



SNS COLLEGE OF TECHNOLOGY

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

19ECT221 – MICROPROCESSORS AND MICROCONTROLLERS

II YEAR - IV SEM

UNIT I – 8085 and 8086 MICROPROCESSOR



8085 MICROPROCESSOR- Instruction Set

- An instruction is a binary pattern designed inside a microprocessor to perform a specific function
- The entire group of instructions that a microprocessor supports is called Instruction Set
- 8085 has 246 instructions
- Each instruction is represented by an 8 bit binary value
- These 8 bit are called Opcode or Instruction byte



Classification of Instruction Set

- Data Transfer Instruction
- Arithmetic Instruction
- Logical Instructions
- Branching Instructions
- Control Instructions



Data Transfer Instructions

Opcode	Operand	Description
MOV	Rd, Rs Rd, M M, Rs	Copy from source to destination.

- This instruction copies the contents of the source register into the destination register.
- The contents of the source register are not altered.
- If one of the operands is a memory location, its location is specified by the contents of the HL registers.
- **Example:** MOV B, C
- MOV B, M



Data Transfer Instructions

Opcode	Operand	Description
MVI	Rd, Data M, Data	Move immediate 8-bit

- The 8-bit data is stored in the destination register or memory.
- If the operand is a memory location, its location is specified by the contents of the H-L registers.
- **Example:** MVI A, 57H



Data Transfer Instructions

Opcode	Operand	Description
LXI	Reg. pair, 16-bit data	Load register pair immediate

- This instruction loads 16-bit data in the register pair.
- **Example:** LXI H, 2034 H



Data Transfer Instructions

Opcode	Operand	Description
XCHG	None	Exchange H-L with D-E

- The contents of register H are exchanged with the contents of register D.
- The contents of register L are exchanged with the contents of register E.
- **Example: XCHG**



Arithmetic Instructions

Addition

- Any 8-bit number, or the contents of register, or the contents of memory location can be added to the contents of accumulator.
- The result (sum) is stored in the accumulator.
- No two other 8-bit registers can be added directly.
- **Example:** The contents of register B cannot be added directly to the contents of register C.



Increment / Decrement

- The 8-bit contents of a register or a memory location can be incremented or decremented by 1.
- The 16-bit contents of a register pair can be incremented or decremented by 1.
- Increment or decrement can be performed on any register or a memory location.



Arithmetic Instructions



Opcode	Operand	Description
ADD	R M	Add register or memory to accumulator

- The contents of register or memory are added to the contents of accumulator.
- The result is stored in accumulator.
- If the operand is memory location, its address is specified by H-L pair.
- All flags are modified to reflect the result of the addition.
- **Example:** ADD B or ADD M



Arithmetic Instructions

Opcode	Operand	Description
DAD	Reg. pair	Add register pair to H-L pair

- The 16-bit contents of the register pair are added to the contents of H-L pair.
- The result is stored in H-L pair.
- If the result is larger than 16 bits, then CY is set.
- No other flags are changed.
- **Example: DAD B**



Arithmetic Instructions

Opcode	Operand	Description
DCX	R	Decrement register pair by 1

- The contents of register pair are decremented by 1.
- The result is stored in the same place.
- **Example: DCX H**



Logical Instructions

- These instructions perform logical operations on data stored in registers, memory and status flags.
- The logical operations are:
 - AND
 - OR
 - XOR
 - Rotate
 - Compare
 - Complement



AND, OR, XOR

- Any 8-bit data, or the contents of register, or memory location can logically have
 - AND operation
 - OR operation
 - XOR operationwith the contents of accumulator.
- The result is stored in accumulator.



Logical Instructions

Opcode	Operand	Description
CMP	R M	Compare register or memory with accumulator

- if $(A) < (\text{reg/mem})$: carry flag is set
- if $(A) = (\text{reg/mem})$: zero flag is set
- if $(A) > (\text{reg/mem})$: carry and zero flags are reset.
- **Example:** CMP B or CMP M



Branching Instructions

Opcode	Operand	Description
JMP	16-bit address	Jump unconditionally

- The program sequence is transferred to the memory location specified by the 16-bit address given in the operand.
- **Example:** JMP 2034 H.



Jump Conditionally



Opcode	Description	Status Flags
JC	Jump if Carry	CY = 1
JNC	Jump if No Carry	CY = 0
JP	Jump if Positive	S = 0
JM	Jump if Minus	S = 1
JZ	Jump if Zero	Z = 1
JNZ	Jump if No Zero	Z = 0
JPE	Jump if Parity Even	P = 1
JPO	Jump if Parity Odd	P = 0



Branching Instructions

Opcode	Operand	Description
CALL	16-bit address	Call unconditionally

- The program sequence is transferred to the memory location specified by the 16-bit address given in the operand.
- Before the transfer, the address of the next instruction after CALL (the contents of the program counter) is pushed onto the stack.
- **Example:** CALL 2034 H.



Call Conditionally



Opcode	Description	Status Flags
CC	Call if Carry	CY = 1
CNC	Call if No Carry	CY = 0
CP	Call if Positive	S = 0
CM	Call if Minus	S = 1
CZ	Call if Zero	Z = 1
CNZ	Call if No Zero	Z = 0
CPE	Call if Parity Even	P = 1
CPO	Call if Parity Odd	P = 0



References



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Thank You