

United International University

Department of Computer Science and Engineering

Final Examination Summer 2023Course Code: **CSE 1112** Course Title: **Structured Programming Language Laboratory**

Date: September 12, 2023 Time: 11:30 AM – 12:30 AM (1 hour) Full marks: 25

Name:

Student ID:

Write down C programs for the following problems in Code Blocks (or any C compiler you prefer), and present the code to your instructor after the time is up. You can make rough calculations in this paper.

Problem 1 (Marks: 12)

In the arcane territory of Fibonia, there exist numbers called "Fibonacci Warriors." These aren't just your regular Fibonacci numbers. A Fibonacci Warrior is a number that belongs to the Fibonacci series and has an even count of odd digits (remember 0 is an even number). Legendary numbers like 13 (two odd digits), 144 (two odd digits), and 1597 (four odd digits) have echoed throughout the annals of Fibonia's history.

Your calling is to create a program that identifies the Fibonacci Warriors within a given range.

- int is_fibonacci(int x):** This checks if incanted number x is a part of the Fibonacci series. Return 1 (true) if it is and 0 (false) if it isn't.
- int count_odd_digits(int x):** Using recursion, this function counts the number of odd digits in a given number x. It will return the count upon completion.
- int is_warrior(int x):** A function that combines the power of the previous two functions. It checks if a number is both a Fibonacci number and has an even count of odd digits. Return 1 (true) for a confirmed warrior and 0 (false) otherwise.
- void list_fibonacci_warriors(int limit):** With the strength of the ancients, this spell will unveil all the Fibonacci Warriors up to the specified limit starting from 1, revealing them for all Fibonians to behold.

Sample Input	Sample Output
Enter the upper range: 300	Amicable number pairs within the range 300: 2, 8, 13, 55, 233,

Problem 2 (Marks: 13)

Imagine you are developing a ticket management system for a local theater. The theater has a variety of shows, and each show has specific details and tickets associated with it.

Requirements:

- Show Details: Every show in the theater has the following details:
 - Name of the show (a string)
 - Total tickets (an integer)
 - Tickets currently available (an integer)
- Create a structure named Show to hold the details of each show.
- Functions:
 - **addShow>Show *listings, int *numShows**): Allows the management to add a new show to the system. Make sure (Here, listings is a pointer to an array of Show structures and numShows is the current number of shows listed.)
 - **bookTicket>Show *listings, int numShows, char *showName**): Allows a user to book a ticket for a particular show using its name. This function should decrement the number of available tickets for the chosen show. If no tickets are available, print a message to inform the user.
 - **displayShows>Show *listings, int numShows**): Prints the details of all the shows listed in the theater.
- In the **main()** function:
 - Create an array of Show structures. This will represent the theater's show listings.
 - Provide a menu for management to add shows and allow users to book or cancel tickets, as well as display all available shows.

NOTE: Ensure that when booking, the number of available tickets never exceeds the total number of tickets for that show.

Sample Input/Output (bold -> user input, regular text -> console print)
1. Add a show 2. Book a ticket 3. List out the shows 4. Exit What do you want? 1 Name of the show: Princess Mononoke Total tickets: 200 Tickets currently available: 1
1. Add a show 2. Book a ticket 3. List out the shows

SET A

4. Exit

What do you want? **2**

Please name a show: **Princess Mononoke**

You have successfully booked a ticket!

1. Add a show

2. Book a ticket

3. List out the shows

4. Exit

What do you want? **2**

Please name a show: **Princess Mononoke**

Oops! There is no ticket left.

1. Add a show

2. Book a ticket

3. List out the shows

4. Exit

What do you want? **3**

Show no 1

Name of the show: Princess Mononoke

Total tickets: 200

Tickets currently available: 0