. That is, for each author there is a secondary data structure where that author's books are stored by title. Which of the following data structures would result in an average cost of O(log n)+O(log k) **to find** a book ?
a) author : sorted array, books : AVL
b) author : unsorted array, books : AVL
c) author : hash table, books : sorted array
d) author : binary search tree, books : hash table
e) author : binary search tree, books : hash table

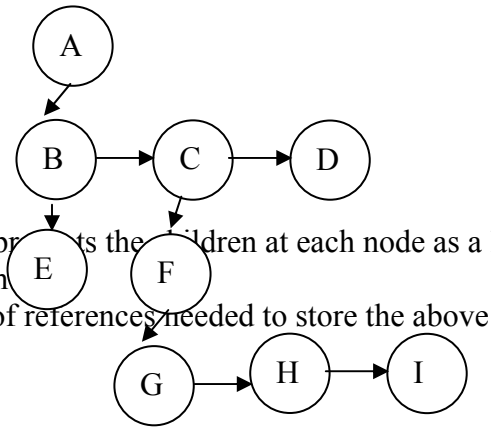
Ans : a

39.Which of the following traversals of a 2-4 tree would result in the values being visited

in decreasing order:
a) Left, parent, right
b) Parent, right, left
c) Parent, left, right
d) Right, left, parent
e) Right, parent, left

Ans : e

40. Consider the following tree :



If one represents the children at each node as a linked list tree node, what would be the minimum number of references needed to store the above tree?

(a) 0
(b) 1
(c) 2
(d) 3
(e) Depends on the number of children in each node. 9) Consider the following program segment:

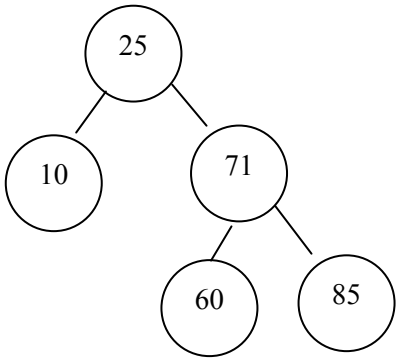
Ans : c

41. Which of the following access methods and their definitions are not related and not correct in connection with Binary trees?
(a) LeftChild(v) :- Return the left child of v, an error condition occurs, if v is an external node.
(b) LeftChild(v) :- Return the left child of v, an error condition occurs, if v is an internal node.
(c) Sibling(v) :- Return the sibling v, an error condition occurs, if v is the root.
(d)) RightChild(v) :- Return the left child of v, an error condition occurs, if v is an external node.
(e) RightChild(v) :- Return the right child of v, an error condition occurs, if v is an external node.

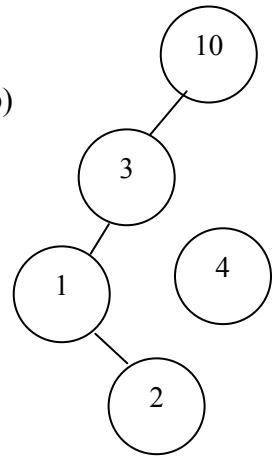
Ans : b,d

42. Which of the following is/are not (an) AVL tree(s)?

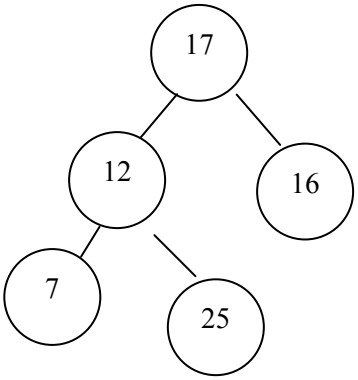
(a)



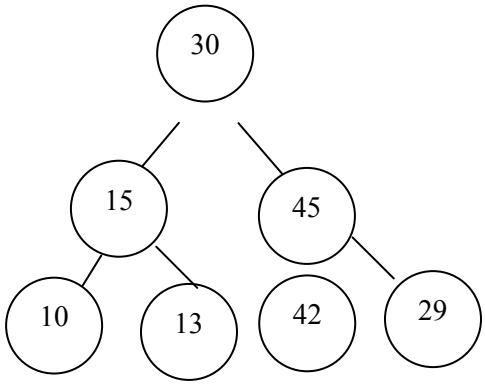
b)



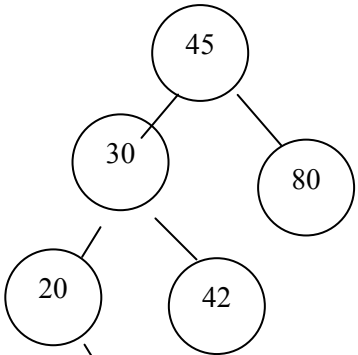
c)



d)



e)



Ans : b, c, d, e

43. Let T be a (proper) binary tree with n nodes, and let h denote the height of T. Consider the following properties of T.
(i)The number of external nodes in T is at least h+1 and at most 2h
(ii)The number of internal nodes in T is at least h and at most 2h –1.
(iii) The total number of nodes in T is at least 2h+1 and at most 2h+1 – 1

Which of the above is valid in connection with (proper) binary trees?
(a) (i) only
(b) (i) and (ii) only
(c)(ii) and (iii) only
(d) (iii) only
(e) All of these

Ans : e

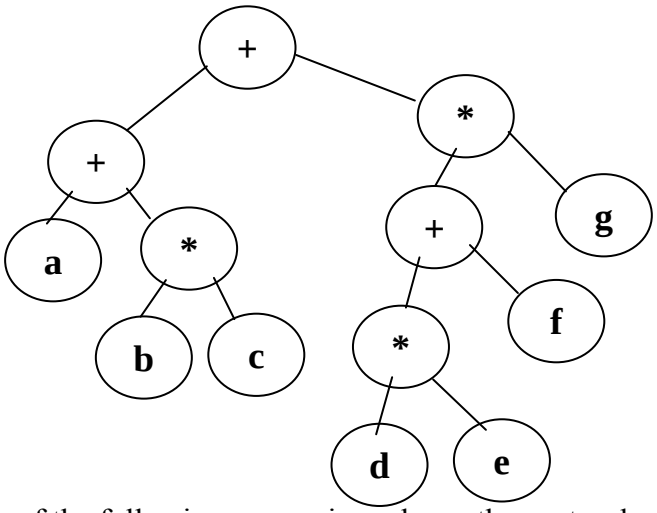
44. The following incomplete paragraph with five blanks is related to trees:

If node u is the parent of node v, then we say that v is a …..(i)..… of u. Two nodes which are children of the same parent are ……(ii)…….. A node is ……(iii)……if it has no children and it is ……(iv)…….,if it has one or more children. …….(v) …… nodes are known as leaves.
Correct answers for the blank positions are

(a) (i) child (ii) siblings (iii) internal (iv) external (v) internal
(b) (i) parent (ii) siblings (iii) external (iv) internal (v) external
(c) (i) child (ii) siblings (iii) external (iv) internal (v) external
(d) (i) child (ii) brothers(iii) external (iv) internal (v) external
(e) (i) child (ii) siblings (iii) internal (iv) internal (v) external

Ans : c,d

45. Consider the following expression tree:



Which of the following expressions shows the post order traversal of the above tree?

(a) ++a*bc*+*defg
(b) abc*+de*f+g+*
(c)abc*+de*f+g*+
(d) ++a*bc**+defg
(e) ab*c+de*f+g*+

Ans : c

46. Consider the following statements:
(i) In a max heap, root value is always higher than its children (if any).
(ii) Priority queues can be implemented by a heap.
(iii) A heap is fully filled from level 1 to level last –1.

Which of the above statements is/are correct?

(a)(i) and (ii) only
(b) (i) and (iii) only

(c)(ii) and (iii) only
(d) (i) only
(e)All of these

Ans : e

47. Consider the following paragraph.
The traversal proceeds as far as possible to the left, then backs up until the first cross road, goes one step
to the right and again as far as possible to the left. Repeat this process until all nodes are visited.
What does the above paragraph describe?
(a) Breadth first traversal
(b) Critical path traversal
(c) Shortest path traversal
(d) Depth first traversal
(e) Depth and breadth hybrid traversal

Ans : d

48.

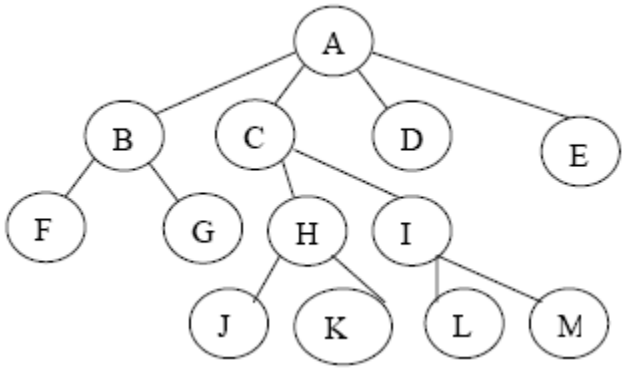


Fig 1.1

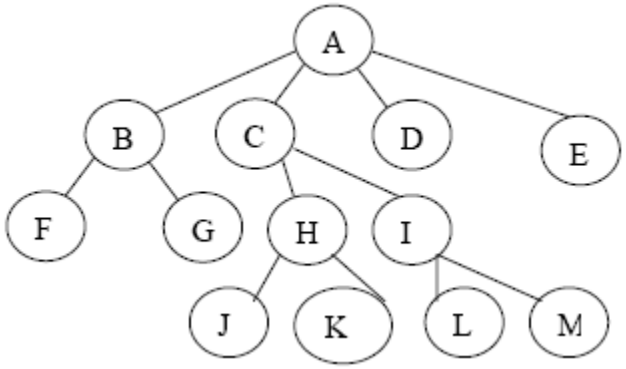
Consider the following five statements.
(i) It is a tree.
(ii) It is a binary tree.
(iii) It is an AVL tree.

(iv) It is a binary search tree.
(v) It is a strictly binary tree.
Which of the above statements is correct with respect to the above tree?

(a) (i) only
(b) (i) and (ii) only
(c) (i) , (ii) and (iii) only
(d) (i), (ii) and (iv) only
(e) All

Ans : a

49.

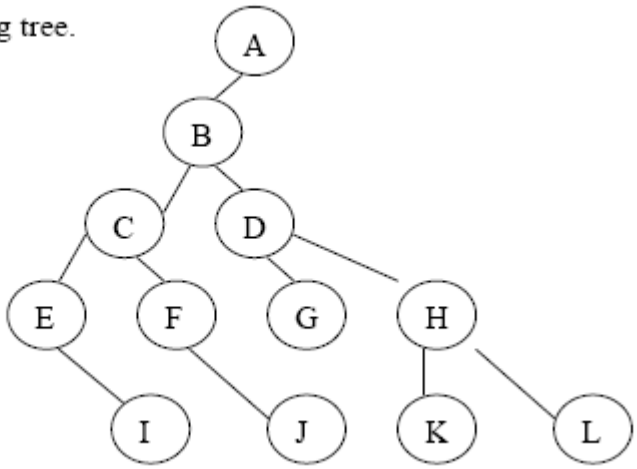


Consider the following four statements.
(i) Depth of the above tree is equal to 4.
(ii) C's proper descendants are I, J, K, L only.
(iii) B's siblings are C, D, E only.
(iv) K, L, M, N are siblings.
Which of the above statements is correct, with respect to the above tree?

(a) (i) and (ii) only
(b) (iii) only
(c) (ii) and (iii) only
(d) (ii) only
(e) (ii), (iii) and (iv) only
Ans : b

50.

Consider the following tree.

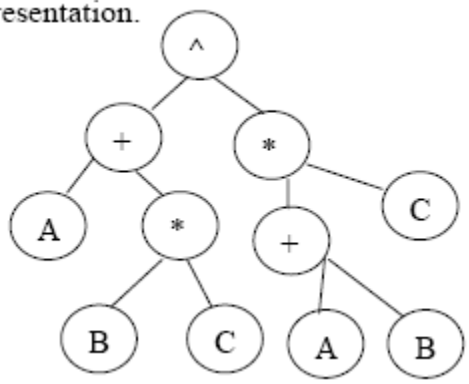


Which of the following is/are correct with respect to the above tree?
(a) Pre-order listing is ABCEIFJDGHKL.
(b) Pre-order listing is ABCIEFJDGHKL.
(c) In- order listing is EICFJBGDKHLA.
(d)In- order listing is EICFJBGKDHLA.
(e) Post-order listing is IEJFCGKLHDBA.

Ans : a, c, e

51.

Consider the following expression tree representation.



Which of the following expressions is correct in relation to the above tree?
(a) (A*B+C)^((A+B)*C)
(b) (A+B*C)^((A+B)*C)
(c) (A+B*C)^(A+(B *C))
(d) (A+B^C)*((A+B)*C)
(e) (A+B*C)^(A+B*C)

Ans : b

52. Consider the following statement (Algorithm Segment).

The method one uses to replace the node being deleted by the rightmost node in its left sub tree or
leftmost node in its right sub tree.
What does the above statement (algorithm segment) intend to do?

(a) Deleting a node from an AVL, if deleting node has both a left and a right child
(b) Deleting a node from a binary tree
(c) Deleting a node from a general tree
(d) Deleting a node from a binary search tree, if deleting node is a leaf node
(e) Deleting a node from a binary search tree, if deleting node has both a left and a right Child

Ans : e

53. Consider the following table.

State on node	**Effect of new node**	**Action of new state**
(i) Balanced	Increase left sub tree height	Left-high
(ii) Balanced	Increase right sub tree height	Right-high
(iii)Left-high	Increase left sub tree height	Left balance
(iv)Right-high	Increase left sub tree height	Balanced
(v) Right-high	Increase right sub tree height	Left balance

Which of the above would be correct for inserting a new node into an AVL tree?

(a) (i) only
(b) (i) and (ii) only
(c) (i), (ii) and (iii) only
(d) (i) (ii) (iii) and (iv) only.
(e) (i) (iii) and (iv) only

Ans : d

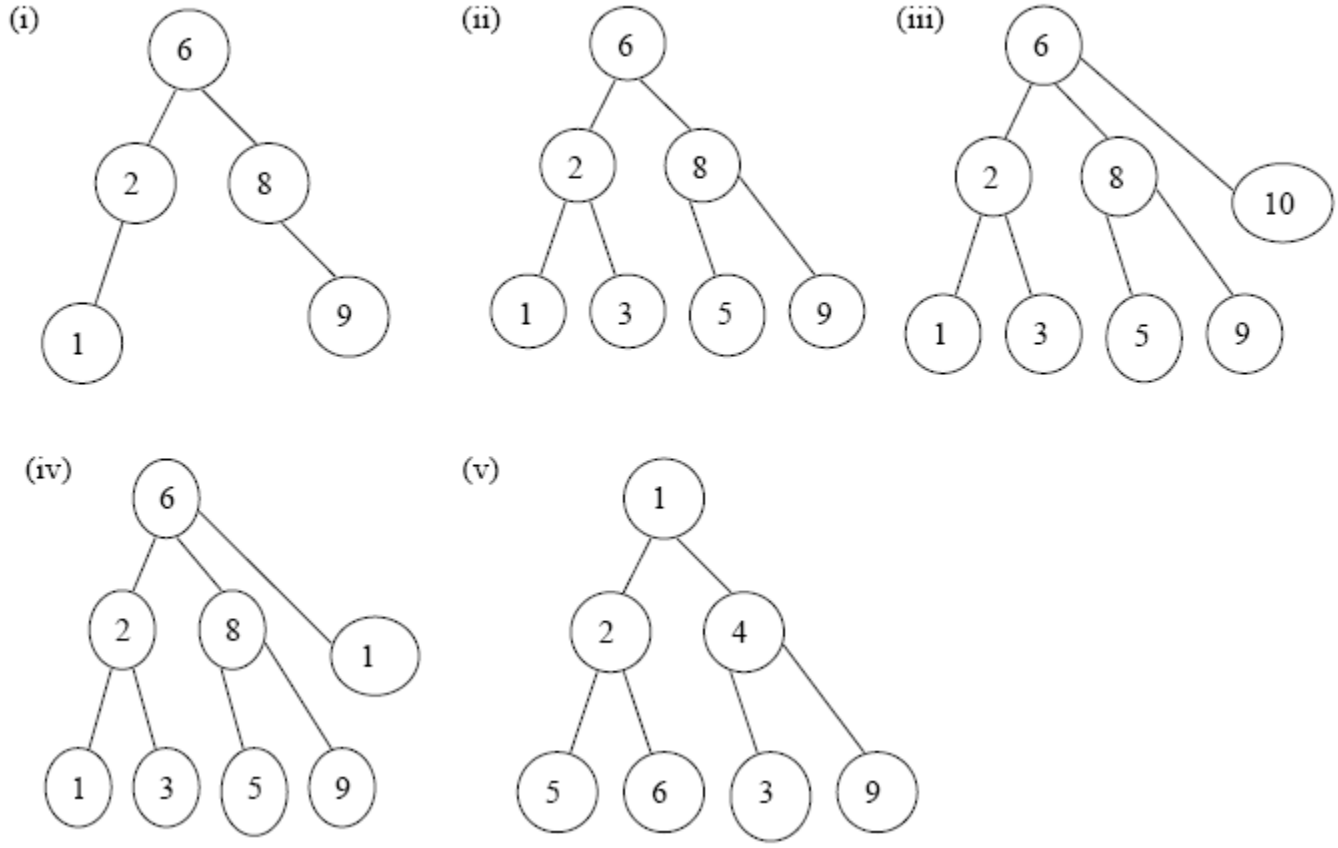
54. Which of the following is/are correctly describing a step in the definition of the Heap data structure?

(a) All leaves are on two adjacent levels.
(b) All leaves on the lowest level occur at the left of the tree.
(c) All leaves on the lowest level occur at the right of the tree.
(d) All levels above the lowest are completely filled.
(e) Balance factor is always -1,0,+1

Ans : a, b, d

55.

Which of the following is/are AVL tree(s)?



(a) (i) only
(b) (ii) only
(c) (iii) only
(d) (iv) only
(e) (v) only

Ans : a

56. Consider the following pseudo code algorithm segment.

```
algo-1 ( )
for all vertices u
num(u)=0;
edges=null;
i=1;
while there is a vertex v such that num(u) = = 0
num(v)=i++;
enqueue(v);
while queue is not empty
v=dequeue();
```

for all vertices u adjacent to v
if num(u) is 0
num(u+=i++;
enqueue(u);
attach edge (uv) to edges;
output edges;
What does the above algorithm describe?

(a) Array based implementation of queue
(b) Depth first traversal
(c) Breadth first traversal
(d) Deleting nodes from a queue
(e) Inserting nodes to a queue

Ans : c

57. {2,8,13,6,7,27,18}
If the maximum heap is created using the above set of integers, what would be the value at the 6th
position of the heap?

(a) 2
(b) 8
(c) 6
(d) 13
(e) 7

Ans : b

GRAPHS-01

1. What are the different traversal techniques available for Graphs
1)Depth-First Traversal
2)Pre-Order Traversal
3)Breadth-First Traversal
   a. 2 and 3
   b. 1 and 2
   c. 1 and 3
   d. All
Ans)C

2. A graph having 'n' number of arcs for
a node that have 'n' as the head is called its

1)Outdegree
2)Postdegree
3)predegree

a. 1 and 2
b. 1 and 3
c. 2 and 3
d. None

Ans)D

3. Which of the following statements is false?

- A. A graph can drawn on paper in many ways.
- B. Graph vertices may be linked in any manner.
- C. A graph must have at least one vertex.
- D. A graph must have at least one edge.

Ans :D

4. Suppose you have a game with 5 coins in a row and each coin can be heads or tails. What number of vertices might you expect to find in the state graph?
   a. A. 7
   b. B. 10
   c. C. 25
   d. D. 32

   Ans : B

5) Which of the following statements is/are true in connection with graphs?

(a) If few nodes are associated with a Di-Graph, array based implementation is more useful than linked list implementation.

(b) If the graph contains n nodes, a total of n2 locations must be used in array based implementation.

(c) If the graph is not weighted, the entire graph can de described using the Adjacency matrix.

(d) Wars hall's Algorithm increases the efficiency of finding the transitive closure.

(e) An example of a real life situation that can be modeled by a graph is the Air path System.
Ans) B, C, D, E

6) Which of the following statements is/are correct in connection with Graphs?

a. There are three kinds of Graphs, namely Directed Graphs, Un-directed Graphs and Digraphs.

b. The In _degree of a node n is the number of arcs which have n as the head.

c. The path matrix of any Di-graph can be calculated as pathn[I][J]=adj1 [I][J] or adj2[I][J] or adj3[I][J] or …… adjn[I][J]

d. Transitive closure can be calculated using the Path Matrix.

e. Transitive closure can be calculated using the Adjacency Matrix.

Ans) B, C, E

GRAPHS-02

1) A Graph consists of a set of
   a. Lines
   b. Nodes
   c. Arcs
   d. Figures

   Ans) B,C

2) The second node in the ordered pair of nodes making up an arc is represented by
   a. Head of the arrow
   b. Beginning of the line
   c. End of the line
   d. Tail of the arrow

Ans) A

3) Mark the statement(s) that are true
   a. A graph need not be a tree
   b. A graph must be a tree
   c. A tree must be a graph
   d. A tree need not be a graph

Ans) A, C

4) A node *n* is said to be_____ to a node *m* if there is an arc from *m* to *n*.

a. Adjacent
b. Connected
c. Linked
d. Near

Ans) A

5) When a node is connected to itself by a path, such a path is referred to as

a. Connection
b. Relation
c. Cycle
d. Network

Ans) C

6) A _____ may be defined as an acyclic graph in which every node has one or no predecessors.

a. Tree
b. Network
c. twig
d. Forest

Ans) D

7) A cycle is

a. A path which starts and end into itself
b. A path which starts and end into the nearest node
c. A path which starts and end into the farthest node
d. A path which starts and end into any other node

Ans) A

8) A forest may be defined as a _____in which every node has one or no predecessors.

a. Concyclic graph
b. Acyclic graph
c. Bipartite graph
d. Network

Ans) B

9) In the ordered pair of nodes making up an arc, the head of the arrow represents
   a. The first node
   b. The second node
   c. The nearest node
   d. Siblings

Ans) B

10)A Graph consists of a set of
   a. Lines
   b. Figures
   c. Vertices
   d. Edges

Ans) C, D

11) Mark the statement(s) that are false
   a. A graph must be a tree
   b. A tree must be a graph
   c. A tree need not be a graph
   d. A graph need not be a tree

Ans) A, C

12) If a node n is adjacent to node m, n is called a _____of m
   a. Successor
   b. Degree
   c. Predecessor
   d. Adjacent

Ans) A

13) A digraph is
   a. A graph with ordered pairs of arcs that make up the nodes
   b. A graph which is cyclic
   c. A graph in which pair of nodes that make up the arcs are ordered pairs
   d. A graph which is not cyclic

Ans) C

14) An ordered pair is indicated by
   a. “{ }”
   b. “[ ]”
   c. “( )”
   d. “< >”

Ans) D

15) The _____ of a node *N* is the number of arcs that have *N* as the tail.
   a. In degree
   b. Out degree
   c. Adjacent
   d. Degree

Ans) B

16) Weight of an arc is
   a. The number of arcs terminating at the nearest node.
   b. The number of arcs starting at the nearest node.
   c. The number associated with the arc
   d. The number of nodes it connects.

Ans) C

17) The function ____ adds a node with information field to a graph and returns a pointer to that node.
   a. Addnode
   b. Add
   c. Getnode
   d. adder

Ans) A

18) An _____ is one whose component trees are ordered.
   a. Ordered Network
   b. Ordered Tree
   c. Ordered Twig
   d. Ordered Forest

Ans) D

19) A set of nodes and arcs make a
   a. A Graph
   b. A Figure
   c. A Tree
   d. A Twig

Ans) A

20) The _____represents the first node in the ordered pair of nodes making up an arc.
   a. Tail of the arrow
   b. End of the line
   c. Head of the arrow
   d. Beginning of the line

Ans) A

21) Mark the statement(s) that are true
   a. A node need not have any arcs associated with it
   b. Arcs need not have any nodes associated with it
   c. A node must have arcs associated with it.
   d. A node does not have any arcs associated with it

Ans) A

22) If a node n is adjacent to node m, m is called a _____of n
   a. Successor
   b. Degree
   c. Predecessor
   d. Adjacent

Ans) C

23) Dag refers to
   a. Direct acyclic graph
   b. Directed acyclic graph
   c. Denoted acyclic graph
   d. Denoted cyclic graph

Ans) B

24) A forest may be defined as an acyclic graph in which every node has one or no _____.

a. Predecessors
b. Adjacent nodes
c. Successors
d. Connections

Ans) A

25) An ordered pair of nodes make up the arcs, what is the graph called?

a. Digraph
b. Cyclic graph
c. Weighted graph
d. Directed graph

Ans) A, D

26) An unordered pair is indicated by

a. "{ }"
b. "[ ]"
c. "( )"
d. "< >"

Ans) A

27) The _____ of a node *N* is the number of arcs that have *N* as the head.

a. In degree
b. Out degree
c. Adjacent
d. Degree

Ans) A

28) A graph in which each arc is associated with a number is called

a. Numbered graph
b. Associated graph
c. Linked graph
d. Network

Ans) D

29) Adjacency list node is also referred to as
   a. Header node
   b. Arc node
   c. Allocated node
   d. Graph node

Ans) B

30) Any_____ consists of a collection of trees.
   a. Network
   b. Graph
   c. Twig
   d. Forest

Ans) D

31) Mark the statement(s) that are true
   a. Each line in a graph is specified by a pair of nodes.
   b. Each arc in graph is specified by a pair of nodes.
   c. Each edge in graph is specified by a pair of nodes.
   d. Each figure in graph is specified by a pair of nodes.

Ans) B, C

32) In the ordered pair of nodes making up an arc, the tail of the arrow represents
   a. The first node
   b. The second node
   c. The nearest node
   d. Siblings

Ans) A

33) The Degree of a node is
   a. The number of arcs going away from the node
   b. The number of arcs connected to that node
   c. The total number of arcs present in the graph.
   d. The number of arcs incident to it.

Ans) D

34) A graph in which each arc is associated with a number is called
   a. Numbered graph
   b. Associated graph
   c. Linked graph
   d. Weighted graph

Ans) D

35) Mark the statement(s) that are true
   a. In the linked representation of trees, each allocated node corresponds to a tree node.
   b. A cycle is a path which starts and end into the farthest node
   c. A number may be associated with each arc of the graph, such a graph is called associated graph
   d. The number associated with an arc is called Graph number

Ans) A

36) A tree maybe defined as a _____ in which only a single node has no predecessors.
   a. Network
   b. Tree
   c. Twig
   d. Forest

Ans) D

37) A directed graph is
   a. A graph with ordered pairs of nodes that make up the arcs
   b. A graph with ordered pairs of arcs that make up the nodes
   c. A graph which is cyclic
   d. A graph which is not cyclic

Ans) A

38) A pair of angled brackets"< >" are used to indicate
   a. Beginning and ending
   b. An ordered pair
   c. A sequence
   d. An unordered pair

Ans) B

39) The In degree of a node *N* is the number of arcs that have *N* as _____.

a. The head
b. The tail
c. Incident arc
d. Outgoing arcs

Ans)A

40) The number associated with an arc is called

a. Weight
b. Graph number
c. Associated number
d. Network number

Ans) A

41) Each _____ contains an info field and two pointers.

a. Arc node
b. Allocated node
c. Graph node
d. Header node

Ans) D

42) Any forest is a collection of _____.

a. Networks
b. Trees
c. Twigs
d. Arcs

Ans) B

43) The _____represents the second node in the ordered pair of nodes making up an arc.

a. Tail of the arrow
b. Head of the arrow
c. Beginning of the line
d. End of the line

Ans) B

44) Mark the statement(s) that are true

a. We use parentheses to indicate unordered pair and angled brackets for ordered pair.
b. We use angled brackets to indicate unordered pair and parentheses for ordered pair.
c. We use Square brackets to indicate unordered pair and angled brackets for ordered pair.
d. We use parentheses to indicate unordered pair and Square brackets for ordered pair.

Ans) A

45) The out degree of a node *N* is the number of arcs that have *N* as _____.

a. The head
b. The tail
c. Incident arc
d. Outgoing arcs

Ans) B

46) A path from a node to itself is called as a

a. Network
b. Cycle
c. Relation
d. Connection

Ans) B

47) A_____, also called a bigraph, is a set of graph vertices decomposed into two disjoint sets such that no two graph vertices within the same set are adjacent.

a. Concyclic graph
b. An acyclic graph
c. Bipartite graph
d. Network

Ans) C

48) An undirected graph is termed_____ if every node in it is reachable from every other.

a. Connected
b. Linked
c. Joined
d. Cyclic

Ans) A

49) A group of edges and vertices make
   a. A tree
   b. A graph
   c. A cycle
   d. A forest

Ans) B

50) The first node in the ordered pair of nodes making up an arc is represented by
   a. Head of the arrow
   b. Beginning of the line
   c. End of the line
   d. Tail of the arrow

Ans) D

51) Mark the statement(s) that are false
   a. Arcs need not have any nodes associated with it
   b. A node must have arcs associated with it.
   c. A node need not have any arcs associated with it
   d. A node does not have any arcs associated with it

Ans) A,B,D

52) A number may be associated with each arc of the graph, such a graph is called
   a. Weighted graph
   b. Numbered graph
   c. Linked graph
   d. Associated graph

Ans) A

53) A _____ graph is one in which a probability function associates a probability with each arc.
   a. Denoted acyclic graph
   b. Concyclic graph
   c. An acyclic graph
   d. A probabilistic directed graph

Ans) D

54) A _____maybe defined as a forest in which only a single node has no predecessors.

a. Network
b. Tree
c. Twig
d. Forest

Ans) B

55) If the pair of nodes that make up the arcs are ordered pairs, the graph is said to be_____

a. Ordered graph
b. Unordered graph
c. Directed graph
d. Digraph

Ans) C, D

56) A pair of parentheses"{}" are used to indicate

a. Beginning and ending
b. An ordered pair
c. A sequence
d. An unordered pair

Ans) D

57) The number of arcs incident to a node is

a. The degree of the node
b. The in-degree of the node
c. Adjacent of the node
d. Out-degree of the node

Ans) A

58) A number may be associated with each arc of the graph, such a graph is called

a. Network
b. Numbered graph
c. Linked graph
d. Associated graph

Ans) A

59) The term _____ is used to refer to either a header or a list node of a multilinked structure representing a graph.

a. Header node
b. Arc node
c. Allocated node
d. Graph node

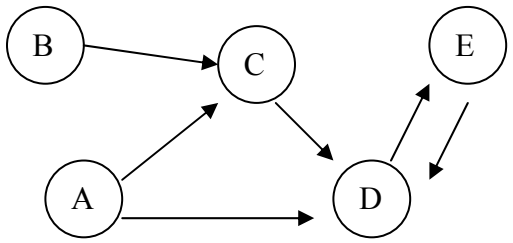
Ans) C

60) A tree maybe defined as a forest in which only a single node has no_____.

a. Predecessors
b. Adjacent nodes
c. Successors
d. Connections

Ans) A

61) Adjacency matrix of the following directed graph is



(a)
0 0 1 1 0
0 0 1 0 0
0 0 0 1 0
0 0 0 0 1
0 0 0 1 0

(b)
0 0 0 1 1
0 0 0 1 1
0 0 0 1 1
0 0 0 1 0
1 0 0 0 1

(c)
0 0 0 1 1
1 0 0 1 1
0 0 0 1 1
0 0 0 1 0
0 0 0 0 1

(d) 0 0 0 1 1

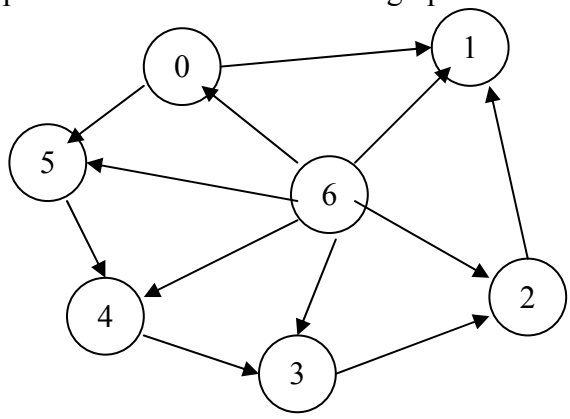
0 0 0 1 1
0 0 0 0 1
0 0 0 0 1
0 0 0 1 0

(e) 0 0 1 1 1
0 0 1 1 1
0 0 0 1 1
0 0 0 1 1
0 0 0 1 1
Ans : a

62. Which of the following condition(s) is/are correct for the graphs.
(i) A graph need not to be a tree
(ii) A tree must be a graph
(iii) A node need not have any arcs associated with it

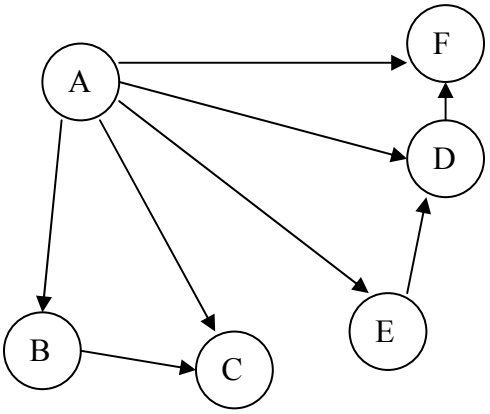
(a) (i) only
(b) (i) and (iii) only
(c) (ii) and (iii) only
(d) (i) only
(e) None of these
Ans : e

63. Find the depth first traversal order of the graph below starting at node 6.



(a) 6, 0, 1, 5, 4, 3, 2
(b) 6, 0, 4, 5, 1, 2, 3
(c) 6, 4, 5, 3, 2, 1, 0
(d) 6, 5, 4, 3, 2, 1, 0
(e) 6, 1, 2, 5, 4, 3, 0
Ans : a d e

64. Consider the directed graph given below

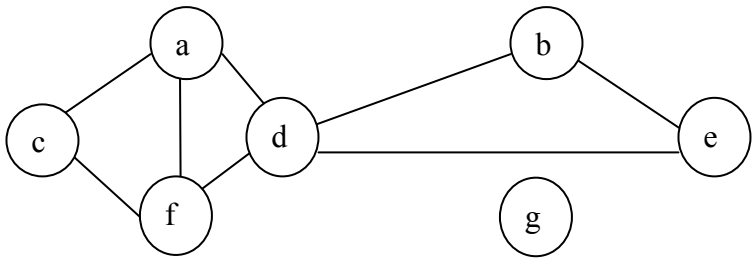


Find the dept first traversal of this graph, starting at vertex A
(a) A,E,D,B,C,F
(b) A,B,C,F,E,D
(c) A,D,F,E,B,C
(d) A,F,E,D,B,C
(e) A,D,B,C,E,F
Ans : b c d

65.Consider the following (vi) statements.
(i) Simple graph.
(ii) Complete graph.
(iii) Multi graph.
(iv) Pseudo graph.
(v) A circuit in a di-graph.
(vi) A cycle in a di-graph.
Which of the following are different types of graphs?

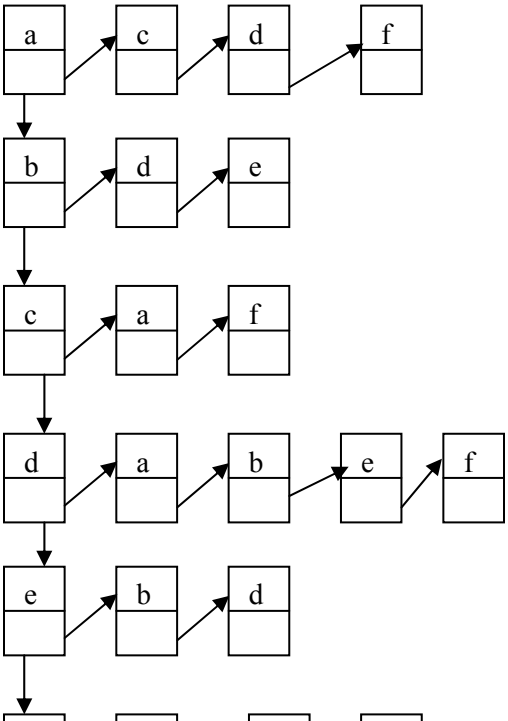
(a) (i), (ii), (iv), (v) only
(b) (i), (ii), (iv) only
(c) (i), (ii) only
(d) (iii) and (v) only
(e) All of these
Ans : e

66. Consider the un-directed graph given below.

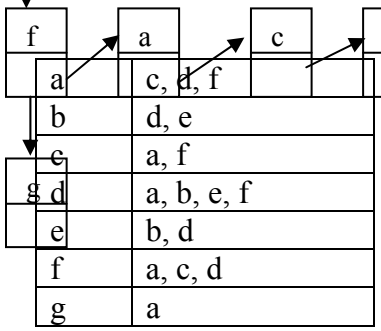


Which of the following is/are true about the adjacency list of the above graph?

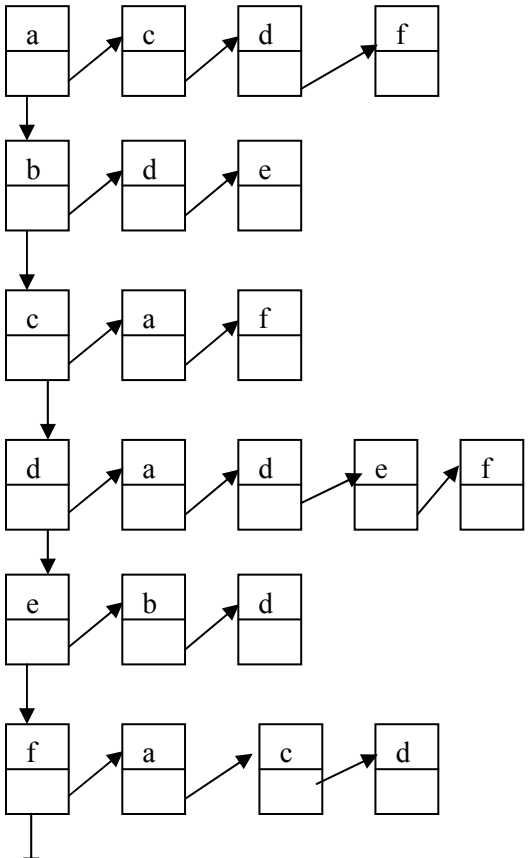
(a)


a c d f
b d e
c a f
d a b e f
e b d

b.


f a c d
a c, d, f
b d, e
c a, f
g d a, b, e, f
e b, d
f a, c, d
g a

(c)


a c d f
b d e
c a f
d a d e f
e b d
f a c d

(d)

a	c, d, f
b	d, e
c	a, f
d	a, b, e, f
e	b, d
f	a, c, d
g	

(e)

a	e, d, f
b	d, c
c	a, f
d	a, b, e, f
e	d, b
f	a, c, d
g	

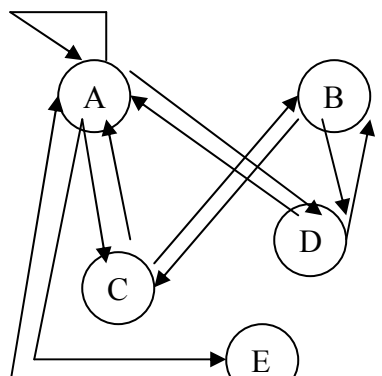
Ans : a,d

67.Consider the following adjacency matrix:

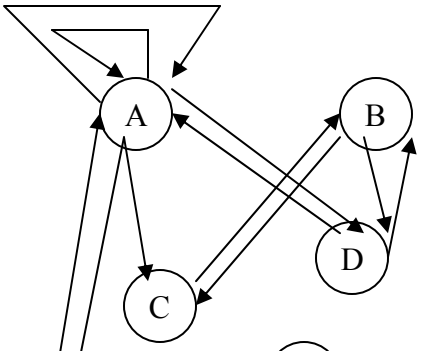
	A	**B**	**C**	**D**	**E**
A	T	F	T	T	T
B	F	F	F	F	T
C	T	F	F	T	F
D	T	F	T	F	F
E	T	T	F	F	F

Which of the following graph(s) is/are related to the above adjacency matrix?

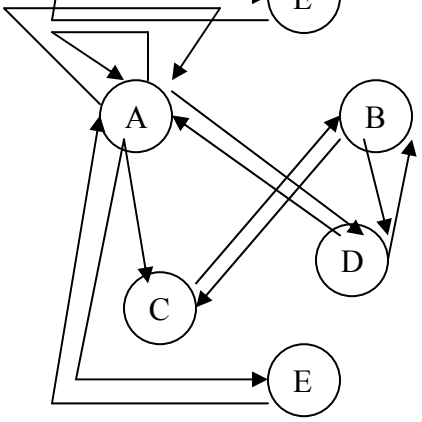
(a)



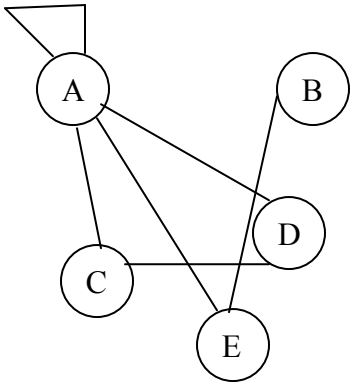
(b)



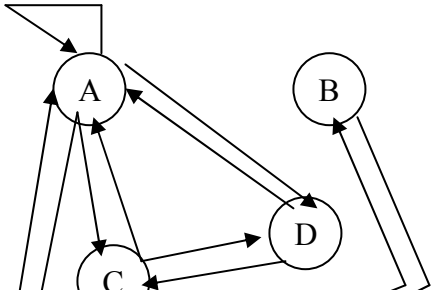
(c)



(d)

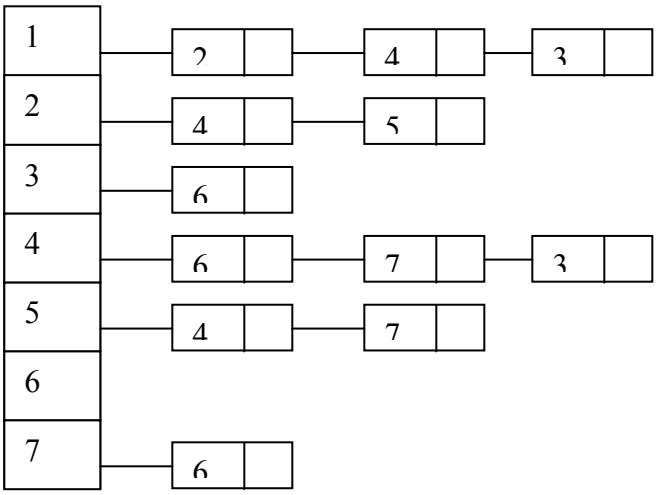


(e)



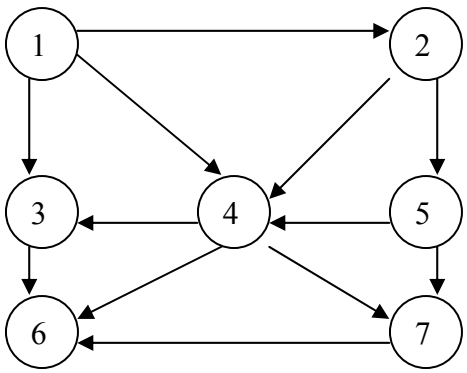
Ans :d,e

68. Consider the following adjacency list:

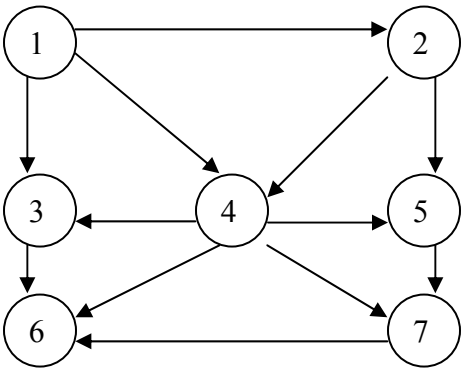


Which of the following graph(s) describe(s) the above adjacency list?

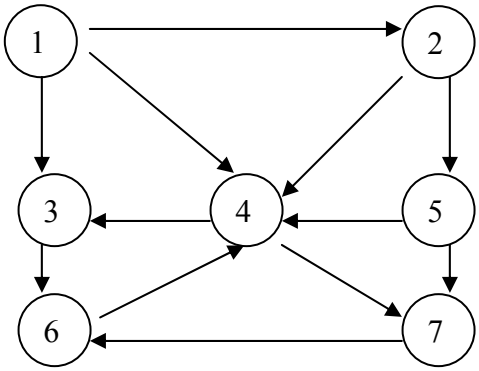
(a)



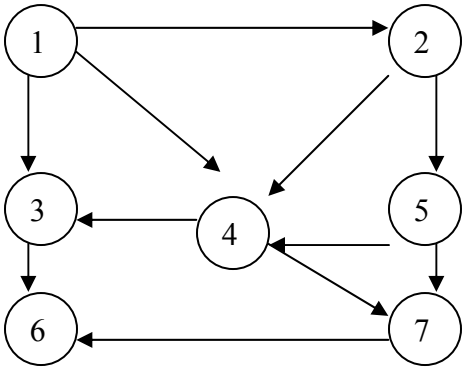
(b)



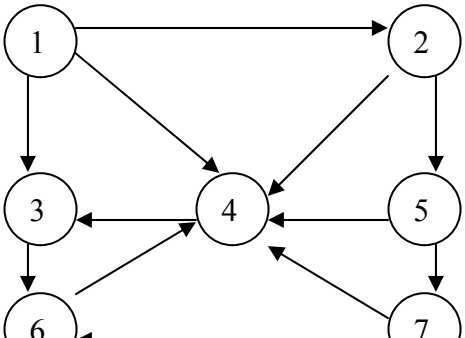
(c)



(d)

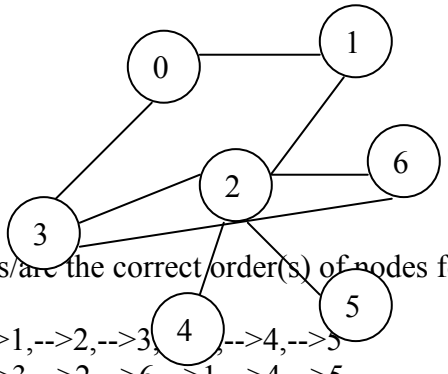


(e)



Ans :a

69. Consider the undirected graph given below:

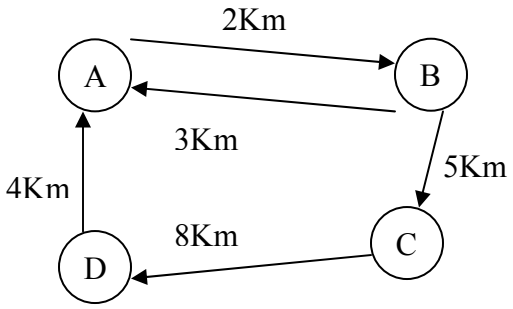


What is/are the correct order(s) of nodes for the depth first traversal starting from node 0?

(a) 0-->1,-->2,-->3,-->4,-->5
(b) 0-->3,-->2,-->6,-->1,-->4,-->5
(c) 0-->3,-->6,-->2,-->1,-->4,-->5
(d) 0-->1,-->3,-->2,-->4,-->5,-->6
(e) 0-->1,-->2,-->3,-->6,-->5,-->4

Ans :a,b,c,e

70. Consider the following directed graph and the paragraph which follows:



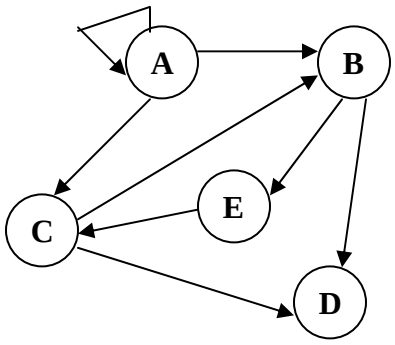
A graph consists of a set of …… (i) …… and …… (ii) ……. A number is associated with each arc and the graph is called a …… (iii) …… graph or a network. If the pairs of nodes that make up the arcs are ordered pairs, the graph is said to be a/an …… (iv) …… graph.
Which of the following would the correct words be for the above blank positions?

(a) (i) nodes (ii) lengths (iii) weighted (iv) ordered
(b) (i) ancestors (ii) descendents (iii) weighted (iv) ordered
(c) (i) nodes (ii) arcs (iii) weighted (iv) directed
(d) (i) nodes (ii) arcs (iii) linear (iv) un-directed
(e) (i) vertices (ii) edges (iii) weighted (iv) directed

Ans :c,e

71.

Graph :G

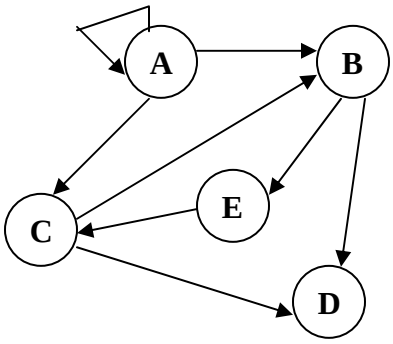


Consider the following statements about the above directed-graph:(i) There are two cyclic paths.(ii) There is only one path from node C to node B, where the path of length is equal to 1.(iii) There is no direct path from Node A to itself.(iv) There are two paths from node A to node B, where each path is of length equal to 2.Which of the above statements is/are correct in relation to the above graph G?

(a) (i) and (iii) only
(b) (i) and (ii) only
(c) (i), (ii) and (iv) only
(d) (i), (ii) and (iii) only
(e) All of these

Ans :c

72.



The Adjacency matrix of the above graph is :

a.

	A	B	C	D	E
A	T	T	T	F	F
B	F	F	T	T	T
C	F	T	F	F	F
D	F	F	F	F	F
E	F	F	T	F	T

b.

	A	B	C	D	E
A	T	T	T	F	F
B	F	F	T	T	T
C	F	T	F	F	F
D	T	F	F	F	F
E	F	F	T	F	F

c.

	A	B	C	D	E
A	T	T	T	F	F
B	F	F	T	T	T
C	F	T	F	F	F
D	F	F	F	F	F
E	F	F	T	F	F

d.

	A	B	C	D	E
A	T	T	T	F	F
B	F	F	T	T	T
C	F	T	F	T	F
D	F	F	F	F	F
E	F	F	T	F	F

e.

	A	B	C	D	E
A	T	T	T	F	F
B	F	F	F	T	T
C	F	T	F	T	F
D	F	F	F	F	F
E	F	F	T	F	F

Ans : e

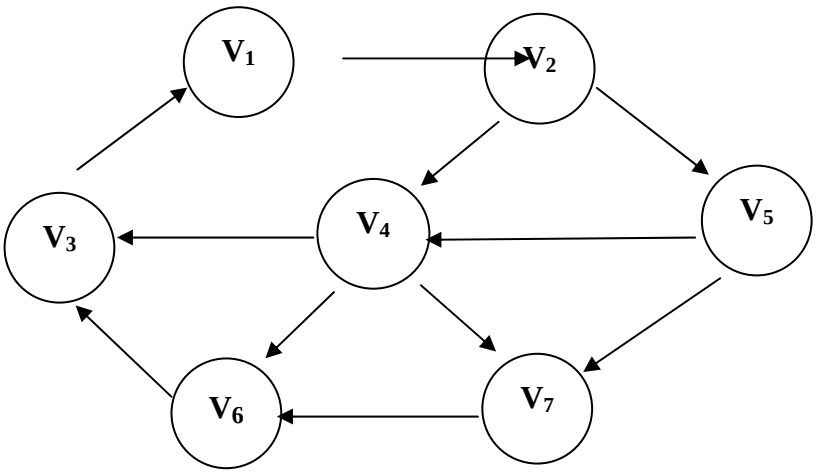
73. Consider the following statements.
(i) A node n is incident to an arc x if n is one of the two nodes in the ordered pair of nodes that comprise x.
(ii) The degree of a node is the number of arcs incident to it.

(iii) A node n is adjacent to a node m if there is an arc from m to n. In such a case, n is called the successor of m and m is the predecessor of n.
(iv) A path of a length k from node a to node b is defined as a sequence of k nodes n1, n2, …..nk+1 such that n1 = a, nk+1 = b and adjacent (ni, n i+1) is true for all i between 1 and k.
Which one of the following statements is correct for a graph?

(a) (i), (ii), and (iv) only.
(b) (i), (ii) and (iii) only.
(c) (i) and (iv) only.
(d) (ii), (iii) and (iv) only.
(e) All of these.

Ans : b

74.



GRAPH 1.1

How many cylic paths are there in the above graph (GRAPH 1.1) starting from V3?

(a) 2
(b) 3
(c) 4
(d) 5
(e) More than 5

Ans : e

75. The adjacency matrix of the above graph (GRAPH 1.1) is

(a)

	V1	V2	V3	V4	V5	V6	V7
V1	0	1	0	0	0	0	0
V2	0	0	0	1	1	0	0
V3	1	0	0	0	0	0	0
V4	0	0	1	0	0	1	1
V5	0	0	1	1	0	0	1
V6	0	0	1	0	0	0	0
V7	0	0	0	0	0	1	1

(b)

	V1	V2	V3	V4	V5	V6	V7
V1	0	1	0	0	0	0	0
V2	0	0	0	1	1	0	0
V3	1	0	0	0	0	0	0
V4	0	0	1	0	0	1	1
V5	0	1	0	1	0	0	1
V6	0	0	1	0	0	0	0
V7	0	0	0	1	0	1	0

c)

	V1	V2	V3	V4	V5	V6	V7
V1	0	1	0	0	0	0	0
V2	0	0	0	1	1	0	0
V3	1	0	0	0	0	0	0
V4	0	0	1	0	0	1	1
V5	0	0	0	1	0	0	1
V6	0	0	1	0	0	0	0
V7	0	0	0	0	0	1	0

d)

	V1	V2	V3	V4	V5	V6	V7
V1	0	1	0	0	0	0	0
V2	0	0	0	1	1	0	0
V3	1	0	1	0	0	0	0
V4	0	0	1	0	0	1	1
V5	0	0	0	1	1	0	1
V6	0	0	1	0	0	0	0
V7	0	0	0	0	0	1	0

e)

	V1	V2	V3	V4	V5	V6	V7
V1	0	1	0	0	0	0	1
V2	0	0	0	1	1	0	0
V3	1	0	0	0	0	0	0
V4	0	0	1	0	0	1	1
V5	0	0	0	1	0	0	1
V6	0	0	1	0	0	0	1
V7	0	0	0	0	0	1	1

Ans : c

76) The Adjacency matrix of the GRAPH 1.1, when the path is of length 3 is:

(a)

	V1	V2	V3	V4	V5	V6	V7
V1	0	0	1	1	0	1	2
V2	1	0	2	0	0	3	1
V3	0	0	0	1	1	0	0
V4	1	1	1	0	0	0	0
V5	1	0	2	0	1	1	0
V6	0	1	0	0	0	0	0
V7	1	0	0	2	0	0	0

b)

	V1	V2	V3	V4	V5	V6	V7
V1	0	0	1	1	0	1	2
V2	1	0	2	0	0	3	1
V3	0	0	0	1	1	0	0
V4	1	1	1	0	0	0	0
V5	1	0	2	0	0	1	0
V6	0	1	0	0	0	0	0
V7	1	0	0	0	0	0	0

c)

	V1	V2	V3	V4	V5	V6	V7
V1	0	0	1	1	0	1	2
V2	1	0	2	0	0	3	1
V3	0	0	0	0	0	0	0
V4	1	1	1	0	0	0	0
V5	1	0	2	0	0	1	0
V6	0	1	0	0	0	0	0
V7	1	0	0	0	0	0	0

d)

	V	V	V	V	V	V	V

	1	2	3	4	5	6	7
V1	0	0	1	1	0	1	2
V2	1	0	2	0	0	3	1
V3	0	0	0	1	1	0	0
V4	1	1	1	0	0	0	0
V5	1	0	2	2	1	1	0
V6	0	1	0	0	0	0	0
V7	1	0	0	0	0	0	0

e)

	V1	V2	V3	V4	V5	V6	V7
V1	0	0	1	1	0	1	2
V2	1	0	2	0	0	3	1
V3	0	0	0	1	1	0	0
V4	1	1	1	0	0	0	0
V5	1	0	2	0	0	1	0
V6	0	1	0	0	0	0	0
V7	1	0	0	0	0	0	0

Ans : b, e

77) Consider the following two diagrams.

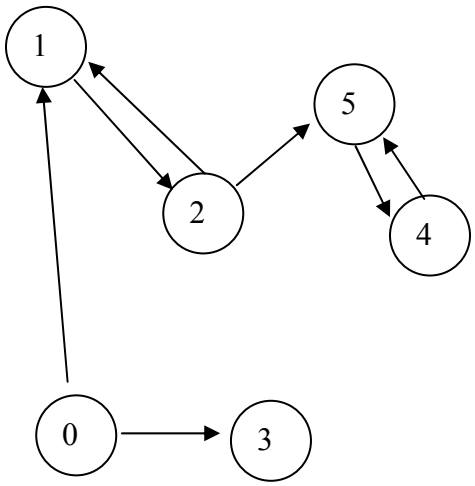


Fig 1

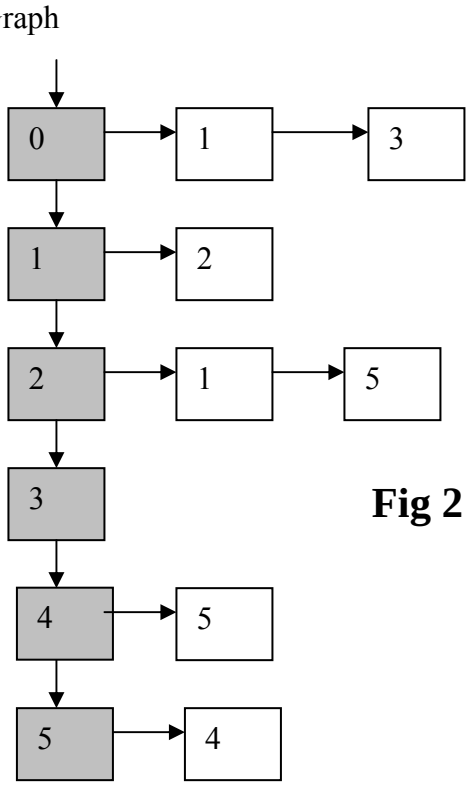


Fig 2

Which of the following statement(s) is/are correct in relation to the above two diagrams?

(a)Fig 2 represents the correct adjacency list node representation of Fig 1.
(b) In fig 2, shaded nodes are called their adjacency list node representations.
(c) In Fig 2, non-shaded nodes are called their arc representations.
(d) There is no relationship between Fig 1 & Fig 2.
(e) Fig 2 is incomplete with respect to Fig 1.

Ans : a, b, c

78) Consider the following paragraph.

The ……(i) …….of a node is the number of incident arcs of it. The. ……(ii)….. of a node A is the number of arcs which have A as the head and the …….(iii) …… of A is the number of arcs which have A as the tail. A node A is said to be adjacent to a node B if there is an arc connecting A and B . In the case of a directed graph, A is said to be a …….(iv)…….. of B if there is an outgoing arc from A to B
Correct words for the blank positions are:

(a)) (i) degree (ii) indegree (iii) outdegree (iv) predecessor
(b)(i) indegree (ii) degree (iii) outdegree (iv) successor
(c) (i) degree (ii) indegree (iii) outdegree (iv) successor
(d) (i) degree (ii) outdegree (iii) indegree (iv) successor
(e) (i) successor (ii) indegree (iii) outdegree (iv) successor

Ans : a

79) Consider the following polynomial
aknk+ak-1nk-1+…….a0 .
What is the Big –O representation of the above polynomial?

(a) O(n)
(b) O(nk)
(c) O(nk+1)
(d) O(log k)
(e) O(nlog n)

Ans : b

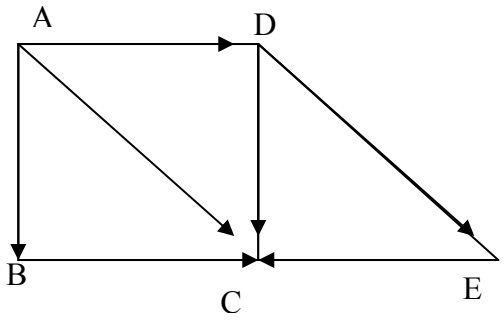
80.Consider the following adjacency list table:

Node	Adjacency list
A	B,C,D
B	C

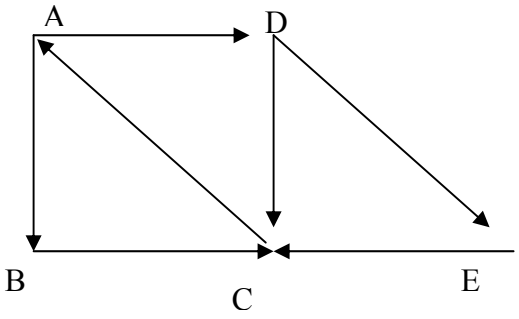
C	
D	C,E
E	C

Which of the following graphs summarize(s) the above adjacency list table?

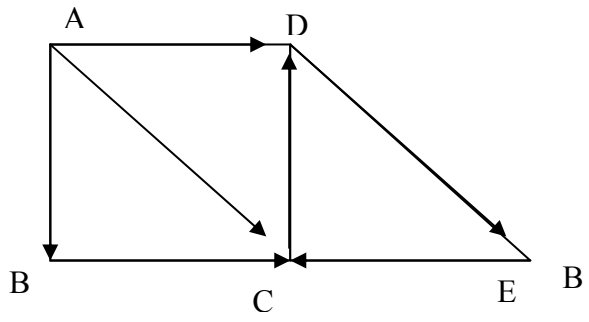
(a)



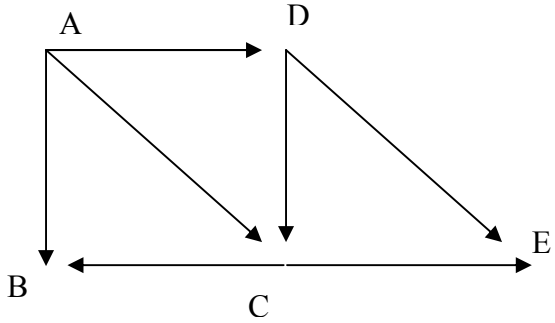
(b)



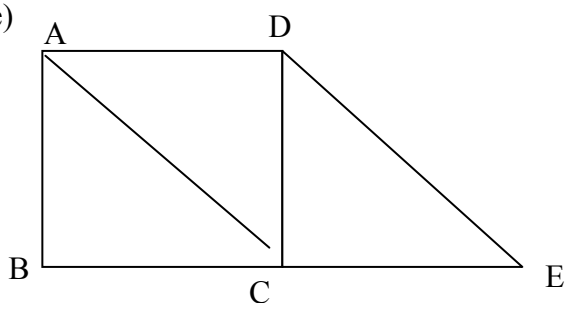
(c)



(d)



e)



Ans : a

81. {2,8,6,1,10,15,3,12,11} is a set of integers. If you create a maximum heap and store it in an array, what would be the final values in the array?

(a)1,2,3,6,8,10,11,12,15
(b)15,12,11,10,8,6,3,2,1
(c) 15,12,6,11,10,2,3,8,1
(d) 15,12,6,10,11,2,3,1,8
(e)15,12,10,11,2,6,3,1,8

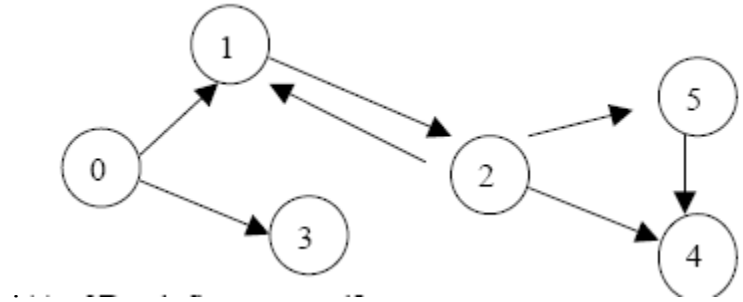
Ans : e

82. Which of the following statements is/are correct in connection with a graph?

(a) Purely array-based representation of a graph is called its path matrix.
(b) Graphs may be used as diagrams which illustrate the relationship between pairs of elements in a set of objects.
(c) Depth first traversal and Breadth first traversal techniques can be used only for graphs.
(d) A multi-graph is a graph where two vertices can be joined by multiple edges.
(e) A graph is called a weighted graph if each edge has an assigned number.

Ans : b, d, e

83. Consider the following directed graph.



Which of the following is/are **not** (an) output(s) of Depth first traversal?

(a) 0-->1-->2-->4-->5-->3
(b) 0-->1-->2-->5-->4-->3
(c) 0-->3-->1-->2-->4-->5
(d) 0-->1-->2-->2-->4-->3
(e) 0-->1-->2-->5-->4-->1

Ans : d, e

84. Which of the following is/are correct in connection with graph data structures?

(a) Path matrix can be defined as path [i][j] = adj[i][j] or adj2[i][j] or adj3i][j] or…….
(b) Transitive closure can be determined by using the path matrix.
(c) adj3[i][j]= adj2 [i][j]* adj[i][j] .
(d) Warshall's algorithm will increase the efficiency of finding the Transitive closure.
(e) Warshall's algorithm will increase the efficiency of finding the adjacency matrix.

Ans : a, c, d

85. Which of the following is/are **not** (an) alternative representation(s) of graphs?

(a) An adjacency list
(b) An adjacency matrix
(c) Depth first traversal
(d) Incidence matrix
(e) Breadth first traversal

Ans : c, e

HASHING

1) The function that transforms a key into a table index is called a _____
   a. Hash function
   b. Key function

c. Transformation function
d. Table function

Ans) A ,
Function that transforms key to table index is called hash function

2) One of the techniques of dealing with the hash collision is
a. Chaining
b. Addressing
c. Resolving
d. Probing

Ans) A

3) _____ builds a linked list of all items whose keys hash to the same values.
a. Chaining
b. Addressing
c. Resolving
d. Probing

Ans) A

4) Hashing allows direct access to the _____
a. Link
b. Tuple
c. Data
d. Table

Ans) D

5) One way to eliminate all clustering is
a. Quadratic rehash
b. Rehashing
c. Hashing
d. Double hashing

Ans) D

6) Mark the statement(s) that is/are true
a. Attempt made to insert a record K2 in the position where K1 is already placed is defined as Hash collision
b. Transforming a key into a table index is called hash function
c. Attempt made to insert a record K2 in the position where K1 is already placed is defined as Hash function
d. Transforming a key into a table index is called Hash collision

Ans) A, B

7) If the _____ of the item is found to be occupied during a search the rehash function is again used to locate the item.

a. Proper position
b. Hash position
c. Search position
d. Key position

Ans) B

8) The larger the range of the hash functions the less likely it is that the two keys yield the same _____.

a. Hash value.
b. Key value
c. Table value
d. Tuple value

Ans) A

9) Different keys that hash to the same value follow the same rehash path. This is called

a. Secondary clustering
b. Primary clustering
c. Double hashing
d. Quadratic rehash

Ans) A

10) _____ permits a hash table to expand and shrink dynamically without requiring an index.

a. Linear hashing
b. Linear rehashing
c. Extendible hashing
d. Dynamic hashing

Ans) A

11) The function that transforms a key into a _____ is called a hash function.

a. Key index
b. Data table
c. Table index
d. Record

Ans) C

12) _____ involves using a secondary hash function on the hash key of the item.

a. Probing
b. Addressing
c. Resolving
d. Rehashing

Ans)D

13) All items whose keys hash to the same values is built into a linked list, this is called

a. Addressing

b. Resolving
c. Chaining
d. Probing

Ans) C

14) Two keys that hash into different values compete with each other in _____ is called primary clustering.

a. Hash table
b. Successive rehashes
c. Link table
d. Secondary hash

Ans) B

15) The _____of a hashing method is usually measured by the average number of table positions that must be examined in searching for a particular item.

a. Accuracy
b. Efficiency
c. Complexity
d. Easiness

Ans) B

16) If *r* is the record whose key hashes into *hr*, *hr* is called

a. Function of r
b. Hash key of *r*.
c. Function key of r
d. Key of r

Ans) B

17) Rehashing involves using a secondary hash function on the _____ of the item.

a. Hash Key
b. Data Key
c. Table Key
d. Index Key

Ans) A

18) A good hash function is one that

a. Spreads the records uniformly throughout the table
b. Minimizes duplication
c. Reduces link fields
d. Reduces duplication

Ans) A,B

19) One way of eliminating _____is to allow the rehash function to depend on the number of times that the function is applied to a particular hash value.

a. Secondary clustering

b. Primary clustering
c. Double hashing
d. Quadratic rehash

Ans) B

20) _____is defined as any hashing scheme in which any newly inserted element is equally likely to be placed at any of the empty positions of the hash table.

a. Quadratic rehash
b. Double hashing
c. Uniform hashing
d. Rehashing

Ans) C

21) The function that transforms a _____ into a table index is called a hash function.

a. Key
b. Data
c. Table
d. Index

Ans) A

22) Hash collision can be dealt with techniques like

a. Resolving and addressing
b. Probing
c. Rehashing and chaining
d. Hashing

Ans) C

23) Chaining builds _____of all items whose keys hash to the same values

a. An index
b. A linked list
c. A collection
d. A grouping

Ans) B

24) The phenomenon, where two keys that hash into different values compete with each other in successive rehashes is called _____.

a. Double hashing
b. Quadratic rehash
c. Primary clustering
d. Secondary clustering

Ans) C

25) It is difficult to delete items from the hash table that uses _____for search and insertion.

a. Rehashing
b. Addressing

c. Probing
d. Linking

Ans) A

26) If *h* is a hash and *key* is key_____ is called the hash of key.
a. h-key
b. key(h)
c. h(k)
d. h(key)

Ans) D

27) Rehashing involves using a secondary _____ on the hash key of the item.
a. Hash function
b. Key function
c. Transformation function
d. Table function

Ans) A

28) A good hash function is one that minimizes _____.
a. Collisions
b. Duplication
c. Creation
d. Link fields

Ans) A

29) Any _____ that depends solely on the index to be rehashed causes primary clustering.
a. Rehash function
b. Key function
c. Hash function
d. Table function

Ans) A

30) The Efficiency of a hashing method is usually measured by the average number of _____ that must be examined in searching for a particular item.
a. Table positions
b. Tuple
c. Data
d. Links

Ans) A

31) Hash collision is defined as
a. An attempt made to insert a record K2 in the position where K1 is already placed
b. Transforming a key into a table index
c. Inserting an already existing record

d. Inserting a record into the wrong position

Ans) A

32) The hash function is applied successfully until _____is found where the items can be inserted.

a. Proper position
b. Hash position
c. Empty position
d. Key position

Ans) C

33) The _____ the range of the Hash function, the less likely it is that the two keys yield the same hash value.

a. Smaller
b. Larger
c. Closer
d. Farther

Ans) B

34) One way of eliminating primary clustering is to allow there hash function to depend on the number of times that the function is applied to a particular _____.

a. Data
b. Table Key
c. Hash value
d. Index value

Ans) C

35) Uniform hashing is defined as any newly inserted element is equally likely to be placed at any of the empty positions of the_____.

a. Index table
b. Hash table
c. Sorted list
d. Grouped elements

Ans) B

36) If *h* is a hash and *key* is key, *h(key)* is called the

a. Key of hash
b. Hash of key
c. Function key
d. Key function

Ans) B

37) Rehashing involves using _____hash function on the hash key of the item.

a. Primary
b. First
c. Second

d. Secondary

Ans) D

38) The chaining technique involves adding an extra_____ to each table position.

a. Series of data
b. Line
c. Tuple
d. Link field

Ans) D

39) Any rehash function that depends solely on the index to be rehashed causes _____.

a. Double hashing
b. Quadratic rehash
c. Primary clustering
d. Secondary clustering

Ans) C

40) The Efficiency of a_____ is usually measured by the average number of table positions that must be examined in searching for a particular item

a. Rehash method
b. Linking method
c. Hashing method
d. Searching method

Ans) C

41) One of the techniques of dealing with the hash collision is

a. Probing
b. Addressing
c. Resolving
d. Rehashing

Ans) D

42) If the Hash function of the item is found to be occupied during a search the _____ is again used to locate the item.

a. Key function
b. Hash function
c. Transformation function
d. Rehash function

Ans) D

43) _____ allows direct access to the table.

a. Probing
b. Rehashing
c. Hashing

d. Addressing

Ans) C

44) Secondary clustering is the phenomenon where different keys that hash to the same value follow _____

a. Different rehash path
b. Same rehash path
c. Selected path
d. Ideal path

Ans) B

45) Linear hashing permits a_____ to expand and shrink dynamically without requiring an index.

a. Index table
b. Hash table
c. Sorted list
d. Grouped elements

Ans) B

46) If an attempt is made to insert a record k2 in the position where k1 is already placed The situation that results is called

a. Hash collision
b. Probing
c. Hash clash
d. Invalid insertion

Ans) A, C

47) The _____is applied successfully until an empty position is found where the items can be inserted.

a. Key function
b. Hash function
c. Transformation function
d. Table function

Ans) B

48) The larger the range of the _____ the less likely it is that the two keys yield the same hash value.

a. Key function
b. Hash function
c. Transformation function
d. Table function

Ans) B

49) One way of eliminating primary clustering is to allow the _____ to depend on the number of times that the function is applied to a particular hash value.

a. Key function

b. Hash function
c. Table function
d. Rehash function

Ans) A

50) Uniform hashing is defined as any_____ in which any newly inserted element is equally likely to be placed at any of the empty positions of the hash table

a. Sorting scheme
b. Hashing scheme
c. Searching scheme
d. Linking scheme

Ans) B

51) The following paragraph is connected with hashing:

The process of mapping large amounts of data into a smaller table is called …… (i) ……. A good hash function should satisfy two criteria, namely quickness to compute and minimisation of the number of …… (ii) ……. Minimization of …… (iii) …… can be achieved by choosing a hash function that spreads the incoming data as evenly as possible over the hash table.
Correct terms for the blanks positions are:

(a) (i) indexing (ii) collisions (iii) couplings
(b) (i) hashing (ii) collisions (iii) couplings
(c) (i) hashing (ii) collisions (iii) collisions
(d) (i) indexing (ii) collisions (iii) collisions
(e) (i) hashing (ii) couplings (iii) couplings

Ans :c

52. Consider the following five (v) terms:

(i) Coupling
(ii) Double hashing
(iii) Collision
(iv) Linear probing
(v) Quadratic probing

Which of the above is a/are hashing method(s)?

(a) (ii) only
(b) (ii) and (iv) only
(c) (ii),(iv) and (v) only
(d) (ii) and (iii) only
(e) All of these

Ans :c

53. Which of the following is a /are hash function(s)?

(a) Shortest path
(b) Folding
(c) Mid-square
(d)Extraction
(e)Binary

Ans : b, c, e

54. Which of the following are **not** hash functions?

(a) division
(b) folding
(c) coupling
(d) mid square
(e) extraction

Ans : c