National University of Computer & Emerging Sciences, Karachi
Fall-2020 CS / SE / AI / DF Department
Final Examination
4th January 2021, 8:30 am – 11:30 am

Course Code: CS118	**Course Name:Programming Fundamentals**
Instructor Name: M.Shahzad/Basit Ali / S. Zain / Atiya / Musawar / Nida	
Student Roll No:	**Section No:**

Instructions:

- Return the question paper and make sure to keep it inside your answer sheet.
- Read each question completely before answering it. There are **6 questions on 1 page**
- In case of any ambiguity, you may make assumption. But your assumption should not contradict any statement in the question paper.
- You are **not allowed to write** anything on the question paper (except your ID and group).

Time: 180 minutes. **Max Marks**: 100 Points

Q1. Consider the following program, where the comments at the beginning of each line represent a line number. ***[25 minutes, 3 x 8 = 24 Points]***

```
/*  1 */ #include <stdio.h>
/*  2 */ int main() {
/*  3 */    FILE *textfile;
/*  4 */    int score;
/*  5 */    int s[10];
/*  6 */    int n = 0;
/*  7 */    inti;
/*  8 */    textfile = fopen("source.txt", "r");
/*  9 */    if (textfile == NULL) {
/* 10 */       printf("Can't open scores.txt\n");
/* 11 */       exit(1);
/* 12 */    }
/* 13 */    for (;;) {
/* 14 */       fscanf(textfile, "%d", &score);
/* 15 */       if (score == -1) break;
/* 16 */       s[n] = score;
/* 17 */       n++;
/* 18 */    }
/* 19 */    close(textfile);
/* 20 */
/* 21 */    s[n] = 99;
/* 22 */    n++;
/* 23 */
/* 24 */    textfile = fopen("source.txt", "w");
/* 25 */    for (i = 0; i< n; i++) {
/* 26 */       fprintf(textfile, "%i ", s[i]);
/* 27 */    }
/* 28 */    fprintf(textfile, "-1\n");
/* 29 */ }
```

a) If you run this program, what will the black box show?
b) Write briefly what lines 8-12 are doing.
c) Write briefly what lines 13-19 are doing.
d) Write briefly what lines 21-22 are doing.
e) Write briefly what lines 24-28 are doing.
f) If the file "source.txt" looks like: ***90 87 56 78 -1***, what will it look like after the program has run?
g) Suppose you run the program one more time. Now what will the file "**source.txt**" look like?

Q2.A newly launched company advertises its employee recruitment process. They designed their form on the portal in such a way which omit the option whether the candidate is male or female. They decided to use the CNIC "XXXX-XXXXXXX-X" verification of Nadra. As, there is a secret behind every digit of its 13-digit number. The number comprises three parts. The first part, which contains five digits "XXXXX", identifies province, division, district, tehsil and union council. The second and middle part of the CNIC is for the family number of a citizen and third part which is only one digit is for the gender of a person, odd for man and even for female. Write a C program which uses structure to store the values of CNIC that contains three members namely FirstPart, SecondPart and ThirdPart. On the basis of CNIC values let the company know whether the candidate is male or female. ***[25 minutes, 8 Points]***

Q3. Mr. Patel family (He, his wife, one son and two daughters) wants to visit northern areas. Mr. Patel went to Faisal Movers Bus service for booking a ticket. He booked 5 seats for his family tour.

[30 minutes, 6x3 = 18 Points]

- **a)** Create an array of structure called Ticket details which include data members— Seat Number, a Bus Name, a price, destination city and a nested structure which includes the person details --- a traveller_ID(CNIC), a traveler name, his age and a contact number.
- **b)** You are required to assign the value of each ticket based on the person's age. If the age is below 15 or above 60 then the ticket price is 4500 otherwise the ticket price is 7000.
- **c)** Write a function named "calculate_bill", which calculates the bill of Mr. Patel. If the total bill exceeds to 10 thousands, give him a discount of 10% or if the total bill exceeds to 25 thousands, give him a discount of 20% or if the bill exceeds 50 thousands give him a discount of 30%. Your function should print the receipt with every detail of Mr. Patel.

Q4. Write a C program that calculates the number of *1s* in the entire 2D Array of MxN size using recursion. You will be rewarded ZERO marks if you use loops by any means in the program.

[30 minutes, 20 Points]

Example:

Input

1	0	0
0	1	1
1	0	1

Output
Count=5

Q5. Write a program in C to replace a specific line with another text in a file. Your program must read the file name to open, the new text to replace and the line no. Finally display the content of the updated file.

[30 minutes, 15 Points]

Assume that the content of the file test.txt is:	**Sample input of Test Data:**	**Expected Output:**
test line 1 *test line 2* *test line 3* *test line 4*	*Input the file name to be opened: test.txt* *Input the content of the new line: line has been replaced* *Input the line no you want to replace: 2*	*test line 1* *line has been replaced* *test line 3* *test line 4*

Q6. Consider the given array containing N sentences declared in the main function.

[30 minutes, 15 Points]

```
char * txt[ ] = {"this sentence contains two", "one is so easy", "what is
two", "this cannot be three", "why is this not three", "no numbers here" };
```

Write a program that contains a function ***SaveInOrder***(). This function should receive the sentences contained in txt[ ] using appropriate parameters and then save it to a local 2D char array such that the sentences containing "*one*" be stored first, followed by the sentences containing "*two*", then sentences containing "*three*". The sentences containing neither of "*one*", "*two*" and "*three*" must be stored at the end.

********** Best of Luck**********