9. Integers and Float

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Integer Data Type

int data type is used for integers, like -5, 123, etc. with no fractional part.

For example, you can declare an integer variable as

```
int variableName;
```

An integer variable generally occupies 2 bytes of memory and thus can only store a finite range of values, from -32768 to 32767

Integer Type Modifiers

- We can add a keyword in front of a basic type to modify its meaning and fit various situations more precisely. For example,

```
unsigned long int variableName;
```

- C++ allows three different integer sizes : short, int and long

  And each version is available as signed and unsigned.

Integer Type Modifiers

- The prefix unsigned makes the variable not to hold the negative values. Thus an ***unsigned int*** variable which occupies 2 bytes can store values from 0 to 2^{16} -1 (= 65535).

- Thus an unsigned int is more suitable for storing values like lengths, counts, time, etc. which are never negative

- Whereas ***signed int*** is same as normal ***int,*** and can store both positive and negative values

Short Integer Type

- You can simply use it as **short** or **short int.** For example,

  short int someName; or short someName;

Data Type	Approximate size (in bytes)	Range
short int	2	-32768 to 32767
unsigned short int	2	0 to 65535
signed short int	2	Same as short

- On most systems, short is similar to a normal integer, but the only guarantee is that range of *short int* will be smaller than or equal to *int*.

Integer

- You can simply use it as **int.** For example,

```
int someName;
```

Data Type	Approximate size (in bytes)	Range
int	2	-32768 to 32767
unsigned int	2	0 to 65535
signed int	2	Same as int

Long Integer Type

- You can simply use it as **long** or **long int.** For example,

long int someName; or long someName;

Data Type	Approximate size (in bytes)	Range
long	4	-2,147,483,648 To 2,147,483,647
unsigned long int	4	0 to 4,294,967,295
signed long int	4	Same as long

Float Data Type

float data type is used for floating point numbers (number having fractional part), like 123.5, 3.14, etc.

Note that 3 is an integer whereas 3.0 is a floating point number

You can declare a float variable as

```
float someName;
```

Example

We have to write a program which takes radius of a circle as input from the user and computes the circumference of a circle.

Note that the radius can have a fractional part, thus we will use float variable to store the input.

Also the circumference will be stored in a floating point variable.

Example

Write a program which takes radius as input and computes the circumference of a circle.

```
#include <iostream.h>
#include <conio.h>
int main()
{
        clrscr();
        float radius, circum;
        cout << "Enter radius : ";
        cin >> radius;
        circum = 2 * 3.14 * radius;
        cout << "Circumference = " << circum;
        getch();
        return 0;
}
```

Float Data Type

- A float variable has a larger range than integer variable

Data Type	Approximate size (in bytes)	Range
float	4	3.4×10^{-38} to $3.4 \times 10^{38} - 1$ (upto 7 digits of precision)

What’s next?

In the next video, we will study about double and character data type.