Department of Computer Science and Engineering

Exam: **Final** Year: **2021** Trimester: **Summer** Course: **CSE 1111/CSI 121**
Title: **Structured Programming Language** Marks: **25** Time: **1 hr 15 min + 15 min**

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

Answer all of the Questions given in the **Section-A** and **Section-B**. At first complete all the Questions in **Section-A** and then **Section-B**. Numerical figures in the right margin indicate full marks.

Section-A

Show the **manual tracing** for each of the programs (assume they are syntactically correct) given below. In the programs, LAST_FOUR_DIGITS_OF_YOUR_STUDENT_ID is used. For example, your STUDENT ID is 011202017 and therefore, the value of LAST_ FOUR_DIGITS_OF_YOUR_STUDENT_ID is 2017. Below, **Use your own student ID**.

1. In the **manual tracing**, **show** the values of the **globally declared** variables ***a***, ***b***, and ***c*** every time their values change. **[2.5]**

```
#include<stdio.h>
int a, c;
float b;
int func1(float x);
void func2(int *x, float y);
void main(){
        a = LAST_FOUR_DIGIT_OF_YOUR_STUDENT_ID % 39;
        b = func1(a);
        func2(&a, b);
 }
int func1(float x) {
        c = x + a;
        func2(&c, b);
        return c;
}
void func2(int *x, float y){
        *x *= 2;
        y = a;
}
```

2. In the manual tracing, show the value of variable ***my_str*** every time its value changes: **[2.5]**

```
#include<stdio.h>
#include<string.h>
#include<ctype.h>
int main(){
   char arr[5][20] = {"Elon Musk", "Sundar Pichai", "Steve Wozniak", "Steve Jobs",
                      "Mark Zuckerberg"};
   char my_str[50], temp_str[50];

   int a = LAST_FOUR_DIGIT_OF_YOUR_STUDENT_ID % 5;
   int b = LAST_FOUR_DIGIT_OF_YOUR_STUDENT_ID % 4;
   int c = LAST_FOUR_DIGIT_OF_YOUR_STUDENT_ID % 6;

   strcpy(my_str, arr[a]);
   my_str[b] = toupper(my_str[c]);
   strncpy(temp_str, arr[b], c);
   strcat(my_str, temp_str);
}
```

3. **Write** the final content of the test.txt file. **[2.5]**

```
#include<stdio.h>
void main(){
        FILE *file;
        int i, sum, a = LAST_FOUR_DIGIT_OF_YOUR_STUDENT_ID;
        int num[] = {a, a%10, a%20, a%30, a%40};
        file= fopen("test.txt", "w");
        fprintf(file, "%s\n", “Hello Vaxxers!”);
        for(i=4; i>=0; i--){
                fprintf(file, "%d\n", num[i]);
        }
        fclose(file);
 }
```

4. What is the output of the following code? **[2.5]**

```
#include<stdio.h>
int main(){
   int b = LAST_FOUR_DIGIT_OF_YOUR_STUDENT_ID % 11;
   int a[5] = {b+1, b+2, b+3, b+4, b+5};
   int *p1,t,u,v,w;

   p1=a;
   t = (*p1)++;
   u = *p1;
   v = *++p1;
   w = *(++p1);

   printf("%d %d %d %d", t, u, v, w);
}
```

Section-B

5. Write a program that performs the following operations. **[5]**

a) Declare a global array "idValues" of int type and size 4 and initialize it with values a%11 + 3i, Where a= LAST_FOUR_DIGIT_OF_YOUR_STUDENT_ID and i is the index of array.

b) Implement a "takeInput" function that takes values from keyboard and populate the "idValues" array.

c) Implement an "elementProd" function that takes an array and its size as parameters. It multiplies all the elements of the array "idValues" and returns the result.

d) In the main function:

i) Call the function "takeInput".

ii) Call the function "elementProd" function passing the array and its size as arguments. Display the returned result.

e) Add appropriate prototypes of the functions.

6. Write a program that (i) **declares** a string **str_a** (of size (LAST_FOUR_DIGITS_OF_YOUR_STUDENT_ID % 11 + 30)) and **initializes** with "***Your own name, Your own student id***". (ii) **Take** input from user into **str_a**. This string may have alphabets and digits. (iii) **Store** only the numerical characters of str_a into another string str_b. (iv) If the string str_b doesn't contain any numerical character, **print** 0 (zero), otherwise, **print** str_b. Some example input/outputs are given below: **[5]**

	Example 1	Example 2	Example 3	Example 4
Input	123	abc	123abc	12ab34
Output	123	0	123	1234

7. Write a program that performs the following operations: **[5]**

a) (i) **Define** a structure named "Student_Info" with student_ID (string), student_Name (string), an array marks (float) to contain scores of 5 subjects. Use appropriate size for the strings.

(ii) Put default values with your own name, your own student id, and zeroes for marks.

b) In the main() function,

i) **Declare** an array "students" of Student_Info structure of size (LAST_FOUR_DIGITS_OF_YOUR_STUDENT_ID % 11 + 10).

ii) Take input from keyboard for all students in "students" array.