United International University (UIU)

Dept. of Computer Science & Engineering (CSE)

Mid Term Exam:: Trimester: Fall 2024

Course Code: CSI 121 / CSE 1111, Course Title: Structured Programming Language

Total Marks: **30** Duration: 1:30 hour

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

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

1 a) Determine which of the following variable names are invalid and explain why: [1]

(i) first_name (ii) @home (iii) int_ (iv) 1st_name

b) Compute the values of the variables a, b, c, and d. ASCII codes: 'A' = 65, 'a' = 97, '0' = 48.: [2]

(i) int a = 'B' - '7';

(ii) float b = (float)(2 % 5);

(iii) int n = 5, c = n-- + 3;

(iv) int d = (5 == 5) ? 1 : 0;

c) Determine the output of the following program (below left) for: [3]

(i) x = 6, y = 5

```
#include<stdio.h>
void main() {
   int x, y;
   scanf("%d%d", &x, &y);
   if ((x == y) || (x + y > 10)) {
      printf("Alpha\n");
      if (x % 2 == 0 && y % 2 == 0)
         printf("Both Even\n");
      else
         printf("Not Both Even\n");
   } else if (x > y) {
      printf("Beta\n");
      if (x - y > 5)
         printf("Difference > 5\n");
   } else {
      printf("Gamma\n");
      if (y % x == 0)
         printf("Divisible\n");
      else
         printf("Not Divisible\n");
   }
   if (x!=0 && y!=0)
      printf("End\n");
}
```

C code for **1(c)**

```
switch(x-y){
    case 1: int d = x-y;
            printf("%d", d);

    case 2: break;

    case 5: d = i++;

    case 7:

    default:
            printf("%d", d);
}
```

C code for **2(a)**

2 a) Implement the given code segment (above right) using if..else statement without changing the logical meaning. [3]

b) Show manual tracing of variables **start, end** and **current** for the following code segment. [3]

```
int start = 13, end = 16;
 for (int current = start; current <= end; current++) {
    if (current % 2 == 1) {
       printf("%d %d\n", start++, end + 5);
    } else {
       start += 3;
      --end;
    }
 }
```

3 a) Consider the following code segment. Rewrite the code again and replace the outer and inner for loops using while loops. [3]

```
for(int i=1,j=1;i<8;j+=2,i++){
   int n =i+j;
   for(n=n+2;n<12;){
      n++;
      printf("i=%d,j=%d and n=%d\n",i,j,n);
   }
}
```

b) Consider the following code segment. Your task is to draw a flowchart based on this code segment. [3]

```
int x,y,low,high;
   scanf("%d%d",&x,&y);
   if(x<y){
      low=x;
      high=y;
   }else{
      low=y;
      high=x;
   }
   printf("Low=%d and high=%d\n",low,high);
   int count = 0;
   while(low<=high){
      low+=2;
      high-=2;
      printf("Iteration no:%d\n",count++);
   }
```

c) Write a C program to print the following pattern of an hourglass. Take n as user input where n is odd. [3]

n=5	* * * * *
	  * *
	  *
	  * *
	* * * * *
		n=7	* * * * * * *
			  * *
			  * *
			  *
			  * *
			  * *
			* * * * * * *

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

```
int i,j, m[3];
   for (i=0, j = 5; i<3 ; i=i+1, j=j+2){
      m[i] = i*i + j;
      printf("\n i = %d, j = %d", i, j);
      printf("  m[%d] = %d ", i, m[i]);
   }
```

b) Write down a program to find out the 2nd largest number in an array of 10 integers. [3]

c) Manually trace the following code segment for the 2D array m[2][3]. Show the changes of all the variables. [3]

```
int i,j, m[2][3];
for (i=0; i<2 ; i++){
      printf("\n");
      for (j=0; j<3; j++){
         m[i][j] = (i +2*j)*10;
         printf(" (%d,%d):", i, j);
         printf("%d ", m[i][j]);
      }
}
```