# UNITED INTERNATIONAL UNIVERSITY (UIU)

## Department of Computer Science and Engineering (CSE)

**MID-TERM EXAMINATION** **SPRING, 2025**
**DURATION: 1 HOUR 30 MINUTES** **FULL MARKS: 30**

# CSE 1111: Structured Programming Language

Answer **all 3 (three)** questions. Figures in the right margin indicate full marks of questions.

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

1. Check out the following programs:

**a.c**

```
#include <stdio.h>

int main()
{
    int a = 5 != 6? -1.2 : 0.3;
    int b = 1 + a--;

    if(!b--)
        printf("Inside First IF\n");

    printf("a = %d and b = %d\n", a, b);

    if(a * b > 0 && b - a > 0)
        printf("Inside Second IF\n");

    else if(a + b < 0)
        printf("Inside ELSE IF\n");

    else
        printf("Inside ELSE\n");

    return 0;
}
```

**b.c**

```
switch(a * b)
{
    case 0:
    a = b + 2;
    b = a--;

    case 1:
    printf("a = %d and b = %d\n", a, b);
    break;

    case 2:
    a = b + 2;
    b = a--;

    case 3:

    case 4:
    break;
    printf("a = %d and b = %d\n", a, b);

    default:
    printf("Inside default\n");
}
```

a) Determine the output of the program **a.c**. [3]

b) Rewrite the code segment **b.c** using `if-else` block without changing the logical meaning. [3]

2. a) Determine the output of the following program: [4]

```
#include <stdio.h>

int main()
{
    int a = 8, b = 0, c = 0;

    do
    {
        if(a % 2 == 0) b++;
        else c++;

        printf("%d %d %d\n", a, b, c);

        if(a == 8) a = 3;
        else if(a == 3) a = 6;
        else if(a == 6) a = 9;
        else if(a == 9) a = 0;
    } while(a != 0);

    return 0;
}
```

b) Determine the output of the following program: [3]

```
#include <stdio.h>

int main()
{
    int n = 9;
    int i = 1;
    int j;

    for(j = i * 7; i < n / 2 && i != j; j = j - 1 + i)
    {
        j = j - 2 + i;
        printf("i=%d, j=%d\n", i, j);

        do{
            j += 3, n--;
        } while(j % 2 != 0);

        if(i == 1) continue;

        i++;
    }

    return 0;
}
```

c) Draw a flowchart for a rocket launch countdown system. The system should begin with a countdown timer set to 10 seconds. It should then: [3]

- Count down from 10 to 1, printing the countdown number each second.
- Once the countdown reaches 0, display an alert message "`Blasting Off!`"

d) Write a program that takes an odd integer n as input and displays a triangular pattern as demonstrated in the following table: [5]

| Sample Input | Sample Output |
|---|---|
| 3 | 0<br>101<br>21012 |
| 5 | 0<br>101<br>21012<br>3210123<br>432101234 |

3. a) Manually trace the following code segment for the array m[4]. Show the changes of all the variables. [4]

```
#include <stdio.h>

int main()
{
    int i, j, m[4];

    for(i = 0, j = 1; i < 4; i = i + 1, j = j + 2)
    {
        m[i] = i * i + j;
        printf("i = %d, j = %d, ", i, j);
        printf("m[%d] = %d\n", i, m[i]);
    }

    return 0;
}
```

b) Write a C program that reads 20 integers into an array, then determines how many of those numbers are even, and how many are odd. The program should also calculate and display the average of all 20 numbers. [5]