Student Name :
Student ID :

Green University of Bangladesh

Department of Computer Science and Engineering

Lab Final Assessment, Fall 2023

Course Code: CSE 304   Course Title: Microprocessors and Microcontrollers Lab

Time: 1 Hour   Full Marks:30

Answer all the following questions:

[The values on the right-hand side indicate marks allocated for that question only and the [CO1] represents mapping of the question with one of the expected outcomes of the course.]

1. As a software developer for XYZ Microprocessor Solutions, you have been given a   10
    specific assignment by a client to implement a crucial assembly language feature for
    a specialized microprocessor. Creating a software that can effectively read two
    integer integers, X and Y, print the summation of the integers and print every number
    in between is the requirement. But the numbers we are going to print need to meet
    the requirement that the residual of a division of 5 is equals 2.

    Because of the microprocessor's restricted capabilities, the customer has
    underlined the significance of performance and resource optimization. It is up to you
    to write an assembly language program that satisfies this condition.

    Example:

Sample Inputs	Sample Outputs
10 20	Summation= 30 12,17
50 60	Summation=110 52,57

2. Imagine that you work as an assembly language programmer at Pinnacle   10
    Microprocessor Solutions, and a client has given the business a challenging task. The
    assignment is to write a complex software for their microprocessor that dynamically
    converts an input letter from uppercase to lowercase or vice versa. The trick comes
    in not being able to use standard techniques like lookup tables or pre-written
    conversion instructions. Beyond this, the application needs to show the transformed
    letter along with the letters that come before and after it in a single line. The
    microprocessor's limited resources, which necessitate an optimal approach to
    register and memory utilization, further complicate matters.

Success depends on how well the software can handle a range of user inputs while remaining accurate, efficient, and compliant with the given limitations. Developing a creative assembly language solution that not only satisfies these needs but also uses resources effectively is the problem.

Example:

Sample Inputs	Sample Outputs
r	Input's Capital/Small Form: R Previous-Input-Next Letter: rst
N	Input's Capital/Small Form: n Previous-Input-Next Letter: MNO

3. As a software architect at Quantum Microsystems, you've been presented with a perplexing challenge. The task involves devising an assembly language program for their cutting-edge microprocessor, focusing on a group of ten individuals—Rahul, Tina, Rina, Mina, Ani, Bob, Rohan, Moly, Rani, and Mechel. The program should intricately capture the first letters of their names, incorporating them into an array. The complexity lies in unraveling the chronological order of the letters in the array, representing the order of the individuals' names. However, the challenge intensifies with the program's requirement to clandestinely determine and display the count of names commencing with the elusive letters' 'M' and 'R.'

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   This enigmatic task demands not only an ingenious approach to assembly programming but also a subtle understanding of the intricacies involved in managing arrays, deciphering name sequences, and clandestinely counting specific initials within the microprocessor's constrained environment.

Example:

Sample Inputs	Sample Outputs
R T R M A B R M R M	Chronological Order: A B M M M R R R R T Name starts with M= 3 Name starts with R= 4

Note: Chronological order of the array must be done using a **PROCEDURE** and count the name starts with M and R must be passed by **MACRO**