Department of Computer Science and Engineering

Exam: **Final** Year: **2021** Trimester: **Spring** Course: **CSE 1111/CSI 121**
Title: **Structured Programming Language** Marks: **40** Time: **1 hr 30 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 value of variables **num1** and **num2** every time their values change starting from initial value. **[4]**

```
int num1=-1, num2=-1;
int f1(float x);
void f2(int x, float y);
int main(){
        num1 =  LAST_FOUR_DIGITS_OF_YOUR_STUDENT_ID % 7;
        num2 = f1(num1);
        f2(12, 15.0);
        return 0;
}
 int f1(float x) {
        num2 = x*num1;
        return num2-1;
}
void f2(int num1, float num2){
        num1 = num1+num2;
        num2 = num1-num2;
}
```

2. In the **manual tracing**, **show** the value of variable **str1** every time its value changes. **[4]**

```
#include<string.h>
void main(){
        int a = LAST_FOUR_DIGITS_OF_YOUR_STUDENT_ID % 8;
        char str1[50] = “PUT_YOUR_STUDENT_ID”;
        char arr[8][20] = {"is truthful",
                           "is honest",
                           "is friendly",
                           "is brave",
                           "is trustworthy",
                           "is straightforward",
                           "is simple",
                           “is dependable”};
        strcat(str1, “-“);
        strcat(str1, arr[a]);
        strcpy(str1, strstr(str1, “s “));
}
```

3. **Manual trace** the values of **num** array elements**. Also, write** the final content of the input.txt file. **[4]**

```
#include<stdio.h>
void main(){
        int sum=0, a = LAST_FOUR_DIGITS_OF_YOUR_STUDENT_ID%7, num[4];
        FILE *fp= fopen(“input.txt”, “w”);
        fprintf(fp, “%s\n”, “Good Morning”);
        for(int i=0;i<4;i++){
            num[i] = 2*i + a;
            fprintf(fp, “%d\n”, num[i]);
        }
        for(int i=0; i<4; i++){
            sum += num[i];
        }
        fprintf(fp, “%d”, sum);
        fclose(fp);
}
```

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

```
#include<stdio.h>
void main(){
        int a=LAST_FOUR_DIGITS_OF_YOUR_STUDENT_ID%7;
        int num[10], sum=0;
        for(int i=0; i<10; i++){
            num[i] = 3*i + a;
        }
        for(int i=0; i<10; i++){
            if(i%3 == 0){
                printf(“%d\n”,*(num+i));
            }
            sum += *(num+i);
        }
        sum /= 10;
        printf(“%d\n”, sum);
```

}

Section-B

5. Write a program that performs the following operations: **[8]**
   a) Implement a "**sumOfSevens"** function. The "**sumOfSevens"** function takes an int array and its size as parameters. It finds and returns the sum of all the array elements that are divisible by 7.
   b) In main() function,
      i) Declare an array "**scores"** of int type and size 5. At the same time, initialize the array with values **LAST_FOUR_DIGITS_OF_YOUR_STUDENT_ID%9 + 2i**, where i is the index of array.
      ii) Then, call the "**sumOfSevens"** function passing the array and its size as arguments.
      iii) Finally, display the returned value from the "**sumOfSevens"** function.

6. Write a program that takes a sentence from keyboard, makes the sentence camel/title casing (first letter of all words capital), appends **your student id** at the end of the sentence as the last word, and finally display the sentence. **[8]**

   For **example**, if your id is "011202017"
   Input = "It is a nice sunny morning today"
   Output: "It Is A Nice Sunny Morning Today 011202017"

7. Write a program that performs the following operations: **[8]**
   a) **Define** a structure "**Soldier**" with id (string), age (int), and weight (float) as members.
   b) In the main() function,
      i) **Declare** a variable **soldier1** of *Soldier* structure.
      ii) Take input from keyboard and assigns to the soldier1 member variables.
      iii) Display the information of soldier1 in the following format:

      Id: 011202017
      Age: 19
      Weight: 61