National University of Computer and Emerging Sciences

Prefinal

Computer Organization and Assembly Language

Prefinal

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Class	DS3
Semester	Fall 2022

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Objectives

- Display memory
- Bit Manipulation
- Subroutines

Contents

==Note for all questions==: You can make as many memory variables and subroutines as you need. Must read all the manual before starting.

ACTIVITY 1:   [20 Marks]

Initialize AX with last 4 digits of your roll number as **Hexadecimal number** (for example, if your roll number is 16L-4195 then AX should be initialized with 0x4195). Write a subroutine which separates every digit of your roll number.

$$[d1,\ d2,\ d3,\ d4] = Digit\_Separator(0x4195)$$

Write another subroutine to determine r and l described as follows:

If your roll number is 16L-4195 then

$$r = \frac{d1+d2+d3+d4}{4} = (4 + 1 + 9 + 5)\ shiftright\ by\ 2bits = 4$$

And

$$l = r + 3 = 6.$$

ACTIVITY 2:   [20 Marks]

Initialize AX with last 4 digits of your roll number as **Hexadecimal number** (for example, if your roll number is 16L-4195 then AX should be initialized with 0x4195).

Write a program which performs *Recursive Swapping* and returns Yellow highlighted answer from your roll number.

For Example:

AX	Contents of AX (Your Roll #)
Before	4 1 9 5
Mask1	? ? ? ?
Step1	9 5 4 1
Answer	9 5 4 1
Mask2	? ? ? ?
Step2	5 9 1 4
Answer	5 9 1 4

Hint! First, swap two bytes using **Mask1**, then swap every nibble of both bytes together using **Mask2** to finally result the Answer.

PF_Array for Activity 3,4,5
Initialize a *PF_Array* of 100 numbers as shown below.

PF_Array: dw 566, 189, 243, 60, 131, 403, 238, 612, 32, 26, 285, 501, 503, 241, 758, 98, 380, 545, 99, 659, 652, 580, 232, 530, 956, 701, 790, 967, 958, 745, 341, 400, 988, 20, 384, 571, 126, 886, 549, 983, 619, 876, 369, 221, 474, 818, 900, 983, 178, 176, 824, 188, 141, 467, 128, 705, 200, 885, 647, 841, 571, 551, 909, 499, 456, 796, 766, 530, 68, 51, 559, 927, 444, 188, 452, 688, 526, 307, 267, 572, 315, 512, 481, 824, 72, 905, 581, 937, 300, 42, 31, 914, 971, 872, 633, 632, 794, 666, 406, 133

ACTIVITY 3:   [20 Marks]

Write a program which finds the top three numbers from *PF_Array* without using any sorting algorithm.

ACTIVITY 4:   [20 Marks]

Write a program which sorts the first 50 values of *PF_Array* in ascending order and the next 50 values in descending order. Make a new array **PF_Dual_Sort** and store the answers.

Show in memory all the sorted array values, in the form of screenshots.

ACTIVITY 5:   [20 Marks]

Write a program which prints the **PF_Dual_Sort** from activity 4 on DosBox console in Text Mode (25X80).