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
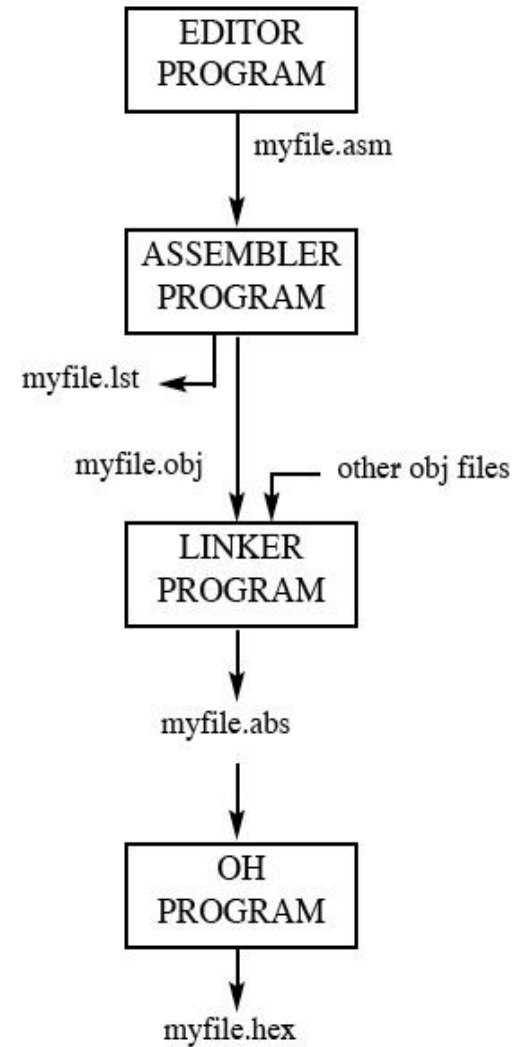
ASSEMBLING AND RUNNING AN 8051 PROGRAM

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 lst file

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- 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