National University of Computer and Emerging Sciences

FAST School of Computing **Spring-2023** **Islamabad Campus**

EL-2003: Computer Organization and Assembly Language Lab

Serial No:

Final Exam

Total Time: 1.00 Hours

Total Marks: 40

Thursday , 27 April, 2023

_____

Signature of Invigilator

Lab Instructor

Zonera Anjum

Student Name Roll No. Section Signature **Submission Time**

DO NOT OPEN THE QUESTION BOOK OR START UNTIL INSTRUCTED.

Instructions:

1. Attempt all of them. Read the question carefully, understand the question, and then attempt it.
2. No additional sheet will be provided for rough work. Use the back of the last page for rough work.
3. After asked to commence the exam, please verify that you have **4** different printed pages including this title page. There are total of **4** questions.
4. Submit **rollnumber_final.zip** containing asm files with naming convention **Q1.asm** files. Any other naming convention will lead to negative marks.
5. Make sure your work is dosbox and masm 615 compatible. Using high level directives is strictly not allowed.
6. Exam is close book, 'F' grade will be awarded on cheating case.

	Q-1	Q-2	Q-3	Q-4	Total
Marks Obtained					
Total Marks	**15**	**10**	**5**	**10**	**40**

NOTE:

1. **Submit Rollnumber_FinalExam.zip containing task1.asm, task2.asm so on. Your work will be checked on DOSBox and masm615.**
2. **No submission will be accepted other than this pattern. No late submission will be acceptable.**
3. **High–level directives are strictly not allowed.**

Question 1 [15 Marks]

Given a square matrix A of dimensions' n x n, rotate the matrix 90 degrees clockwise without using any additional data structures.

Example:

A:

| 1 2 3 |
| 4 5 6 |
| 7 8 9 |

Rotated A:

| 7 4 1 |
| 8 5 2 |
| 9 6 3 |

Question 2 [10 Marks]

Write a program that calculates the frequency of each element in a given array of signed integers. The input array should be taken from user, and show the number of frequency.

Example:

Input Array: -2 , 3, 1, 3, -2, 1, 1, -2

Output Frequencies:

Frequencies: -2: 3
3: 2
1: 3 |

Question 3 [5 Marks]

Write a program that reverses a given string. The input string should be stored in memory, and the reversed string should be stored in a different memory location.

Input String: "hello world"

Reversed String: "dlrow olleh"

Question 4 [10 Marks]

Convert this code into assembly 8086

```
cout << "Enter your age: ";
cin >> age;
cout << "Enter your income: ";
cin >> income;
cout << "Are you a student? (1 for Yes, 0 for No): ";
cin >> isStudent;
cout << "Do you have a car? (1 for Yes, 0 for No): ";
cin >> hasCar;

if ((age >= 18 && age <= 30) && (income >= 15000 || isStudent) && hasCar) {
    cout << "You qualify for a special car loan." << endl;
}
 else if (age >= 25 && income >= 25000 && !isStudent) {
    cout << "You qualify for a regular car loan." << endl;
}
else if (age >= 18 && income >= 20000 && !isStudent) {
    cout << "You qualify for a basic car loan." << endl;
} else {
```

```
    cout << "Sorry, you do not qualify for a car loan." << endl;

}



return 0;
```