

A decorative graphic on the left side of the slide consisting of two overlapping parallelograms. The front one is blue and the back one is light green. They are positioned diagonally, with the blue one partially covering the green one.

# Basic Programming

Starting with C++



# Loops in C++

```
1  #include <iostream.h>
2  using namespace std;
3
4  int main()
5  {
6      for (int i = 1; i <= 1000; i++)
7      {
8          cout << i << endl;
9      }
10 }
11
```

Loops in programming are used when we need to repeatedly execute a block of statements.

For example:

Suppose we want to print nos. from 1 to 1000. Should we write it 1000 times? No NEVER! We use loops for these execution

# Types of Loops

## while loop

```
initialization expression;
while (test_expression)
{
    // statements

    update_expression;
}
```

```
#include <iostream.h>
using namespace std;

int main()
{
    int i = 2; // Initialization expression

    do
    {
        // loop body
        cout << "Hello World\n";

        // update expression
        i++;
    } while (i < 1); // test expression

    return 0;
}
```

## do while

```
initialization expression;
do
{
    // statements

    update_expression;
} while (test_expression);
```

```
#include <iostream.h>
using namespace std;

int main()
{
    // initialization expression
    int i = 1;

    // test expression
    while (i < 6)
    {
        cout << "Hello World\n";

        // update expression
        i++;
    }

    return 0;
}
```

## for loop

```
for (initialization expr; test expr; update expr)
{
    // body of the loop
    // statements we want to execute
}
```

```
#include <iostream.h>
using namespace std;

int main()
{
    for (int i = 1; i <= 10; i++)
    {
        cout << "Hello World\n";
    }

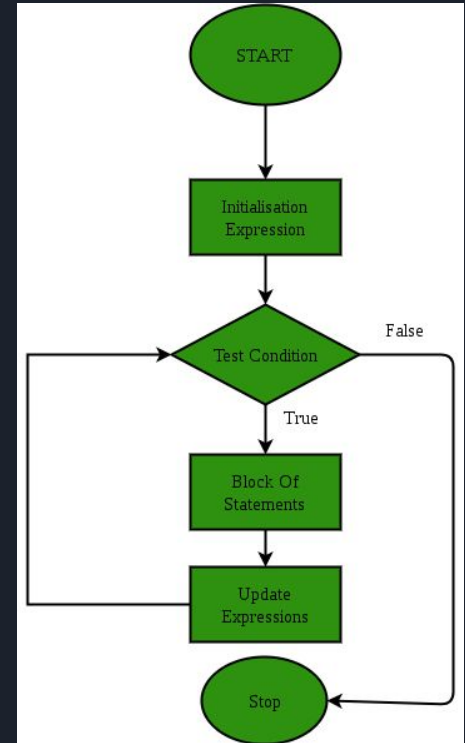
    return 0;
}
```

# For Loop

A for loop is a repetition control structure which allows us to write a loop that is executed a specific number of times. The loop enables us to perform n number of steps together in one line.

```
1 for (initialization expr; test expr; update expr)
2 {
3     // body of the loop
4     // statements we want to execute
5 }
```

- **Initialization Expression:** In this expression we have to initialize the loop counter to some value. for example: `int i=1;`
- **Test Expression:** In this expression we have to test the condition. If the condition evaluates to true then we will execute the body of loop and go to update expression otherwise we will exit from the for loop. For example: `i <= 10;`
- **Update Expression:** After executing loop body this expression increments/decrements the loop variable by some value. for example: `i++;`





# While Loop

While studying **for loop** we have seen that the number of iterations is known beforehand, i.e. the number of times the loop body is needed to be executed is known to us. while loops are used in situations where we do not know the exact number of iterations of loop beforehand. The loop execution is terminated on the basis of test condition.

```
1 initialization expression;  
2 while (test_expression)  
3 {  
4     // statements  
5  
6     update_expression;  
7 }
```



# Do While Loop

In do while loops also the loop execution is terminated on the basis of test condition. The main difference between do while loop and while loop is in do while loop the condition is tested at the end of loop body, i.e do while loop is exit controlled whereas the other two loops are entry controlled loops.

**Note:** In do while loop the loop body will execute at least once irrespective of test condition.

```
1 initialization expression;
2 do
3 {
4     // statements
5
6     update_expression;
7 } while (test_expression);
8
```

## What about an Infinite Loop?

An infinite loop (sometimes called an endless loop ) is a piece of coding that lacks a functional exit so that it repeats indefinitely. An infinite loop occurs when a condition always evaluates to true. Usually, this is an error.

```
1 // C++ program to demonstrate infinite loops
2 // using for and while
3 // Uncomment the sections to see the output
4 #include <iostream>
5 using namespace std;
6 int main ()
7 {
8     int i;
9
10    // This is an infinite for loop as the condition
11    // expression is blank
12    for ( ; ; )
13    {
14        cout << "This loop will run forever.\n";
15    }
16
17    // This is an infinite for loop as the condition
18    // given in while loop will keep repeating infinitely
19    /*
20    while (i != 0)
21    {
22        i-- ;
23        cout << "This loop will run forever.\n";
24    }
25    */
26
27    // This is an infinite for loop as the condition
28    // given in while loop is "true"
29    /*
30    while (true)
31    {
32        cout << "This loop will run forever.\n";
33    }
34    */
35 }
36
```



# Important Points

- 01 Use for loop when number of iterations is known beforehand, i.e. the number of times the loop body is needed to be executed is known.
- 02 Use while loops where exact number of iterations is not known but the loop termination condition is known.
- 03 Use do while loop if the code needs to be executed at least once like in Menu driven programs





# Switch Cases

Switch case statements are a substitute for long if statements that compare a variable to several integral values

- The switch statement is a multiway branch statement. It provides an easy way to dispatch execution to different parts of code based on the value of the expression.
- Switch is a control statement that allows a value to change control of execution.

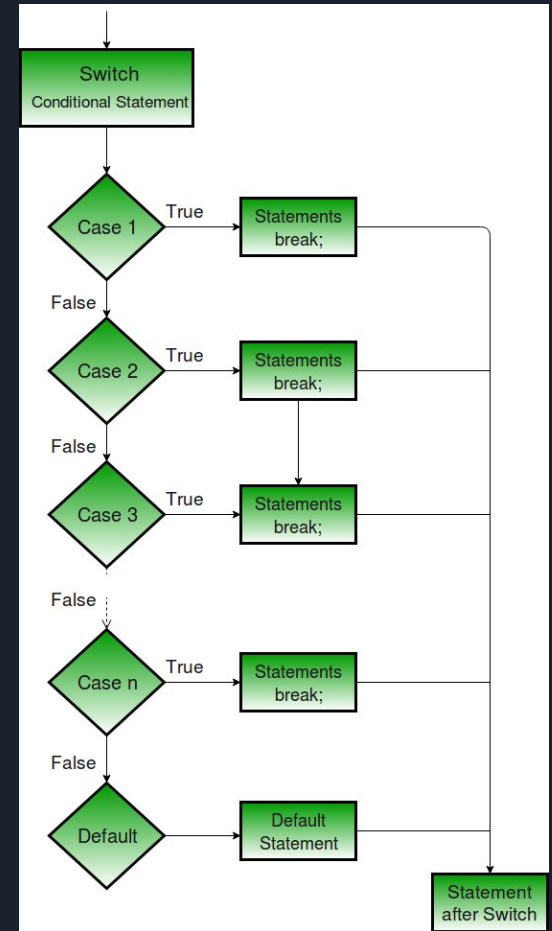
```

1
2 // Following is a simple program to demonstrate
3 // syntax of switch.
4 #include <stdio.h>
5 int main()
6 {
7     int x = 2;
8     switch (x)
9     {
10         case 1: printf("Choice is 1");
11                 break;
12         case 2: printf("Choice is 2");
13                 break;
14         case 3: printf("Choice is 3");
15                 break;
16         default: printf("Choice other than 1, 2 and 3");
17                  break;
18     }
19     return 0;
20 }
21

```

Output:

Choice is 2





# Binary Conversion

# ASCII

A	B	C	D	E	F	G	H	I	...
65	66	67	68	69	70	71	72	73	...
a	b	c	d	e	f	g	h	i	...
97	98	99	100	101	102	103	104	105	...

# string

s	t	e	l	i	o	s
---	---	---	---	---	---	---

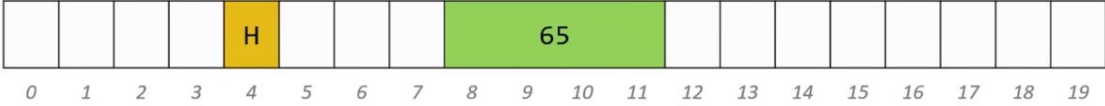


# string

s	t	e	l	i	o	s	\0



Data Type	Size (in bytes)
int	4
char	1
float	4
double	8
long long	8







# Get Set Code

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