# Introduction to Algorithms and Programming

**Lecture 6**

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## Example 1 – Write a C++ program that reverse a number (example: 4392 => 2934) :

```cpp
#include <iostream>
using namespace std;

int main()
{
    int x;
    cout << "Enter a number \n";
    cin >> x;
  while(x>0)
 {
        cout << x % 10;
        x = x / 10;
 }

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

## Example 2 – Write a C++ program to display Fibonacci series up to a given number of terms :

```cpp
#include <iostream>
using namespace std;

int main()
{
 int t1=0, t2=1, nextTerm, num;
    cout << "Enter the number of terms: ";
    cin >> num;
    cout << "Fibonacci Series: ";
    cout <<t1 << ", " << t2 << ", ";
    for (int i = 3; i <= num; ++i)
{

        nextTerm = t1 + t2;
        cout << nextTerm << ", ";
        t1 = t2;
        t2 = nextTerm;
}

    system("pause");
    return 0;
}
```

THE FIBONACCI SERIES IS A SERIES WHERE THE NEXT TERM IS THE SUM OF PREVIOUS TWO TERMS. THE FIRST TWO TERMS IS 0 FOLLOWER BY 1

FIBONACCI SEQUENCE: 0, 1, 1, 2, 3, 5, 8, 13, 21, .......

# Example 3 – Use the loops to print the following shape:

```cpp
#include <iostream>
using namespace std;
int main()
{
    int rows = 3;
    int columns = 5;

    for (int i = 1; i <= rows; ++i) {
        for (int j = 1; j <= columns; ++j) {
            cout << "*  ";
        }
        cout << endl;
    }

    system("pause");
    return 0;
}
```
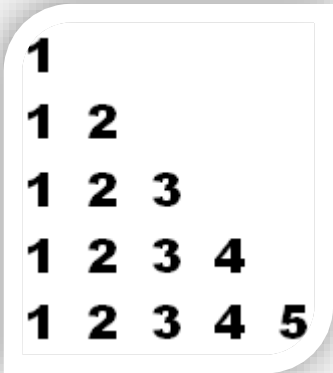
```
*   *   *   *   *
*   *   *   *   *
*   *   *   *   *
```

## Example 4 – Use the loops to print the following shape:

```cpp
#include <iostream>
using namespace std;
int main()
{
    for (int i = 1; i <= 5; i++)
    {
        for (int j = 1; j <= i; j++)
        {
            cout<< j << " ";
        }
        cout << endl;
    }

    system("pause");
    return 0;
}
```

```
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
```

## Example 5 – Use the loops to print the following shape:

```cpp
#include <iostream>
using namespace std;
int main()
{
    for (int i = 1; i <= 5; i++)
    {
        for (int j = 1; j <= 5 - i + 1; j++)
        {
            cout << "* ";
        }
        cout << "\n";
    }

    system("pause");
    return 0;
}
```

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

# Example 6 – Use the loops to print the following shape:

```cpp
#include <iostream>

using namespace std;

int main()
{
        // الحلقة الأولى للأسطر
    for (int i=1;i<=5;i++){
        // الحلقة الثانية تعمل في السطر رقم i
        for (int j=1;j<=5;j++){
            // العنصر ينتمي للقطر الرئيسي
            if (i == j) cout <<"*";
            // عنصر في موقعه الادي
            else cout << j;
        }
        // سطر جديد عند الانهاء من السطر الحالي
        cout << "\n";
    }

    return 0;
}
```

```
*2345
1*345
12*45
123*5
1234*
```

**Q. Use the loops to print the following shape.**

```
-   -   -   -   *
-   -   -   *   *
-   -   *   *   *
-   *   *   *   *
*   *   *   *   *
```