Department of Computer Science & Engineering

End Sem Examination

July 2022

Branch and Year: **2ndSemester**, **B. Tech. (R, S, T, U, L Section)**

Course: **CSL101 Computer Programming**

Duration**: 90 minutes**   Max. Marks: **35**

Note:

1. *State your assumptions clearly, if any.*
2. *Use meaningful variable names, and use properindentation.*

Q1 The book Id number is represented in the following pattern: 0-07-041183-2. The first part(0) **(6)** represents a region, the second part(07) is a publisher, the third part(041183) is a book subject, and the fourth part(2) is a book code. The book code is calculated as below:

```
dig = (1 x first digit) + (2 x second digit) + (3 x third digit) +
……+ (9 x ninth digit)
```

Book code is remainder when the `dig` is divided by 7. Write a ***python*** program that reads Book Id as a number and checks whether it represents correct or valid Book Id.

Sample input and output -

```
Input: 0070411835
Output: Valid
Input: 1234567893
Output: Invalid                                                    CO1
```

Q2 Write a C program that reads an integer n and prints the sequence of order n. The first few strings of **(7)** the sequence are 0, 01, 0110, and 01101001, … Each successive string is obtained by flipping all of the bits of the previous string and concatenating the result to the end of the previous string.

Sample input and output -

```
Input: n = 0
Output: 0
Input: n = 1
Output: 01
Input: n = 2
Output: 0110
Input: n = 3
Output 01101001
Input: n = 4
Output: 0110100110010110                                        CO1, CO3
```

Q3 In a company, there are several branches. Let us consider a branch of that company having N **(5)** employees, if the manager is allotted to that branch(s) then he is known to everyone else in that branch. Note that the property of "known to everyone" is unique to a manager. Your task is to find the manager in that branch. Input from the user in main ( ), the square matrix M where if an element of row i and column j is set to 1 it means that i^{th} person knows j^{th} person. You need to write a function managerId ( ) which returns the id of the manager if present or else returns -1. The function managerId ( ) takes two arguments - the square matrix of N *N and its size N. Call managerId ( ) from the main ( ) output the information about the manager. Assume all diagonal elements to be 1 (as everyone knows him/herself) and there is at most one manager in the company.

```
Example:
No of persons N = 3
Input matrix:
1  0  1
0  1  1
1  0  1
Output: manager is person 3                                    CO2, CO3
```

Q4 A student database is to be maintained by the institute for placement. The student record should **(8)** contain Name (First Name, Last Name), Branch, RollNo., Date of birth, Placement Company name, annual package, and date of joining. There are a total of 500 students. Possible values of the fields are –

Name (First Name, Last Name) – {{Arun, kumar}, {Venkat, reddy} ...etc}
Branch – {CSE, ECE, CIV, MIN, EEE, MEC, ...etc}
RollNo. – {BT22CSE001, BT22ECE004, ...etc}
Date of birth – {06-02-2000, 05-03-1999, ...etc}
Company name – {Microsoft, dell, HP, Mahindra, ...etc}
annual package (in Rs)– {1500000, 2000000, ...etc}
date of joining – {20-07-2020, 30-08-2021, ...etc}

Appropriately assume the data type of the variables. Write a C program to -
a) Declare the typedef structure for student record.
b) Write a user-defined function to read the details of 500 students through user input.
c) Write a user-defined function that takes an array of the structure of student records as input parameter and prints the records in ascending order according to the annual package. If the annual package is the same, then break the tie by the alphabetical order (a to z) of the first name.

CO2, CO3

Q5 The instructor for the course CSL-101 wants to determine the college rank secured by all students in **(9)** 5 different sections in the college. The files `W.txt, X.txt, Y.txt, Z.txt,` and `N.txt`contain the records of students in sections `W, X, Y, Z,` and `N` respectively. Each

record consists of a roll number and the marks obtained by the respective student. The sample records are as follows:

W.txt	X.txt	Y.txt	Z.txt	N.txt
W001 45	X001 63	Y001 42	Z001 45	N001 52
W002 75	X002 14	Y002 76	Z002 36	N002 10
W003 56	X003 62	Y003 34	Z003 22	N003 40
W004 40	X004 45	Y004 54	Z004 82	N004 62
W005 25	X005 85	Y005 90	Z005 86	N005 65
.	.	.	.	.
.	.	.	.	.

Write a C program to rank all students based on total in non-increasing / descending order. In case of ties in marks, they get the same rank. If k students get the same rank, say m, then the next rank starts from m + k. That is, if there are 3 students who get rank 6, having received equal marks, then the rank of the student with the next highest marks is 9. Create a file called "rank.txt" and store the rank-wise records of students from all 5 different sections as per the above criteria. Note: The number of records in each file is not known prior.

CO1, CO2, CO3