**The University of Lahore, CS&IT Department**

**Programming Fundamentals**

**Assignment # 02**

**Start Date: 04/11/2024 Section: 2-I Total Marks: 20**

**Due Date: 08/11/2024** **Program: BSCS**

**Instructions**

1. Understanding the problems is part of the assignment. So, no query, please.
2. You will get zero marks if found any type of plagiarism.
3. No submission after due date.
4. Upload pdf file (handwritten make pdf).

**Q1: Write definitions and scenario base 1 example of each topic** **[10]**

Introduction to strings, initialization and assignment, Basic String operations, Length and Size, Concatenation, Accessing Characters, individual characters using indexing Modifying characters in a string.

String Comparison Equality and Inequality, Substrings, Finding Substrings, String Modification: Insertion and Deletion – characters or substrings, Replacing substrings

**Q2:** Suppose you are developing a text-based game where the player is given secret words to unlock hidden levels. One of the puzzles requires the player to identify whether the secret word is a **palindrome** (a word that reads the same forwards and backwards) **[5]**

**Task:** Write a program that takes a word as an input and checks if it is a palindrome. If it is, display a message saying "Congratulations! The word is a palindrome." Otherwise, display "Try again! The word is not a palindrome"

### Sample Output Screen:

|  |
| --- |
| Enter the secret word: madam  Congratulations! The word is a palindrome. |
| Enter the secret word: University  Try again! The word is not a palindrome |

### Q3: According to the Collatz problem, any positive integer a ends with 1 if it is operated iteratively according to the following two-pronged rule: [5]

### nn/2 (if n is even)

### nn+1 (if n is odd)

### For example, using the above rule and starting with n = 13, we generate the following sequence:

### It can be observed that this sequence (starting at 13 and finishing at 1) contains 10 terms. Although, it has not been proved yet but it is conjectured that all positive integers end with 1. Which starting number in first 1000 positive integers produces the longest chain?