



# United International University (UIU)

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

### Mid-term Exam: : Trimester: Spring 2023

Course Code: CSE 1111, Course Title: STRUCTURED PROGRAMMING LANGUAGE

Time: 1 hour 45 min Total Marks: 30

Answer all the questions. Figures are in the right-hand margin indicate full marks.

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

1. (a) Which of the following are **invalid** variable names? [1]  
(i) 1UIU (ii) SPL\_2023 (iii) char (iv) SPL\$ (v) My-Course
- (b) **Compute** the values of the variables **a, b, c** and **d**. [2]  

```
int a = (float)15/4;  
float b = a++*a--;  
int c = (a>b || a==1+2)*2;  
float d = a/c;
```
- (c) **Find the output** of the following program for (i) **b=10**, and (ii) **b=2**: [3]  

```
#include <stdio.h>  
int main() {  
    int b;  
    scanf("%d", &b);  
    if(b >= 10) {  
        printf("SPL\n");  
        b--;  
    }  
    if(b < 10) {  
        printf("Spring\n");  
        b--;  
    }  
    else if((b>=3) || (b<10))  
        printf("2023\n");  
    else if(b>=3 && b<10)  
        printf("Happy Coding!");  
    else  
        printf("Huh!")  
    return 0;  
}
```
2. (a) **Rewrite** the following code segment using “**switch ... case**” without [3]  
changing the logical meaning.  

```
int n, a;  
scanf("%d %d", &n, &a);  
if(n>a) {  
    if(n-a>5) {  
        printf("Difference is greater than 5 \n");  
    }  
    else {  
        printf("Difference is less than or equal to 5 \n");  
    }  
}  
else {  
    printf("Please give a larger value of n \n");  
}
```

- (b) **Manually trace** the following code segment and show the change of values of the variables **i, j, result, x, y** in each step. [3]

```
int result = 5, i, x = 2, y = 2;
for(int j = 8; j > 3; --j) {
    i = (j * result) / x;
    result += y;
    x += (y-2);
    y++;
}
```

3. (a) **Replace the nested “for” loop** in the following code using **nested “do ... while” loop** without changing the logical meaning of the program: [3]

```
int main() {
    int weeks = 2, days_in_week = 7;
    for (int i = 1; i <= weeks; ++i) {
        printf("Week: %d\n", i);
        for (int j = 1; j <= days_in_week; ++j) {
            if (i%2 == 0) {
                if(j%2 == 0)
                    printf("    Day: %d\n", j);
            }
            else{
                if(j%2 != 0)
                    printf("    Day: %d\n", j);
            }
        }
    }
    return 0;
}
```

- (b) **Write a C program** that takes an integer **n** as input from the user and **prints** the following pattern using nested loop. [3]

Sample input, n	Sample output
3	2 4 6 4 6 8 10 8 6
5	2 4 6 4 6 8 10 8 6 8 10 12 14 12 10 8 10 12 14 16 18 16 14 12 10

4. (a) **Write a C program** to perform the following operations- [3]
- Take input** of CGPA of 100 students
  - Calculate the average** of the CGPA of the students who achieved more than 3.00
  - Find out the **highest** and **lowest CGPA** and **how many students** achieved that highest CGPA.

- (b) **Draw a flowchart** to calculate the **summation of the following series** up to **1000000-th** term. [3]

$$1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \frac{1}{11} + \frac{1}{13} - \dots$$

5. (a) **Manually trace** the given code segment for the following array “**arr**”. Show the changes of all the variables in each step. [3]

```
#include<stdio.h>
int main()
{
    int arr[10]= {0};
    int k = 15;
    for(int i=1; i<6; i+=2)
    {
        arr[i] = ++k-2;
        k++;
    }
    int c = 0;
    for(int i=6; i<10; i++)
    {
        for(int j=10; j>=i; j--)
        {
            arr[j] = ++c;
        }
    }
    for(int i=0; i<10; i++)
    {
        if(i%2==0)
        {
            arr[i] = ++k;
        }
    }
}
```

- (b) **Manually trace** the following code snippet and **find the final content** of the **2D array “arr”** after the execution of the code. [3]

```
int arr[100][100], i, j, t1 = 0, t2 = 1, t3, x, y, z;
for(i=0; i<5; i++)
{
    x = t1, y = t2, z = t1+t2;
    for(j=0; j<5; j++)
    {
        t3 = t1 + t2;
        arr[j][i] = t3;
        t1 = t2;
        t2 = t3;
    }
    t1 = y;
    t2 = z;
}
```