# United International University (UIU)

## Dept. of Computer Science & Engineering (CSE)

**Final Exam:: Trimester: Fall 2022**

**Course Code: CSE 1111, Course Title: Structured Programming Language**

Total Marks: **40** Duration: **2 hours**

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

**There are FIVE questions. Answer all the questions. Marks are indicated in the right margin.**

**Q.1** a) Write **output** of the following code, if **user inputs** are 21, 24, 27, 30, 33, 36, 39, 42... sequentially. **[ 4 ]**

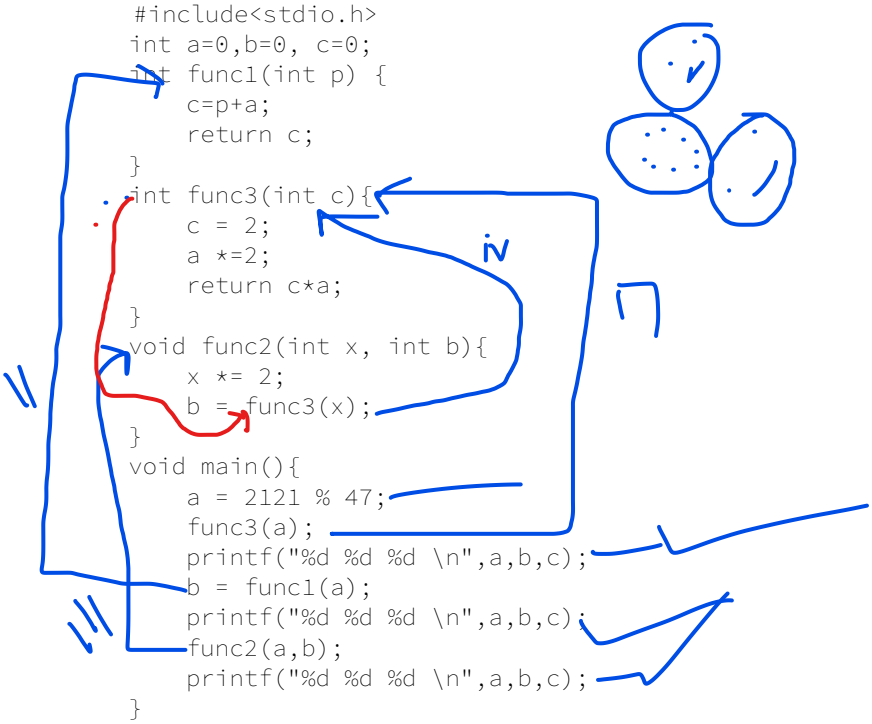
```
#include <stdio.h>
#define SIZE 4
void main(){
    int i, j, mat[SIZE][SIZE]={0};
    for(i=0; i<SIZE; i++){
        for(j=i+1; j<SIZE; j++)
            scanf("%d", &mat[i][j]);}
    for(i=0; i<SIZE-1; i++){
        for(j=i+1; j<SIZE; j++)
            scanf("%d", &mat[j][i]);}
    for(i=0;i<SIZE;i++){
        for(j=0;j<i;j++)
            mat[i][j]+=mat[j][i];}
    for(i=0;i<SIZE;i++){
        for(j=0;j<SIZE;j++){
            printf("%d\t",mat[i][j]);}
        printf("\n");}
}
```

b) Write a program that declares a 4x4 matrix and initializes it with the values given below. The program then calculates the **sum of all elements** that lies within the **"N" shape** as shown in the following figure. **[ 4 ]**

| | | | |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| 5 | 6 | 0 | 6 |
| 0 | 2 | 1 | 3 |
| 1 | 4 | 6 | 2 |

**Q.2** a) Find out the **output** of the following program. **[ 4 ]**

```
#include<stdio.h>
int a=0,b=0, c=0;
int func1(int p) {
    c=p+a;
    return c;
}
int func3(int c){
    c = 2;
    a *=2;
    return c*a;
}
void func2(int x, int b){
    x *= 2;
    b = func3(x);
}
void main(){
    a = 2121 % 47;
    func3(a);
    printf("%d %d %d \n",a,b,c);
    b = func1(a);
    printf("%d %d %d \n",a,b,c);
    func2(a,b);
    printf("%d %d %d \n",a,b,c);
}
```



**Q.2** b) There is a magical world of Narnia, where time is different from the time in this world and where animals can speak. The path to Narnia is through a cupboard. A very special cupboard which can also store items. **[ 4 ]**

(i) Suppose there are some drawers in the cupboard. Each drawer has different number of items stored. In **main()** function, declare two arrays, **items[]** and **add[]** of size 1000. Take an integer n and n integers to populate both the arrays from user.

(ii) Write a function **additems(int items[], int add[], int n)** which will take the declared arrays and n as the parameters and then increase every ith element of the array **items** by the corresponding ith element of the latter array. (Hint. If items[1]=10, add[1]=4 updated items[1]=14)

(iii) Now to open the door of the cupboard, a special password should be uttered. Write another function **openDoor(char password[])** which match the parameter password with the pre-defined password, "**Narnia**". If it matches, it will print a line- "Door to Narnia is open.". Otherwise, it will print- "There is no door".

(iv) In the main function, (a) after declaration and population of the arrays (as mentioned in (i)), (b) call the function **additems** passing arguments. (c) Then take a string as a user input and call the **openDoor** function passing that string as argument.

**Q.3** a) **Manually trace** the following code and show the values of **str1** and **str2** in each step. Assume "**Hello World**", and "**Programming is fun**" as input from keyboard for **str1** and **str2** respectively. **[ 4 ]**

```
char str1[100],str2[100], str3[100];
gets(str1);
scanf("%s",str2);
strncpy(str3,str1,8);
strncat(str2,str3,4);
strcpy(str3,str2);
strncat(str3,str1, 3);
if (strcmp(str2,str3)>0)
     strncpy(str1,str3,2);
else strncpy(str2,str3,2);
```

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**[ 4 ]**

b) Write a program to find whether a substring is present in the main string. You **cannot** use any built in functions of **string.h** header file.

| Sample Input | Sample Output |
|---|---|
| **Main string:** Today is a good day!!!<br>**Substring:** good | Substring matches |
| **Main string:** Today is a good day!!!<br>**Substring:** hello | Substring does not match |

**Q.4** Write a program that will store the following **information of a student** in a structure. **[ 8 ]**

a) **Name**, b) **ID**, and c) **Marks of 5 (five) CT's**,

Use **appropriate data types and variable names** for all the features. The program will also have the following functionalities:

i. Take input for **50 students** from the users.
ii. For each student, calculate the **total marks** of all the CT's.
iii. Find and print the **name of the highest marks scorer** for each CT's **separately**.

**Q.5** a) Show the **output** of the following program: **[ 4 ]**

```
void f1(int *arr, int n){
    for (int i = 0; i < n; i++){
        if (*(arr + i) % 2!= 0){
            printf ("%d\n", *(arr + i) + (i*2));
        }
    }
}
void main(){
    int arr[] = {2, 3, 6, 7, 11, 8};
    f1(arr, 6);
}
```

**Q.5** b) Write a program that performs the following tasks: **[ 4 ]**

(i) Reads the following "**Sample.txt**" file that has integer numbers on separate lines and store them in an integer array.

(ii) Create a new file "**Ouput.txt**" and save the even numbers from the integer array on separate lines in that file.

| **Name of the File** | `Sample.txt` | `Output.txt` |
|---|---|---|
| **Content of the File** | 1<br>2<br>3<br>4<br>5<br>6<br>7<br>8 | 2<br>4<br>6<br>8 |