

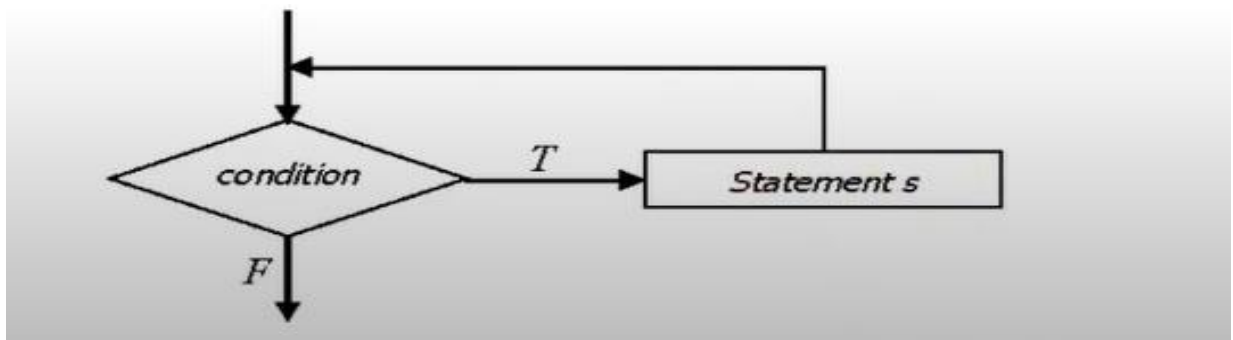
loops

Computers are great for doing the same thing over and over. C++ provides the following looping mechanisms:

The While Loop: the while loop lets you perform a block of code repeatedly as long as an expression evaluates to true. , while loop in C++ is a control flow statement that executes a block of code repeatedly as long as a specified condition is true.

General Form While Repletion Structure:

```
While(condition){  
Statremnet1;  
Statremnet2;  
Statremnet3;  
.  
.  
.  
Statement-n;  
}
```



For example, the following code will output “this is loop” five times:

```
#include <iostream>  
using namespace std;  
int main() {  
    int count = 0;
```



```
// Using a while loop to print numbers from 1 to 5
while (count < 5) {
    cout << "Count: " << count + 1 << endl;
    count++; // Incrementing the count to eventually exit the loop
}
return 0;
}
```

In this example:

- count is initialized as 0.
- The while loop checks the condition $count < 5$. As long as count is less than 5, the loop continues.
- Inside the loop, it prints the value of $count + 1$ (to print numbers from 1 to 5) and increments count by 1 in each iteration.
- Once count reaches 5, the condition $count < 5$ becomes false, and the loop stops executing.

Output:

Count: 1

Count: 2

Count: 3

Count: 4


Count: 5

Examples:

Write a program in C++ to print the numbers from 0 to 10 using the loop statements (while)

```
#include <iostream>
using namespace std;
void main()
{
    int n=0;
```


```
while(n<=10)
{
cout<<n<<endl;
n++;
}
system("pause");
}
```

 Write C++ program to find the summation of the following series:

$$\text{sum} = 1 + 3 + 5 + 7 + \dots + 99$$


in other words: find the summation of the odd numbers, between 0 and 100)

```
#include<iostream.h>
void main( )
{
    int count = 1;
    int sum = 0;
    while ( count <= 99 )
    {
        sum = sum + count;
        count = count + 2;
    }
    cout << "sum is: " << sum << endl;
}
```

 Write C++ program to find the cub of a number, while it is positive:


```
#include<iostream.h>
void main( )
{
    int num, cubenum;
    cout << "Enter positive number \n";
    cin >> num;
    while ( num > 0 )
    {
        cubenum = num * num * num;
        cout << "cube number is :" << cubenum << endl;

        cin >> num;
    }
}
```

 Write C++ program to find the summation of the following series:

$$\sum_{i=1}^n i^2 = 1^2 + 2^2 + 3^2 + \dots + n^2$$

```
#include<iostream.h>
void main( )
{
    int i = 1, n ,sum = 0;
    cout << "enter positive number";
    cin >> n;
    while ( i <= n )
    {
        sum += i * i;
        i++;
    }
    cout << "sum is: " << sum << endl;
}
```

 Write C++ program to find the summation of student's marks, and it's average, assume the student have 8 marks:

```
#include<iostream.h>
void main( )
{
    int mark, i, sum = 0;
    float av = 0;
    i = 1;
    while ( i <= 8 )
    {
        cout << "enter mark: ";
        cin >> mark;
        sum = sum + mark;
        i++;
    }
    cout << "sum is: " << sum << endl;
    av = sum / 8;
    cout << "average is: " << av;
}
```