8051 ADDRESSING MODE

Lecture -6

8051 ADDRESSING MODE

- Immediate Addressing Mode
- Register Addressing Mode
- Direct Addressing Mode
- Register Indirect Addressing Mode
- Indexed Addressing Mode
- Implied Addressing Mode

IMMEDIATE ADDRESSING MODE

- The operand, which follows the Opcode, is a constant data of either 8 or 16 bits.

- constant data to be stored in the memory immediately follows the Opcode.

- The constant value to be stored is specified in the instruction itself rather than taking from a register.

- The destination register to which the constant data must be copied should be the same size as the operand mentioned in the instruction.

- **Example:** MOV A, #030H

- Here, the Accumulator is loaded with 30 (hexadecimal). The # in the operand indicates that it is a data and not the address of a Register.

REGISTER ADDRESSING MODE

- In the 8051, four banks of Working Registers with eight Registers in each bank.

- In Register Addressing mode, one of the eight registers (R0 – R7) is specified as Operand in the Instruction.

- It is important to select the appropriate Bank with the help of PSW Register.

- **Example:** MOV A, R5

- Here, the 8-bit content of the Register R5 of Bank0 is moved to the Accumulator.

DIRECT ADDRESSING MODE

- In Direct Addressing Mode, the address of the data is specified as the Operand in the instruction.

- access any register or on-chip variable.

- includes general purpose RAM, SFRs, I/O Ports, Control registers.

- **Example:** MOV A, 47H

- Here, the data in the RAM location 47H is moved to the Accumulator.

REGISTER INDIRECT ADDRESSING MODE

- The address of the Operand is specified as the content of a Register.

- **Example:** MOV A, @R1

- The @ symbol indicates that the addressing mode is indirect.

- If the contents of R1 is 56H, for example, then the operand is in the internal RAM location 56H.

- If the contents of the RAM location 56H is 24H, then 24H is moved into accumulator.

- Only R0 and R1 are allowed in Indirect Addressing Mode. These register are called as Pointer registers.

INDEXED ADDRESSING MODE

- The effective address of the Operand is the sum of a base register and an offset register.

- The Base Register can be either Data Pointer (DPTR) or Program Counter (PC) while the Offset register is the Accumulator (A).

- only MOVC and JMP instructions can be used.

- useful when retrieving data from look-up tables.

- **Example:** MOVC A, @A+DPTR

- Here, the address for the operand is the sum of contents of DPTR and Accumulator.

IMPLIED ADDRESSING MODE

- There will be a single operand.

- work on specific registers only.

- also known as register specific instruction.

- **Example:** RLA; SWAPA;

- These are 1- byte instruction. The first one is used to rotate the A register content to the Left. The second one is used to swap the nibbles in A.

THANK YOU