Control Structure (For Loop)

WEEK

KEYWORDS:

For condition, initialization

LAB EXERCISE:

Program 1:
Type the following program in the editor of the C++ environment. Compile the program and run it.

```cpp
#include<iostream>

using namespace std;

int main()
{
    int a;

    for(a=1;a<=10;a++)
    {
        cout << a << endl;
    }

    cout << endl;
    system("PAUSE");
    return 0;
}
```

> **Output:**
>
>   1
>   2
>   3
>   4
>   5
>   6
>   7
>   8
>   9
>   10

Program 2:

Type the following program in the editor of the C++ environment. Compile the program and run it.

```cpp
#include<iostream>

using namespace std;

int main()
{
        int counter;        //loop control variable
        int sum;            //variable to store the sum of numbers
        int n;              //variable to store the number of first positive integers

        cout  <<"Enter the number of positive integers to be added: ";
        cin  >>  n;

        sum = 0;
        for (counter = 1; counter <= n; counter++)
        {
                sum = sum + counter;
        }

        cout  <<"The sum of the first "<<  n <<" positive integers is "<<  sum;

        cout << endl;
        system("PAUSE");
        return 0;
}
```

Output:
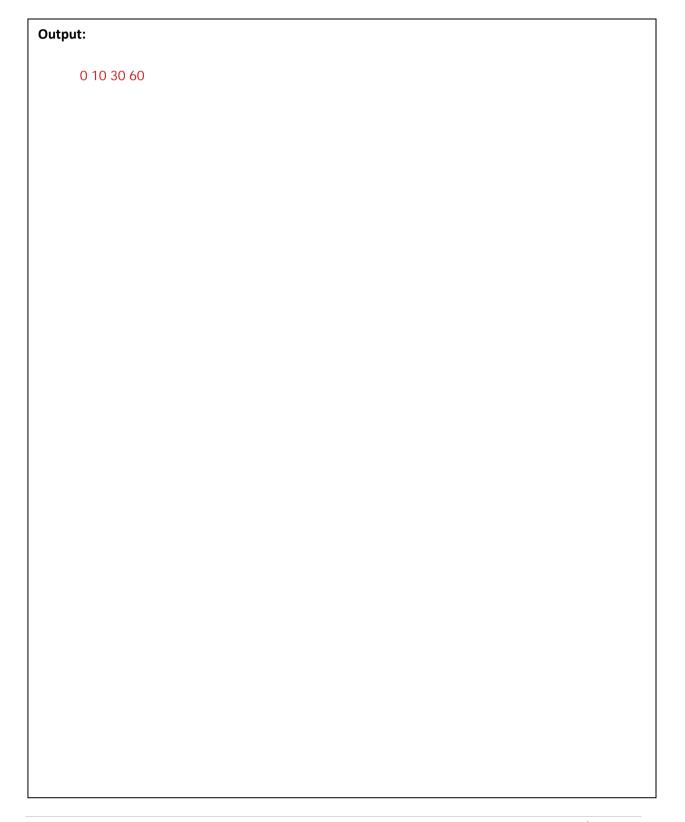
Enter the number of positive integers to be added: 5
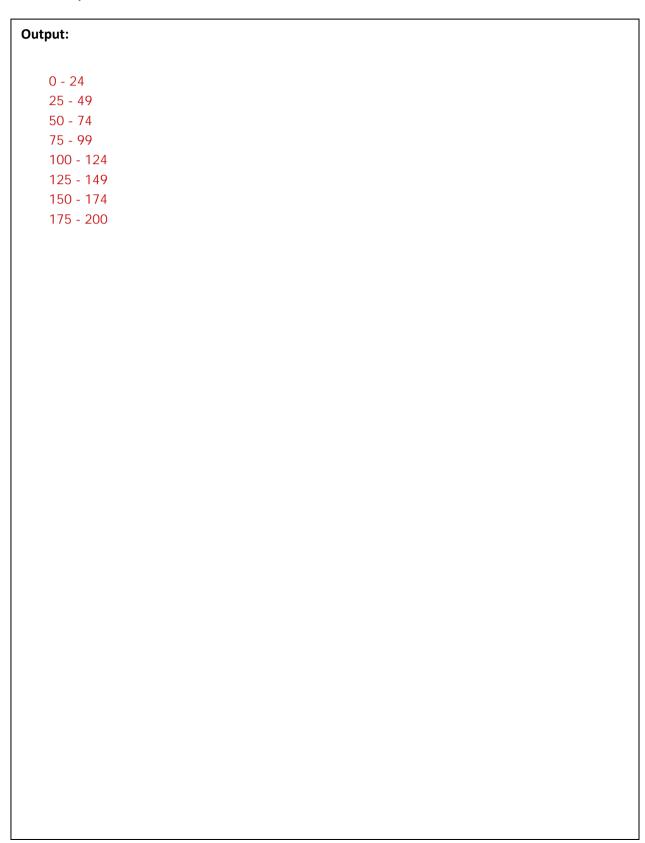The sum of the first 5 positive integers is 15

Question 1: Given that the following code is correctly inserted into a program, state its entire output as to content and form. (Assume all variables are properly declared.)

```
num = 0;
for (i = 1; i <= 4; i++)
{
num = num + 10 * (i - 1);
    cout << num << " ";
}
cout << endl;
```

Output:

0 10 30 60

Question 2: What is the output of the following C++ program segment? Assume all variables are properly declared.

```cpp
for (j = 0; j < 8; j++)
{
    cout << j * 25 << " - ";
    if (j != 7)
            cout << (j + 1) * 25 - 1 << endl;
    else
    cout << (j + 1) * 25 << endl;
}
```

Output:

0 - 24
25 - 49
50 - 74
75 - 99
100 - 124
125 - 149
150 - 174
175 - 200

Question 3: Write a program using for loop to add all the multiples of 3 between 1 and 100.

Input and Output:

The sum is: 1683

Constants and Variables:

int sum

Flowchart:

Code:

```cpp
#include <iostream>

using namespace std;

int main() {
  int sum = 0;
  for (int num = 1; num <= 100; num++) {
    if (num % 3 == 0) {
      sum += num;
    }
  }
  cout << "The sum is: " << sum << endl;
  return 0;
}
```

Question 4: Write a program using for loop which inputs an integer and prints its factorial?

Input and Output:

Enter an integer: 3
The factorial of 3 is: 6

Constants and Variables:

int number, factorial

Flowchart:

Code:

```cpp
#include <iostream>

using namespace std;

int main() {
  int number, factorial = 1;

  cout << "Enter an integer: ";
  cin >> number;

  for (int i = 1; i <= number; i++) {
    factorial *= i;
  }

  cout << "The factorial of " << number << " is: " << factorial << endl;

  return 0;
}
```
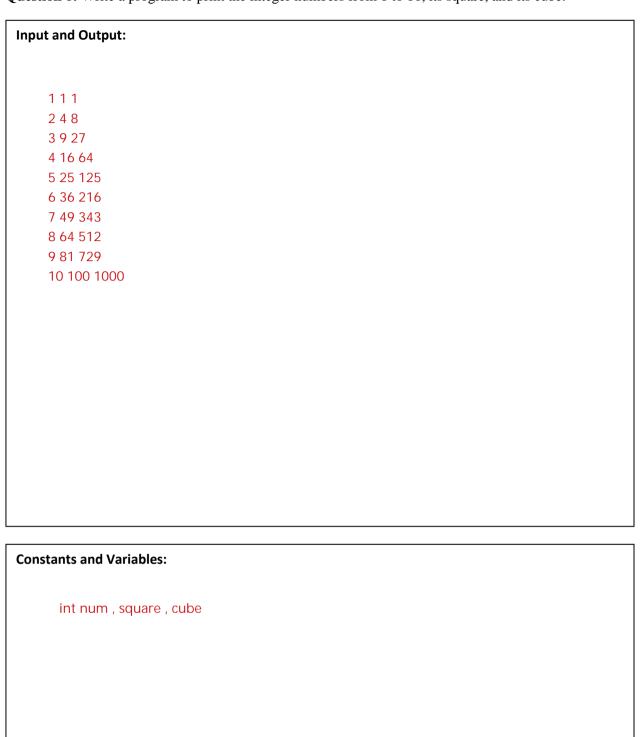
Question 5: Write a program that will calculate the sum of first 50 natural numbers?

Input and Output:

The sum is: 1275

Constants and Variables:

int sum

The sum is: 1275

Flowchart:

Code:

```cpp
#include <iostream>

using namespace std;

int main() {
 int sum = 0;

 for (int i = 1; i <= 50; i++) {
   sum += i;
 }

 cout << "The sum is: " << sum << endl;

 return 0;
}
```

Question 6: Write a program to print the integer numbers from 1 to 10, its square, and its cube.

Input and Output:

1 1 1
2 4 8
3 9 27
4 16 64
5 25 125
6 36 216
7 49 343
8 64 512
9 81 729
10 100 1000

Constants and Variables:

int num , square , cube

Flowchart:

Flowchart:

Code:

```cpp
#include <iostream>

using namespace std;

int main() {
  for (int num = 1; num <= 10; num++) {
    int square = num * num;
    int cube = num * num * num;
    cout << num << " " << square << " " << cube << endl;
  }
  return 0;
}

#include <iostream>
```

Question 7: Write a C++ program using two for loops to produce the following pattern of asterisks.

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

Input and Output:

Constants and Variables:

```
int space, i, j;
```

Flowchart:

Flowchart:

Code:

```cpp
#include<iostream>
using namespace std;
int main()
{

        for(int i = 1; i <= 5; i++)
        {

                for(int space = i; space < 5; space++)
                {
                        cout << " ";
                }

                for(int j = 1; j <= (2 * i - 1); j++)
                {
                        cout << "*";
                }

        cout << "\n";
        }

    return 0;
}
```