EE-308-F
Microcontrollers & Embedded Systems

Section-A & Section-B

- ***INTRODUCTION OF MICROCONTROLLER:*** ***Different types of microcontrollers: Embedded microcontrollers, External memory microcontrollers; Processor Architectures: Harvard V/S Princeton , CISC V/S RISC; microcontrollers memory types; microcontrollers features : clocking, i/o pins, interrupts, timers, peripherals.***

- ***MICROCONTROLLER ARCHITECTURE:*** ***Introduction to PIC microcontrollers, Architecture and pipelining, program memory considerations, Addressing modes, CPU registers, Instruction set, simple operations.***

Section-C & Section-D

- ***Microcontrollers - Microcontroller 8051- Architecture, Pin Diagram, I/O Ports, Internal RAM and Registers, Interrupts, Addressing Modes, Memory Organization and External Addressing, Instruction Set, Assembly Language Programming, Real Time Applications of Microcontroller- Interfacing with LCD, ADC, DAC, Stepper Motor, Key Board and Sensors.***

- ***Embedded Systems-Introduction, Classification, Processors, Hardware Units, Software Embedded into System, Applications and Products of Embedded Systems, Structural Units in Processor, Memory Devices, I/O Devices, Buses, Interfacing of Processor Memory and I/O Devices, Case Study of an Embedded System for a Smart Card.***

Text Book

I. B. B. Brey: The Intel Microprocessors, Architecture, Programming and Interfacing, Pearson Education.

II. Design with PIC Microcontrollers by John B. Peatman , Pearson.

III. Raj Kamal: Embedded Systems- Architecture, Programming and Design, TMH, New Delhi.

IV. V. Udayashankara and M. S. Mallikarjunaswamy: 8051 Microcontroller, TMH, New Delhi

References

I. *Mazidi and Mazidi: The 8051 Microcontroller and Embedded Systems, Pearson Education.*

II. *A. V. Deshmukh: Microcontroller (Theory and Application), TMH*

III. *Programming and Customizing the 8051 Microcontroller : Predko ; TMH.*

IV. *Kenneth J. Ayala: The 8051 Microcontroller Architecture, Programming and Applications, West Publishing Company*

V. *Programming Embedded Systems in C and C++ : Michael Barr; SHROFF PUB. & DISTR*

Common Ques. Section-A

- ***List the registers of the 8051 microcontroller***
- ***Manipulate data using the registers and MOV instructions***
- ***Code simple 8051 Assembly language instructions***
- ***Assemble and run an 8051 program***
- ***Describe the sequence of events that occur upon 8051 power-up***
- ***Explain the ROM memory map of the 8051***
- ***Detail the execution of 8051 Assembly language instructions***
- ***Describe 8051 data types***
- ***Explain the purpose of the PSW (program status word) register***
- ***Discuss RAM memory space allocation in the 8051***
- ***Diagram the use of the stack in the 8051***

ASSEMBLING AND RUNNING AN 8051 PROGRAM

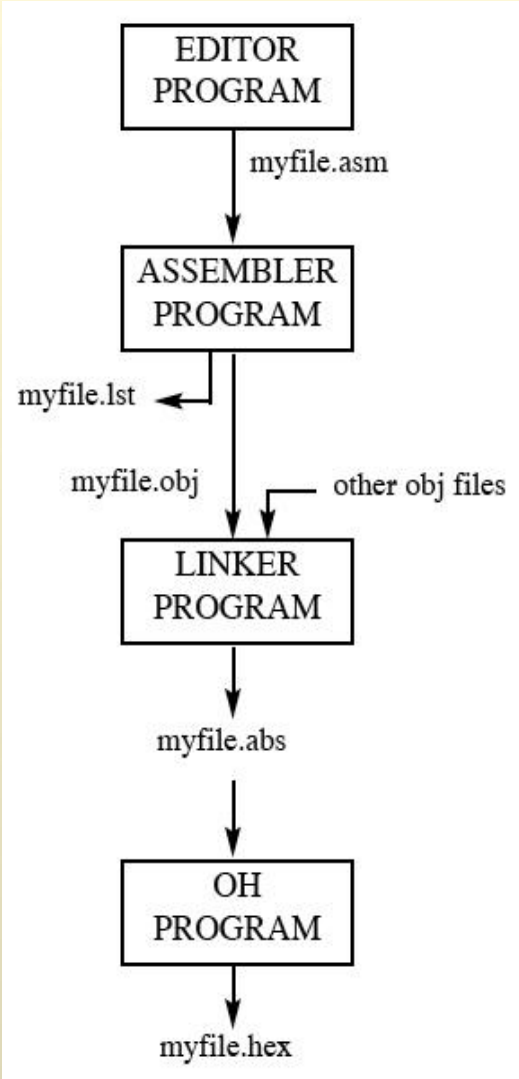

Figure 2–2 Steps to Create a Program

ASSEMBLING AND RUNNING AN 8051 PROGRAM

- ***More about "a51" and "obj" files***
  - ***"asm" file is source file and for this reason some assemblers require that this file have the “a51" extension***
  - ***this file is created with an editor such as Windows Notepad or uVision editor***
  - ***uVision assembler converts the a51 assembly language instructions into machine language and provides the obj file***
  - ***assembler also produces the Ist file***

ASSEMBLING AND RUNNING AN 8051 PROGRAM

- ***lst file***
  - ***lst file is useful to the programmer because it lists all the opcodes and addresses as well as errors that the assembler detected***
  - ***uVision assumes that the list file is not wanted unless you indicate that you want to produce it***
  - ***file can be accessed by an editor such as Note Pad and displayed on the monitor or sent to the printer to produce a hard copy***
  - ***programmer uses the list file to find syntax errors***
  - ***only after fixing all the errors indicated in the lst file that the obj file is ready to be input to the linker program***