Chapter 09

Programming in Assembly

Lesson 01

PROGRAMMING BASICS FOR ASSEMBLY LANGUAGE PROGRAMMING (ALP)

Advantages of programming in assembly language

- Features of processor instruction set kept in full view when programming using ALP

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Programming in assembly language

- Only few assembly instructions are needed for driving the devices

- Driving a device means the configuring of device by writing control or command words and writing or reading the bytes at registers or ports of device

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The internal devices like serial ports and timers

- Precisely controlled with ease

- Example: Few lines of code for control bits for the SCON register written and ISR instructions defined, then the serial port device can be easily used

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Advantages of programming in assembly language

- System operations are speeded by the use of ALP.

- There is full understanding of the process that is taking place at each instance of program execution. Time critical codes are therefore programmed in the machine codes.

- The code size and code execution speed of the program known

ALP when

1. Compact code keeping full instruction set in view

2. Efficient memory use

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ALP when

5. Full understanding of process

6. code size, code execution speed known

7. Assembler available for faster program development

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Assembler for the ALP

Assembler Output

1. Prepares a program Listing, .lst file

Code List

2. Prepares machine codes for each program address as per mnemonics and directives in .asm file

Object code

Assembler Features

1. Faster ALP development

2. Machine code generation

3. Allocation of appropriate start and end addresses of program, ISRs and routines

4. Allocation of addresses for data storage, variables, stacks,queues, tables, messages

Assembler Features

5. Use of directives during code assembly

6. Use of declarations, like in C

7. Assignments

8. Use of Macros and then code insertions for the invoked macros

Assembler Features

9. Use of label in place of address

10. Use of expressions, conditional and arithmetic expressions, assembler generate codes from these later

11. Use of Register and variable names, and low and high bytes for a word

12. Use of assembled modules

Summary

We learnt

- Assembly Language programming advantages

- Efficient memory use

- Device control and status registers use

- Speeding up of system operations

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We leant

- **Assembler** Features are Faster ALP development

- Machine code generation

- 3. Allocation of appropriate start and end addresses of program, ISRs and routines

- 4. Allocation of addresses for data storage, variables, stacks, queues, tables, messages

End of Lesson 01 on

PROGRAMMING BASICS FOR ASSEMBLY LANGUAGE PROGRAMMING (ALP)