SET A

United International **University**

Department of **C**omputer **S**cience and **E**ngineering

CSE 1112: Structured Programming Language Laboratory

Trimester: Summer 2024

Final Examination, Total Marks: 25, Total Time: 1 Hour

Any examinee found adopting unfair means will be expelled from the trimester/program as per UIU disciplinary rules.

Write the following C programs using a C compiler (e.g., Code::Blocks) within the given time. After completion, present the code to your examiner for evaluation.

Name:	**Student ID:**

Problem 1 [Marks: 13] - Hospital Patient Management System

You are required to develop a **C program** that manages patient records in a hospital. Each patient has specific details, including their name, age, gender, ID, and a condition description. The program should allow users to perform the following operations using a menu-driven approach:

- **Add a New Patient:** This allows the user to enter the details of a new patient and store them in the hospital records.
- **Search for Patients by ID:** This allows the user to search for a patient by their ID and display their details.
- **Update Patient Condition by ID:** This allows the user to update a patient's condition by providing their ID.
- **Display the List of All Patients:** This displays the details of all patients currently registered, with recovered patients listed first.
- **Exit the Program:** This terminates the program.

You must first create a structure named `Patient` to store the following details:

- Name (String)
- Age (Integer)
- Gender (Character: 'M' for male, 'F' for female)
- ID (Integer)
- Condition (String)

The program should use an array of `Patient` to store up to **100 patients**.

Instructions:

- Implement the menu using conditional statements (if-else or switch-case).
- Ensure that the maximum number of patients that can be recorded is 100.

Sample Input/Output:

```
Hospital Patient Management System:
1. Add a new patient
2. Search for a patient by ID
3. Update a patient's condition
4. Display all patients
5. Exit

Enter your choice: 1
Enter patient name: John Doe
Enter age: 45
Enter gender (M/F): M
Enter ID: 1002
Enter condition: Flu
Output: The patient added successfully.

Enter your choice: 2
Output: Enter patient ID to search: 1002
Patient Records:
ID: 1002, Name: John Doe, Age: 45, Gender: M, Condition: Flu

Enter your choice: 3
Enter patient ID to update: 1002
Enter new condition: Recovered
Output: Condition updated successfully.

Enter your choice: 4
Output:
Patient Records:
ID: 1002, Name: John Doe, Age: 45, Gender: M, Condition: Recovered

Enter your choice: 5
Output: Exiting the program.
```

Problem 2 [Marks: 12] - Spell Sentence Determination

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.