National University of Computer and Emerging Sciences

School of Computing

Fall 2022

Islamabad Campus

CS-1002 Programming Fundamentals BS(DS/AI)

Thursday, November 10, 2022

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Serial No:	
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Total Time: 1 Hour Total Marks: 60

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

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

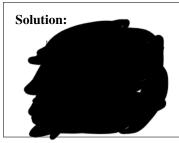
(a) (2 Marks) What will the following program display on screen. Explain the error or bug if there is any.

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

Solu

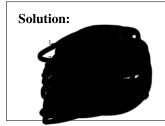
(b) (3 Marks) What will the following program display on screen. Explain the error or bug if there is any.

```
char alphabet= 'A';
for(int i = ('F'-'A'+1); i >= 1; --i)
    for(int j = 1; j <= i; ++j)
        cout << alphabet << " ";</pre>
    ++alphabet;
    cout << endl;
}
```



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

```
int i, j, m, answer;
_{2} m = 0;
  j = 4;
  while (m < 5) {
  for (i = 0; i < j; i++) {
       answer = i * m;
       cout << answer;</pre>
  }
  m = m + 1;
  cout << endl; }</pre>
```



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

```
int x = 5, y = 10;
int z = ++x * y--;
cout<<(z+y);</pre>
```

Solution

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

```
int x=10;
{
cout<<x<"\t";
int x=20;
cout<<(x++)<<"\t";
}
cout<<(x++)<<"\t";
</pre>
```

Solution

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

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

Solution

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

```
int i = 12, counter = 5;
while (i - 1)
{
    ++counter;
    i--;
}
cout<<counter;</pre>
```

Solut

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

```
int a=5;
int b=a++++;
cout<<b;</pre>
```

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.

```
int x=10;

int x=x;

cout<<x<"\t";

cout<<(--x);</pre>
```

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

```
int suite = 5;
switch ( suite );
{
  case 0+5;
  cout<< "\nClub";
  case 1+5;
  cout<< "\nDiamond";
}</pre>
```

Solution

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

```
int i=0, n = 0;
if ((i < 1) && (++i < n))

cout << "Condition True!";
}
else
cout<<"Not True";</pre>
```

Soluti

(1) (2 Marks) What will the following program display on screen. Explain the error or bug if there is any.

```
int x = 8, y = 0, z;
while (x >= 0 && y <=5)

if (x == y)
break;
else
cout<<x<y;
x--;
y+=2;
</pre>
```

Solution

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

```
int z, x=5, y=-10, a=4, b=2;
z = x++ - --y * b / a;
cout << z;</pre>
```

Solution

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

```
int x = 1, y =2, n=50;
while (y <=n)

if (n%y == 0)

n=n/y;
x=x+1;

else
y=y+1;
cout<<x<<y<"";
</pre>
```

Solution

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

- int a = 0, b=26;
- float f=2.6;
- $_{3}$ b+= (a = 50) *f/2*10-b\\\\$5;
- 4 cout << a << "#" << b;



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

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

Solution

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

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

Solution

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

```
cin >> sport;
switch (sport) {
case 'c':
cout << "You like Cricket";
case 'f':
cout << "You like Football";
break;
case 't':
case 'H':
cout << "You like Tennis";
cout << "You like Hockey";
case 'B':
cout << "You like BasketBall";
break; }</pre>
```





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(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.

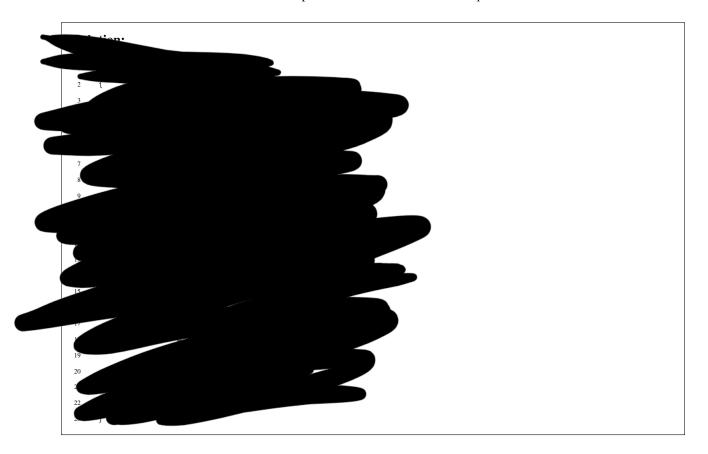
For example, for n=5, print pattern as below

for n=4, print pattern as below



(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.



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

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

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.

