United International **University (UIU)**
Dept. of Computer Science & Engineering (CSE)
Mid-term Exam: : Trimester: Summer 2023
Course Code: CSE 1111, Course Title: STRUCTURED PROGRAMMING LANGUAGE
Time: 1 hour 45 min   Total Marks: 30
Answer all the questions.
"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 and **why**? [1]

   (i) is-Val (ii) a1234 (iii) while (iv) _1num_new (v) CSE 1111

   (b) **Compute** the values of the variables **a, b, c, d** and **result**. [2]

   ```
   (i) float a = 22/4;
   (ii) int b = 2%7;
   (iii) int e = 4, c = 11 + ++e;
   (iv) int d = 2==3? 7:9;
   (v) double result = 3!=5;
   ```

   (c) **Find output** of the following program for (i) **a = 0, b = 0**, and (ii) **a = -1, b = -7**: [3]

   ```
   #include<stdio.h>
   void main(){
       int a, b;
       scanf("%d%d", &a, &b);
       if(!(a-b) && ++a)
           printf("Pattern\n");
       if((a>0&&b>0)||(a<0&&b<0)){
           printf("Fizz\n");
           if(a>0)
             printf("Positive\n");
           return 0;
           if(b<0)
             printf("Negative\n");
       }
       else if(a>0 && b<0)
           printf("Buzz\n");
       else printf("FizzBuzz\n");
   }
                 C Code for 1(c)
   ```

   ```
   char rank;
   scanf("%c", &rank);
   int bonus = 0;
   switch(rank) {
       case 'p':bonus += 20;
       case 'g':bonus += 20;
       case 's':bonus += 20;
                break;
       default: bonus += 10;
   }
   printf("\n%d", bonus);
              C Code for 2(a)
   ```

2. (a) **Rewrite** the code segment (see **above right**) using "**if … else**" without changing [3] the logical meaning.

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

   ```
   #include <stdio.h>
   void main() {
       int i = 2, n = 10, j=0;
       for(j = n; j > i; j--) {
           if(j % 2 == 0) i++;
           else n--;
       }
       i += 2;
   }
   ```

3. (a) **Write a C program** that takes an integer **n** as input from the user and **prints** a [3] specific pattern given as follows. For example, for **n = 4**, the output pattern will be as follows. You must program for n, NOT for 4.

```
 *****
  *****
   *****
*****
```

(b) **Replace** all the **"for" loops** in the following code using only **"while" loops** [3] without changing the logical meaning of the program.

```
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=9; j>=i; j--){
        arr[j] = ++c;
    }
for(int i=0; i<10; i++){
    if(i%2==0)  arr[i] = ++k;
}
```

4. (a) **Write a C program** that takes *n* number of **integers as input** into an array of size [3] *N*, where *n* is an odd number and *n<=N*. Your task is to **reverse the first half** array elements and the **last half** array elements, keeping **only the middle element** intact.

Initial Array Elements	Final Array Elements
1 2 3 4 5 6 7	3 2 1 **4** 7 6 5
10 20 30 40 50	20 10 **30** 50 40
9 8 7	9 **8** 7

(b) **Draw a flow chart** to take an integer as input. Then, display its **odd factors** and [3] calculate the **sum** of its **even factors**. Hint: any integer number is a multiple of any of its factors.

Sample input	Sample output
20	1 5 [Odd factors] 36 [Sum of the even factors: 2 + 4 + 10 + 20 = 36]
28	1 7 [Odd factors] 48 [Sum of the even factors: 2 + 4 + 14 + 28 = 48]

5. (a) **Manually trace** the given code segment. Show the changes of all the variables **i, j,** [3] **jump**, and **array A and B elements** in each step.

```
int A[4]={3, 2, 1};
int B[4]={10, 20, 30};
int jump=100;
for(int i=0; i<3; i++){
    jump = A[i] * 2;
    for(int j=0; j<3; j++){
        B[i] = A[i] + B[i];
        jump = B[i]/2;
    }
    A[i]++;
}
```

C Code for **5(a)**

```
int arr[][4]={{5, 7, 3, 13},
              {31, 2, 11, 23},
              {17, 19, 43, 53},
              {37, 47, 29, 61}};
int n=4, sum=0, x = 0;
for(int i = 0; i<n; i++){
    for(int j = 0; j<n; j++){
        if(j==n-1 || i+j==n-1){
            x = arr[i][j];
            sum+=x;
        }
    }
}
```

C Code for **5(b)**

(b) **Manually trace** the given code segment (see **above right**) and show the changes of [3] all the variables **i, j, x,** and **sum** in each step.