MIT Practical Exam

Practical No.	Problem Statement
1.	In an analysis, the microcontroller will be sent into space, where it will be presented to high energy grandiose beams, which may cause it to avoid at least one or more instruction in its program. The number arithmetic computations and the capacity into X have been solidified however, so in any event, when an instruction is skipped, the value of X is retained, and the remainder of the sequence keeps on executing. The analysts might want to know for a given program, executing on this microcontroller in space, what will be the largest value that could be put away when the program halts. You are given a program written on Simple Language. There's only one variable called in this programming language. Initially, x=0. The program consists of n lines. Each line is one of the following: add y(y is an integer) — add y to x. set y (y is an integer) — set the value of x to y. Here's an example program and also illustrates what happens to after running each line: x = 0 add 5 x = 5 add -3 x = 2 set 1 x = 1 add -2 x = -1 add 5 x = 4 Given a program, your task is to remove some lines (possibly none or all of them) in such a way that the value of after running the resulting program will be the maximum. Find this maximum value. **Input Format** The first line contains a single integer that defines the number of operations to be performed. The next lines describe relevant digits to be added or subtracted or similar kind of

operation. Each of these lines contains an instruction as described in the problem.

Output Format

Print the maximal value of X.
Sample Input 0

4
ADD 3
SQR
LDI 5
ADD 1
Sample Output 0

10

The following table lists all of the possible values of X after each instruction, taking into consideration whether the previous instructions had been executed or not.

Instr	$\{X\}$ (no exec)	$\{X\}$ (exec)
	0	0
ADD 3	0	3
SQR	0, 3	0, 9
LDI 5	0, 3, 9	5
ADD 1	0, 3, 5, 9	1, 4, 6, 10

From the list of possible values, we see that 10 is the maximum value so we print that as our output.

Write an 8085 program for the given problem.

2. Write a 8086 program to implement the strncpy function: void strncpy(char * src, char * dest, unsigned char n) Use src and dest strings as 16-bit addresses, and n as a 8-bit number. If the length of the src string is less than n, the remainder of the dest string will be padded with nulls.
Input: Source string: MICROPROCESSOR AND INTERFACING
n=5
Output: MICRO

3. A small bank has a SmartCard system for all its employees. The locker room access is controlled by an 8085-based microcomputer system. Each bank employee has a

1-byte number on his or her SmartCard. Only n employees have permission to use the locker room (the door closes automatically after an employee goes in). n is specified in a byte at memory location 3000h. A list of n codes (n ≥ 0) is stored from location 3001h onwards. Write a program segment with an infinite loop that uses three subroutines - read card, operate door and check validity. Assume that the first two are given to you. read card interfaces with the SmartCard reader on the door lock, and returns the SmartCard number in register B. operate door uses the number in A prior to the call. If A contains FFh, it unlocks the door, else if A contains 00h, the door stays locked. In addition to the program segment above, write a suitable routine for check validity.
INPUT: n=5
OUTPUT: Get the value of register B. Sub-routine for validity.

4. Write a 8086 program to find Mean, Variance, Standard Deviation for a given set of data elements defined in the data segment.

5. Write a 8085 program to merge first *n* characters of first string and last *n* characters of second string and store the output from memory location 2000.

6.

The water level of two tanks should be monitored by a microprocessor. Set of six readings of the first tank recorded by six water sensors, stored at the memory location 2030H. A corresponding set of six readings from the second tank is stored at memory location starting at 2050H. Each reading from the first set is expected to be lower/equal than the corresponding reading from the second set. For example reading at location 2030H is expected to be lower/equal than the reading at the location 2050H and so on.

Write 8085 program to check the followings:

If all the readings of the first set is lower/equal than the corresponding reading from the second set, display 00 on output PORT1.

If any one of the readings from the first set is higher than the corresponding reading from the second set then display FF on output PORT1.

INPUT:

Data :

First set : 50, 52, 55, 56, 57, 60

Second Set: 53, 56, 60, 64, 6A, 6C

OUTPUT : 0 on PORT 1

7. Write 8086 ALP that finds the area of a rectangle. The Length and Breadth of the rectangle should be enter by the user through keyboard. The result of the operation must be stored in the DX register and display output screen as shown below. (Example. length = 4 and breadth = 5 then area = 20).

OUTPUT :

Enter Length of Rectangle : 4

Enter Breadth of Rectangle: 5

Area of Rectangle: 20

8. Write an 8085 program to calculate odd and even parity of a given array of 10 elements.

9. Write an 8086 program to find the largest substring from given two strings.

10. Traffic Signal Controller

Write a 8085 program to provide the given on/off time to traffic lights (Green, Yellow, and Red) and two pedestrian signs (Walk & Don't Walk). The signal lights and signals are turned on/off by the data bits of an output port as shown below

1. Green D0 15 seconds
2. Yellow D2 5 seconds
3. Red D4 20 seconds
4. WALK D6 15 seconds
5. Don't Walk D7 25 seconds

The traffic and pedestrian flow are in same direction, the pedestrian should cross the road when Green light is on

D7 D6 D5 D4 D3 D2 D1 D0
0 1 0 0 0 0 1 0 = 41H
(15 second delay)
1 0 0 0 0 1 0 0 = 84H
(5 second delay)
1 0 0 1 0 0 0 0 = 90H