

C++ for beginners

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*"There are 10 kinds of people in the world:
those who understand binary, and those who
don't."*

C++ Introduction

- We will learn how to **program**
 - language independent
 - learn a new language very quickly
- Won't learn without actually programming
- C++ is a superset of C and virtually any C program is a valid C++ program

Compilers

- C++ is a compiled language
- Type in text which is converted to machine language in **one go** – we can then execute the resultant program
- Many C++ compilers available
- Enter the program into the window, then save as '*filename.cpp*'
- Compile
- Run the program – may need to switch to File | DOS Shell

A simple program

```
1. #include <iostream.h>
2.
3. int main()
4. {
5.     cout << "Hello World!\n";
6.     return 0;
7. }
```

Breakdown of program

- `#include <iostream.h>`
 - Inserts standard programming code into program, saves you having to ‘re-invent the wheel’
- `int main()`
 - Declares the main part of the program, every program must have this line
- `{ ... }`
 - Surrounds the main part of the program, declaring the ‘start’ and ‘end’
- `cout << “Hello World!\n”;`
 - prints the text ‘Hello World!’ to screen, then starts a new line (`\n`)
- `return 0;`
 - ‘functions’ return data, we will look at this later. For us, ‘main’ will always return ‘0’, and this value will not be used.

Variables

- Think of a pigeon-hole system
- We give each 'hole' a name, then store and retrieve data in it
- Different data needs different 'shapes' of hole
 - Different shapes are called different 'types'
- Variable sizes (and therefore maximum values) can vary slightly from one Operating System (Windows / Unix) to another
 - The following is the most usual configuration

Variable types

Type	Size	Values
unsigned short int	2 bytes	0 to 65,535
short int	2 bytes	-32,768 to 32,767
unsigned long int	4 bytes	0 to 4,294,967,295
long int	4 bytes	-2,147,483,648 to 2,147,483,647
char	1 byte	256 character values
bool	1 byte	true or false
float	4 bytes	1.2e-38 to 3.4e38
double	8 bytes	2.2e-308 to 1.8e308

Variables continued

- int – Integers, whole numbers
 - -13, 5, 0, 128
- float – Floating point numbers
 - Have a decimal point
 - 106.5, 5.0, -12.12457
- char – A single character
 - p , 1 , @ , A
 - Later we will see entire words or ‘strings’

Variable Names

- Each variable must be given a name
- C++ is cAsE sENsiTIVE
 - myVar is not MyVar is not MYVAR is not myvar
- Give variables meaningful names
 - x1f6 will not help readability
 - TaxRate implies meaning
- Develop your own naming convention
 - myVar MyVar my_var

Declaring Variables

- Before a variable can be used, it must be declared
 - unsigned short int Width;
- Values can then be assigned to the variable
 - Width = 20;
- Assignment can occur at declaration
 - unsigned short int Height = 2;

unsigned short int Area;

Area = Height * Width;

- '*' means multiply

Printing variables to screen

- We printed to screen by using 'cout'
 - `cout << "Hello World!\n";`
- Extend this to printing out variables
 - `cout << Width << "\n";`
 - multiple '<<' prints out each section in sequence
- To start a new line "\n" is messy in this case
 - endl (end-ell) can be used
 - `cout << Width << endl;`
- Easy to combine all these
 - `cout << "Length is: " << Length << endl;`

Variables Example

```
#include <iostream.h>
```

```
int main()
```

```
{
```

```
    unsigned short int num1 = 10;
```

```
    unsigned short int num2;
```

```
    num2 = 20;
```

```
    num1 = num1*num2;
```

```
    cout << "The answer is " << num1 << endl;
```

```
    return 0;
```

```
}
```

User Entry

- cout prints data to the user
- cin takes data from the user

- cin >> VarName;
 - Places user input into variable VarName

Input/Output Example

```
#include <iostream.h>
```

```
int main()
```

```
{
```

```
    unsigned short int UserNum;
```

```
    cout << "Please enter a number:\n";
```

```
    cin >> UserNum;
```

```
    cout << "You entered " << UserNum << endl;
```

```
    return 0;
```

```
}
```