United International University
Department of CSE

CSE 1112: Structured Programming Language Lab
Final Examination | Fall 2022
Time: 2 Hours | Full Marks: 25

CLASS ID: NAME:

1. Eleven is overwhelmed by the recent outbreak of Demogorgon unleashed by Vecna. Every Demogorgon is marked with a specific number. Write a Program that will detect all Demogorgon Numbers in between TWO Ranges given by Eleven. **[8]**

Demogorgon numbers are those numbers that have the following CONDITIONS:

[CONDITION 1] Sum of ODD digits is less than the Sum of EVEN digits in that number.

[CONDITION 2] It is a Prime number but not a Strong Number

Write following functions to solve this problem:

int DemogorgonNumber (int a): if DEMOGORGON returns 1 else returns -1
int checkerFunc1 (int a): if CONDITION No. 1 is true returns 1 else returns -1
int checkerFunc2 (int a): if CONDITION No. 2 is true returns 1 else returns -1
int primeChecker (int a): if PRIME returns 1 else returns -1
int defectiveChecker (int a): if DEFECTIVE returns 1 else returns -1
int factorial (int a): return Factorial value of a

***STRONG NUMBERS:** Strong number is a number whose sum of all digits' factorial is equal to the number 'n'. So, to find a number whether its strong number, we have to pick every digit of the number like the number is 145 then we have to pick 1, 4 and 5 now we will find factorial of each number i.e, 1! = 1, 4! = 24, 5! = 120. Now we will sum up 1 + 24 + 120 so we get 145, that is exactly same as the input given, so we can say that the number is strong number.

Sample Input	Sample Output
`130 430`	`163 181 223 241 263 281 283 383 401 421`
`1005 1250`	`1061 1063 1163 1181`

2. WAP that takes n as input and print up to nth Fibonacci number with following special character after each of the number. **[8]**

a. If Even Then $
b. If Odd Then #
c. If 0 Then &

Note that after the last number there will not be any special character

Sample Input	Sample Output
`5`	`0 & 1 # 1 # 2 $ 3`
`7`	`0 & 1 # 1 # 2 $ 3 # 5 # 8`

3 Ms. Isabella wants to find out her best 3 loyal customers. She has the following data of the customer:

- Customer ID
- Name
- Birthday: dd/mm/yyyy
- House: Gryffindor, Slytherin
- Purchase Cost of Last 3 Months **[9]**

For Example, 11034, Christopher Nolan, 11/06/1945, Gryffindor, [40, 56, 67]

Loyal Customer will be awarded to the person with the highest average purchase value from each House with the following additional criteria:

- If House is Gryffindor, he/she must contain "**est**" in his name.
- If House is Slytherin, he/she must contain "**rus**" in her name.

Write a Program to assist Ms. Isabella. Your Program must contain a structure that will be able to contain the data of a customer. If There is No Loyal Customer from a House Print Nil. Else Print the Customer Name, Birthday, and Average Purchase.

NOTE THAT - You must write a function named **`int substringChecker (char *mainString, char *searchString)`** and utilize that while searching a certain sub-string in another string. **[The Function must be called by Reference only]**

Input	Output	Explanation
Num of Customer: 3 Customer 1: Name: Harry Potter Birthday: 11/01/1985 House: Gryffindor Purchase: 22 45 65 Customer 2: Name: Albus Severus Potter Birthday: 11/04/1987 House: Slytherin Purchase: 22 45 65 Customer 3: Name: Hermione Grenzer Birthday: 11/04/1985 House: Gryffindor Purchase: 21 42 65 Customer 4: Name: Severus Snape Birthday: 23/04/1967 House: Slytherin Purchase: 34 41 95 Customer 5: Name: Draco Malfoy Birthday: 11/04/1985 House: Slytherin Purchase: 100 41 45	List of Loyal Customers: Gryffindor: Nil Slytherin: Severus Snape | 23/04/1967 | 56.67	Both the Gryffindor Customers Violate the constraint that he/she must contain "**est**" in his name. Thus NIL. In Slytherin, the average purchase value is as follows: Draco Malfoy | 62 Severus Snape | 56.67 Albus Severus Potter | 44 Though Draco has the highest average, he doesn't have "**rus**" in his name. Thus, the Loyal customer from Slytherin is Severus Snape.