United International University

Department of Computer Science and Engineering

Course Code: CSE 1112

Course Title: Structured Programming Language Laboratory || **Full marks:** 20

1 **Spell Sentence Determination** [10]

A sentence is considered a **Spell** if it meets the following conditions:

1. No word in the sentence has more than 9 letters.
2. If you concatenate the lengths of all the words as digits, the resulting number is a prime number.

Your task is to determine if a given string is a Spell.
For this task, you must implement the following functions (Note: You are not allowed to use functions from the string.h library):

- **int number_of_words(char str[]):** This function takes a string as a parameter and returns the number of words in the string. Words are separated by spaces only.
- **int nth_word_length(char str[], int n):** This function returns the length of the nth word in the string.
- **int is_prime(int number):** This function takes an integer as a parameter and returns 1 if the number is a prime, otherwise 0.
- **int is_spell(char str[]):** This function returns 1 if the string is a Spell, otherwise 0. You should use the number_of_words(), nth_word_length(), and is_prime() functions to accomplish this.

In the main function, you must take a string as input and print whether it is a Spell or not.

Sample Input and Output:

Sample Input	Sample Output	Explanation
Avada Kedavraaa	Yes	Two words with lengths 5 and 9, form the number 59, which is a prime. So, it is a Spell.
Hello World, I love C	No	Five words with lengths 5, 5, 1, 4, and 1, form the number 55141, which is divisible by 3. Hence, it is not a prime and not a Spell.
Every end is a new beginning in disguise	No	Eight words with lengths 5, 3, 2, 1, 3, 9, 2, and 8, form the number 53213928, which is divisible by 2. Hence, it is not a prime and not a Spell.
Obligatory programming course	No	The first word has 10 letters, so the string is not a Spell.

2. Imagine yourself as a member of the SPL LAB project team, "UIU-ULTRON," Your team wants to develop a student information management system for the UIU administration. This system will store and manage student records, including **ID** (int), **Name** (String), and **CGPA** (float). During a recent project meeting, one of your teammates proposed using structures to implement the system. However, the team wants to develop more complex features to secure a place in the project showcase. Unfortunately, you were absent from the feature finalization meeting, but your team has entrusted you with the coding responsibilities since you are good at writing functions and problem-solving. [10]

   Finalized Features of the System:

   The system will present a menu with the following four options:

   1. **Add New Student** – Allows the user to input a student's ID, Name, and CGPA and store it in the system.
   2. **Find Top Student (Highest CGPA)** – Identifies and displays the student ID and name with the highest CGPA.
   3. **Find Average CGPA of Students** – Calculates and displays the total number of students and their average CGPA.
   4. **Display All Students Information** – Prints all students' ID, Name, and CGPA in the system.

   One of your teammates provided a helpful hint regarding the formula for calculating the average CGPA.

   $$\text{AverageCGPA} = \text{Sum of CGPA of all the students} / \text{number of the students}$$

   Now, it's your responsibility to implement the entire system efficiently.

   Sample Output:

```
===== Student Management System =====
1. Add New Student
2. Find Top Student (Highest CGPA)
3. Find Average CGPA of Students
4. Display All Students Information
5. Exit
Enter your choice: 1

Enter Student ID: 101
Enter Student Name: Sarah Zaman
Enter CGPA: 3.85
Student added successfully!

Enter your choice: 1
Enter Student ID: 102
Enter Student Name: Farhan Jabir
Enter CGPA: 3.90
Student added successfully!
```

Enter your choice: 2
Top Student:
ID: 102 Name: Farhan Jabir CGPA: 3.90

Enter your choice: 3
Total Students: 2
Average CGPA: 3.875

Enter your choice: 3
Student Information
ID: 101 Name: Sarah Zaman CGPA: 3.85
D: 102 Name: Farhan Jabir CGPA: 3.90