

## Chapter 5 – Loops

### For Loop

Let's say you wanted to print out the numbers one to a hundred. What way would you do it?

Would you use one hundred lines like this: `cout<<"1"<<endl;`

`cout<<"2"<<endl; .....Etc.`

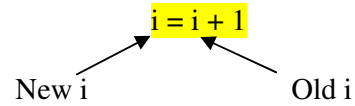
This way would be very time consuming. A much quicker way would be to use a "for loop". For example, below we use a "for loop" to print out the numbers between one and a hundred.

1	<code>#include&lt;iostream.h&gt;</code>
2	
3	<code>int main()</code>
4	<code>{</code>
5	<code>int i;</code>
6	<code>for(i=0; i&lt;100; i++)</code>
7	<code>{</code>
8	<code>cout&lt;&lt; i &lt;&lt;endl;</code>
9	<code>}</code>
10	
11	<code>return 0;</code>
12	<code>}</code>

**Example 5a**

When the "for loop" is first encountered, `i` is set to 0, and this is printed out with the `cout` statement. Next time around `i` is incremented by one (`i++`). Now `i` equals 1, and this is printed out. Then `i` is incremented again and the process continues for as long as `i` is less than 100 (i.e. the program will print out 0 to 99).

Note that `i++` is a shorter way of saying `i = i+1`. In maths this statement does not make sense. If `i` was 10, then this statement would be saying `10=10+1` or `10=11`. We obviously know this to be untrue, but in programming it means take the "old `i`" and add 1 to it to get the "new `i`".



Another example:

1	#include<iostream.h>
2	int main()
3	{
4	int i;
5	
6	for(i=0; i<=100; i++)
7	{
8	cout<< "hello!" <<endl
9	}
10	
11	return 0;
12	}

**Example 5b**

This piece of code will print out “hello” 101 times on your screen. The 101 is because *i* starts at 0 and continues until it is less than *or equal* to 100 (*i*<=100).

Try out the following for loops in your code.

```
for(i=100; i>=0; i--) //Note: i-- means i = i - 1
{
cout<< i <<endl;
}
```

```
for(i=0; i<100; i+=2) //Note: i +=2 means i = i + 2
{
cout<< i <<endl;
}
```

## Do While Loop

If you do not know how many iterations it will take to do something then you use a “do while” loop.

For Example:

1	#include<iostream.h>
2	int main()
3	{
4	int x;
5	
6	do
7	{
8	cout<< "enter a number" <<endl;
9	cin>>x;
10	}
11	while(x!=0); //While x is NOT equal to 0
12	
13	return 0;
14	}

**Example 5c**

This program will keep asking the user to enter a number unless 0 is entered. The program exits the “do while” loop when 0 is entered.

Note: `x!=0` means `x NOT equal to zero`