

Programming Fundamentals- I

Rao Muhammad Umer

Lecturer,

Web: raoumer.github.io

Department of Computer Science & IT,
The University of Lahore.

Administrative Stuff

- Course related stuff is available on following link:

<https://piazza.com/uol.edu.pk/fall2016/cs1012/home>

Loops

For Loop

Printing the counting from 1 to 10

```
#include<iostream>
using namespace std;
int main()
{
    int i;
    for (i = 1; i <= 10; i++)
        cout << "i= \n", i;
    getch();
    return 0;
}
```

The for Statement

- The most important looping structure in C/C++.
- Generic Form:

for (initial; condition; increment)
statement

- **initial**, **condition**, and **increment** are C++ expressions.
- For loops are executed as follows:
 1. **Initial** is evaluated. Usually an assignment statement.
 2. **Condition** is evaluated. Usually a relational expression.
 3. If **condition** is false (i.e. 0), fall out of the loop (go to step 6.)
 4. If **condition** is true (i.e. non zero), execute **statement**
 5. Execute **increment** and go back to step 2.
 6. Next statement

The for Statement

For statement examples

```
#include <iostream>
```

```
using namespace std;
```

```
int main () {
```

```
    int count;
```

```
    /* 1. simple counted for loop */
```

```
    for (count =1; count <=20;  
        count++)
```

```
        cout << "\n", count;
```

```
    /* 2. counting backwards */
```

```
    for (count = 100; count >0;  
        count--)
```

```
        cout << "count= ", count;
```

```
    /* 3. for loop counting by 5's */
```

```
    for (count=0; count<1000;  
        count += 5)
```

```
        cout << "count= ", count;
```

```
    /* 4. initialization outside of  
    loop */
```

```
    count = 1;
```

```
    for ( ; count < 1000; count++)
```

```
        cout << " \n", count;
```

```
        getch();
```

```
    return 0;
```

```
}
```

While Loop

Printing the counting from 1 to 10

```
#include <iostream>
using namespace std;
int main()
{
    int i= 1;
    while (i<= 10)
    {
        cout << "i=\n", i;
        i++;
    }
    getch();
    return 0;
}
```

The while Statement

- Generic Form

```
while (condition)  
    statement
```

- Executes as expected:

1. `condition` is evaluated
2. If `condition` is false (i.e. 0), loop is exited (go to step 5)
3. If `condition` is true (i.e. nonzero), `statement` is executed
4. Go to step 1
5. Next statement

- Note:

```
for (exp1; exp2; exp3) stmt;  
is equivalent to  
exp1;  
while(exp2) { stmt; exp3; }
```

Do while Loop

Counting from 1 to 10

```
#include <iostream>
using namespace std;
int main()
{
    int i= 1;
    do
    {
        cout << "i= \n", i;
        i++;
    } while (i<= 10) ; // can also be written as while ( ++i<= 10)
    getch();
    return 0;
}
```

The do while Loop

- The do/while repetition structure
 - Similar to the while structure
 - Condition for repetition tested after the body of the loop is performed
 - All actions are performed at least once
 - Generic Format:

```
do {  
    statement;  
} while ( condition );
```