



SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

19ITT204 – MICROCONTROLLER & EMBEDDED SYSTEMS

III YEAR - V SEM

UNIT I – Instruction sets of 8086 Micro Processor



8086 Microprocessor- Instruction Sets

The 8086 microprocessor supports 8 types of instructions –

- Data Transfer Instructions
- Arithmetic Instructions
- Bit Manipulation Instructions
- String Instructions
- Program Execution Transfer Instructions (Branch & Loop Instructions)
- Processor Control Instructions
- Iteration Control Instructions
- Interrupt Instructions



8086 Microprocessor- Instruction Sets



➤ Data Transfer Instructions

These instructions are used to transfer the data from the source operand to the destination operand. Following are the list of instructions under this group –

➤ Instruction to transfer a word

MOV – Used to copy the byte or word from the provided source to the provided destination.

PPUSH – Used to put a word at the top of the stack.

POP – Used to get a word from the top of the stack to the provided location.



8086 Microprocessor- Instruction Sets



➤ Instructions for input and output port transfer

IN – Used to read a byte or word from the provided port to the accumulator.

OUT – Used to send out a byte or word from the accumulator to the provided port.

Instructions to transfer the address

LEA – Used to load the address of operand into the provided register.

LDS – Used to load DS register and other provided register from the memory



8086 Microprocessor- Instruction Sets



Instructions to transfer flag registers

LAHF – Used to load AH with the low byte of the flag register.

SAHF – Used to store AH register to low byte of the flag register.

PUSHF – Used to copy the flag register at the top of the stack.

POPF – Used to copy a word at the top of the stack to the flag register.



8086 Microprocessor- Instruction Sets



Instructions to transfer flag registers

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8086 Microprocessor- Instruction Set



These instructions are used to perform arithmetic operations like addition subtraction, multiplication, division, etc.

Instructions to perform addition

ADD – Used to add the provided byte to byte/word to word.

ADC – Used to add with carry.

Instructions to perform subtraction

SUB – Used to subtract the byte from byte/word from word.

SBB – Used to perform subtraction with borrow.

Instruction to perform multiplication

MUL – Used to multiply unsigned byte by byte/word by word.

Instruction to perform multiplication

MUL – Used to multiply unsigned byte by byte/word by word.



Bit Manipulation Instructions



These instructions are used to perform operations where data bits are involved, i.e. operations like logical, shift, etc.

Instructions to perform logical operation

NOT – Used to invert each bit of a byte or word.

AND – Used for adding each bit in a byte/word with the corresponding bit in another byte/word.

Instructions to perform shift operations

SHL/SAL – Used to shift bits of a byte/word towards left and put zero(S) in LSBs.

SHR – Used to shift bits of a byte/word towards the right and put zero(S) in MSBs.

Instructions to perform rotate operations

ROL – Used to rotate bits of byte/word towards the left, i.e. MSB to LSB and to Carry Flag [CF].



String Instructions



String is a group of bytes/words and their memory is always allocated in a sequential order.

REPE/REPZ – Used to repeat the given instruction until CX = 0 or zero flag ZF = 1.

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Program Execution Transfer Instructions (Branch and Loop Instructions)

CALL – Used to call a procedure and save their return address to the stack.

RET – Used to return from the procedure to the main program.

JA/JNBE – Used to jump if above/not below/equal instruction satisfies.

JAE/JNB – Used to jump if above/not below instruction satisfies.



Process Control Instructions



These instructions are used to control the processor action by setting/resetting the flag values.

Following are the instructions under this group –

STC – Used to set carry flag CF to 1

CLC – Used to clear/reset carry flag CF to 0

CMC – Used to put complement at the state of carry flag CF.

Iteration Control Instructions

These instructions are used to execute the given instructions for number of times

LOOP – Used to loop a group of instructions until the condition satisfies, i.e.,
CX = 0

LOOPE/LOOPZ – Used to loop a group of instructions till it satisfies ZF = 1 &
CX = 0



Interrupt Instructions

These instructions are used to call the interrupt during program execution.

INT – Used to interrupt the program during execution and calling service specified.

INTO – Used to interrupt the program during execution if OF = 1

IRET – Used to return from interrupt service to the main program



References

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Thank You