

# CS-1002 Programming Fundamentals BS(DS/AI)

Thursday, November 10, 2022

## Course Instructor

Mr. Adil Majeed, Ms. Ayesha Kamran, Dr. Hasan Mujtaba

Serial No:

## Sessional II

Total Time: 1 Hour

Total Marks: 60

Signature of Invigilator

Student Name

Roll No

Section

Signature

**DO NOT OPEN THE QUESTION BOOK OR START UNTIL INSTRUCTED.**

### Instructions:

1. Attempt on the question paper. Attempt all of them. Read the question carefully, understand the question, and then attempt it.
2. No additional sheet will be provided for rough work. Use the back of the last page for rough work.
3. If you need more space, write on the back side of the paper ( only for questions number II, III and IV ) and mark the question and part number etc.
4. After being asked to commence the exam, please verify that you have (11) different printed pages, including this title page. There is a total of (4) questions.
5. Use of a calculator is strictly prohibited.
6. Use permanent ink pens only. Any part done using a soft pencil will not be marked and cannot be claimed for rechecking.
7. Use **proper indentation** while writing code and ensure that your code is legible. You will lose your marks If your code is not clear.
8. Please read the question thoroughly and use your time **properly**; an uneven time distribution can lead to incomplete answers.

|                | I  | II | III | IV | Total |
|----------------|----|----|-----|----|-------|
| Total Marks    | 36 | 8  | 8   | 8  | 60    |
| Marks Obtained |    |    |     |    |       |

**Question I.....(36 Marks)**

Only the code of main function is written without return 0 statement. So please don't identify those errors.

(a) (2 Marks) What will the following program display on screen. Explain the error or bug if there is any.

```
1  int a, b, c;
2  a=6,b=4,c=2;
3  int max = (a>b>c) * (a+b+c);
4  cout<<max;
```

**Solution:**

(b) (3 Marks) What will the following program display on screen. Explain the error or bug if there is any.

```
1  char alphabet= 'A';
2  for(int i = ('F'-'A'+1); i >= 1; --i)
3  {
4      for(int j = 1; j <= i; ++j)
5      {
6          cout << alphabet << " ";
7      }
8      ++alphabet;
9      cout << endl;
10 }
```

**Solution:**

(c) (3 Marks) What will the following program display on screen. Explain the error or bug if there is any.

```
1  int i, j, m, answer;
2  m = 0;
3  j = 4;
4  while (m < 5) {
5      for (i = 0; i < j; i++){
6          answer = i * m;
7          cout << answer;
8      }
9      m = m + 1;
10  cout << endl;}
```

**Solution:**

(d) **(1 Mark)** What is the output of the following program segment? Identify errors (if any).

```
1  int x = 5, y = 10;
2  int z = ++x * y--;
3  cout<<(z+y);
```

Solution

(e) **(2 Marks)** What is the output of the following program segment? Identify errors (if any).

```
1  int x=10;
2  {
3      cout<<x<<"\t";
4      int x=20;
5      cout<<(x++)<<"\t";
6  }
7  cout<<(--x);
```

Solution

(f) **(1 Mark)** What is the output of the following program segment? Identify errors (if any).

```
1  int z = 5, j = 7, k = 6, n = 3;
2  cout << (z + j % k + k * n - 15) << "\t" ;
3  cout << (z % n + 5) << endl;
```

Solution

(g) **(2 Marks)** What is the output of the following program segment? Identify errors (if any).

```
1  int i = 12, counter = 5;
2  while (i - 1)
3  {
4      ++counter;
5      i--;
6  }
7  cout<<counter;
```

Solution

(h) **(1 Mark)** What is the output of the following program segment? Identify errors (if any).

```
1  int a=5;
2  int b=a++++;
3  cout<<b;
```

Solution

- (i) **(2 Marks)** What is the output of the following program segment? Identify errors (if any). Assume uninitialized variable has value zero in beginning.

```
1  int x=10;
2      {
3          int x=x;
4          cout<<x<<"\t";
5      }
6  cout<<(--x);
```

Sol

- (j) **(2 Marks)** What will the following program display on screen. Explain the error or bug if there is any.

```
1  int suite = 5 ;
2  switch ( suite ) ;
3  {
4  case 0+5 ;
5  cout<< "\nClub" ;
6  case 1+5 ;
7  cout<< "\nDiamond" ;
8  }
```

Soluti

- (k) **(1 Mark)** What is the output of the following program segment? Identify errors (if any). Assume uninitialized variable has value zero in beginning.

```

1  int i=0, n = 0;
2  if ((i < 1) && (++i < n))
3  {
4      cout << "Condition True!";
5  }
6  else
7      cout<<"Not True";

```

**Solution:**

- (l) **(2 Marks)** What will the following program display on screen. Explain the error or bug if there is any.

```

1  int x = 8, y = 0, z ;
2  while ( x >= 0 && y <=5 )
3  {
4      if ( x == y )
5          break ;
6      else
7          cout<<x<<y ;
8          x-- ;
9          y+=2 ;
10 }

```

**Solution:**

- (m) **(2 Marks)** What is the output of the following program segment? Identify errors (if any).

```

1  int z, x=5, y=-10, a=4, b=2;
2  z = x++ - --y * b / a;
3  cout<<z;

```

**Solution:**

- (n) **(3 Marks)** What will the following program display on screen. Explain the error or bug if there is any.

```

1  int x = 1, y =2, n=50 ;
2  while (y <=n )
3  {
4      if ( n%y == 0 )
5      {
6          n=n/y;
7          x=x+1;
8      }
9      else
10     y=y+1;
11     cout<<x<<y<<" ";
12 }

```

---

**Solution** 

(o) **(2 Marks)** What will the following program display on screen. Explain the error or bug if there is any.

```
1  int a = 0, b=26;  
2  float f=2.6;  
3  b+= (a = 50)*f/2*10-b%5;  
4  cout << a << "#" << b;
```

---

**Solution** 

(p) (2 Marks) What is the output of the following program segment? Identify errors (if any).

```

1  float Mystery(int y, int x){
2      return (y + x + 7.0 / 2); }
3  int main(){
4      float i = 9.5;
5      int j = 4;
6      cout << Mystery(i, j) << endl; }
```

**Solution:**

(q) (2 Marks) What is the output of the following program segment? Identify errors (if any).

```

1  int fun(int x){
2      return x % 3 + 1; }
3  int main() {
4      int b = 5;
5      int y = 2 + fun(3 * b + 1);
6      int z = fun(fun(y));
7      cout << y << "-" << z; }
```

**Solution:**

(r) (3 Marks) Convert the following code (of switch) in if-else decision structures.

```

1  cin >> sport;
2  switch (sport) {
3      case 'c':
4      cout << "You like Cricket";
5      case 'f':
6      cout << "You like Football";
7      break;
8      case 't':
9      case 'H':
10     cout << "You like Tennis";
11     cout << "You like Hockey";
12     case 'B':
13     cout << "You like BasketBall";
14     break; }
```

**Solution:**

|    |  |
|----|--|
| 11 |  |
| 12 |  |
| 13 |  |
| 14 |  |
| 17 |  |
| 18 |  |
| 19 |  |
| 20 |  |

.



**Question II..... (8 Marks)**

- (a) **(8 Marks)** Write a function in c++ which takes a number as input and prints the pattern of alphabets as given below. You are required to validate the input that the number should be in-between 1 and 26.

For example, for  $n=5$ , print pattern as below

```
A B C D E D C B A
  B C D E D C B
    C D E D C
      D E D
        E
```

for  $n=4$ , print pattern as below

```
A B C D C B A
  B C D C B
    C D C
      D
```

**Solution:**

```

6
7
8
9
12
13
14
15
16
17
18
19
20
21
22
23
24
```

```
}
```

```
}
```

**Question III ..... (8 Marks)**

- (a) **(8 Marks)** Write a function in c++ which takes a number  $n$  as input (parameter) and return *sum of all digits except unit digit* (rightmost digit), **is equal** to the *unit digit*(rightmost). If the function returns the sum of digits, then print *YES* in main otherwise print *NO*.

For Example, if the user enters 1124 it will print YES because  $1+1+2$  is equal to 4

While if the user enters 2348 it will print No because  $2+3+4$  is not equal to 8.



**Question IV** ..... (8 Marks)

(a) (8 Marks) The value of a function  $F$  is defined by the following infinite series:

$$F = \frac{1}{3} + \frac{x^2}{9} + \frac{x^4}{27} + \frac{x^6}{81} + \frac{x^8}{243} + \dots$$

Write a C++ code that takes  $n$  (number of terms) and the value of  $x$  as input from the user and calculates the function's value. In other words, calculate the sum of the series for the first  $N$  terms. For example, if  $n=5$  and  $x=2$ , then it should display 0.744856.

**Solution:**

3

..

8

9

2

16

18

19

20

21

24