

ACADEMY OF TECHNOLOGY
MICROPROCESSOR & MICROCONTROLLER LABORATORY
1ST ASSIGNMENT

Discipline: ECE

Semester: 4th

Code: EC 493

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Microprocessor: 8085

SET 1(for familiarization with 8085 Microprocessor Simulator):

1. Write an assembly language program to **INTERCHANGE** the contents of two 8-bit registers.
2. Write an assembly language program to **TRANSFER** 1 data byte from a memory location with address 9000H to another memory location with address 9500H using
 - i) **Direct** addressing mode,
 - ii) **Indirect** addressing mode.

SET 2(for submission):

1. Write an assembly language program to **INTERCHANGE** the contents of two register pairs.
2. Write an assembly language program to **EXCHANGE** the locations of two numbers stored in 9500H and 9501H.
3. Write an assembly language program to **FILL UP** memory locations starting from the address A000H to A004H with ABH.

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2ND ASSIGNMENT

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Microcontroller: 8051

SET 1 (for familiarization with 8051 Microcontroller Simulator):

1. Write an assembly language program to load the accumulator with the value 55H and complement the accumulator. Store the result in register R4.
2. Write an assembly language program to set MSB and LSB of A.

SET 2 (for submission):

1. Write an assembly language program to convert a packed BCD available in RAM location 30H to its equivalent unpacked format and store from 40H.
2. Write an assembly language program to divide contents of 70H from contents of 71H (assume that contents of 70H is greater than or equal to contents of 71H). Store the remainder at memory location 53H and the quotient at memory location 52H.
3. Write an assembly language program to count the number of 1's and 0's of an 8-bit data stored in location A000H.
4. Write an assembly language program to find out the square of an 8-bit data in the range of 0 to 9 using the Look Up table technique. Assume the Look Up table is available in data memory with starting address 50H in the following format:

Ram Address(H)	Data (Square value)
50	0
51	1
52	4
53	9
54	16
55	25
56	36
57	49
58	64
59	81

Assume that given data is available at 45H RAM location.

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3RD ASSIGNMENT

Discipline: ECE

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Microprocessor: 8085

SET 1(for familiarization with 8085 Microprocessor Simulator):

1. Write an assembly language program to **TRANSFER THE BLOCK** of sixteen data bytes which are stored starting from memory location **9500H** into the new memory locations starting from **9600**. Given Data: 01H, 02H, 03H, 04H, 05H, 06H, 07H, 08H, 09H, 0AH, 0BH, 0CH, 0DH, 0EH, 0FH, 10H
2. Write an assembly language program to find the **LARGEST and SMALLEST** number from an array. Store the largest or smallest number into the memory location A400H.
Data: 05H, 06H, 78H, FEH, 01H

SET 2(for submission):

1. A set of data bytes containing the following data 01H, 02H, 03H, 04H, 05H, 06H, 07H, 08H, 09H, 0AH, 0BH, 0CH, 0DH, 0EH, 0FH are stored at memory location starting from 8500H. Write an assembly language program to store the Data in **REVERSE ORDER** at location starting from 9600H (i.e., data of 8500H location will save to last location of destination)
2. A string of ten data bytes is stored starting from memory location 8500H. The string includes some blanks (bytes with zero values). Write an assembly language program to save the new string by **eliminating all BLANKS** from that string.
Given Data: A0H, 00H, 00H, 4AH, 98H, 00H, 78H, 90H, 00H, FFH
3. Write an assembly language program to perform the **MULTIPLICATION of two data bytes** which are stored from memory location FC00H. Store the result starting from memory location D500H.
4. Write an assembly language program to **COMPARE two strings** stored from memory location 8091H and 8061H. Length of the string is stored in 8060H. If both strings are same, place 00H, otherwise place FFH at the memory location 8070H.

1st string: 01H, 4FH, 10H, 9BH, 8BH

2nd string: 01H, 4FH, 10H, 9BH, 8BH

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4TH ASSIGNMENT

Discipline: ECE

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Microprocessor: 8085 Interfacing

SET 1(for familiarization with 8085 Microprocessor Simulator):

1. Write an assembly language program to read information from **INPUT PORT** and exchange the upper and lower nibbles. Display the result through the **OUTPUT PORT**.
Input Port Address: 30H Output Port Address: 40H
2. Study the **Timing Diagram** of an instruction on oscilloscope.

SET 2 (for submission):

1. Write an assembly language program to **ADD** six **BCD numbers** which are stored starting from memory location 8500H. Store the BCD sum and number of times carry generated into the memory locations 9000H and 9001H respectively and display the entire sum at Port 10H and Port 20H.
2. Write an assembly language program to **CONVERT a packed BCD to its equivalent BINARY format**:
A BCD number between 0 and 99 is stored in memory location 9100H. Write a main program and a conversion subroutine to convert the BCD number into its equivalent binary number. Store the result in the memory location 9200H and also display at Port 30H.
3. Write an assembly language program to design a **MOD-10 UP counter** to count from 0 to 9 with a one-second delay between each count. At the count of 9, the counter should reset itself to 0 and repeat the sequence continuously. Display each count at the Output Port 02H.

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Microcontroller: 8051

SET 1 (for familiarization with 8051 Microcontroller Simulator):

1. Write an assembly language program to load data $(40)_{10}$ to A and copy the contents of A to register R3.
2. Write an assembly language program to copy the contents of internal memory location pointed by R1 register to internal data memory location pointed by R0. Add the content of Reg. R0 with the content of reg. R5 and store the sum into Reg. B.
3. Write an assembly language program to exchange contents of register R2 with the contents of A.

SET 2 (for submission):

1. Write an assembly language program to exchange the upper and lower nibble of location 20H.
2. Write an assembly language program to add the contents of A and the contents of data memory location 51H and store the result in locations 52H.
3. Write an assembly language program to subtract an 8-bit number stored in register R5 from another number stored in R6 and store the result in location 9400H.
4. Write an assembly language program to add the values of locations 50H and 51H and store the result in locations 52H and 53H.

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2ND ASSIGNMENT

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Microprocessor: 8085

SET 1(for familiarization with 8085 Microprocessor Simulator):

1. Write an assembly language program to **ADD** two data bytes which are stored in general purpose registers. Store the result in memory location ABC0H.
2. Write an assembly language program to **SUBTRACTION** two data bytes which are stored in memory location starting from D600H. Store the result in memory location B000H.
3. Write an assembly language program to determine (i) **AND** & (ii) **XOR** operation on two data bytes which are stored in general purpose registers. Store the result in memory location 8500H & 8501H, respectively.
4. Write an assembly language program to determine 2's **COMPLIMENT** of the contents of memory location 9500H. Store the result in memory location 9600H.

SET 2(for submission):

1. Write an assembly language program to **ADD** two data bytes which are stored in memory location starting from D600H. Store the result in memory location B000H.
2. Write an assembly language program to **SUBTRACTION** two data bytes which are stored in general purpose registers. Store the result in memory location B600H.
3. Write an assembly language program to determine $F = X'Y + XY'$ on two data bytes which are stored in general purpose registers. Store the result in memory location 8600H.
4. Write an assembly language program to **MASK** the lower four bits of an 8-bit number stored at 9000H. Store the result in Register D.
5. Write an assembly language program to **ADD** the two 16 bits numbers, 1234H & ABCDH, which are stored in BC & DE register pair, respectively. Store the sum and carry in two consecutive memory locations starting from 9700H.