**C Data Types**

In C programming, data types are declarations for variables. This determines the type and size of data associated with variables. For example,

int myVar;

Here, myVar is a variable of int (integer) type. The size of int is 4 bytes.

* Basic types

Here's a table containing commonly used types in C programming for quick access.

|  |  |  |
| --- | --- | --- |
| Type | Size (bytes) | Format Specifier |
| int | at least 2, usually 4 | %d |
| char | 1 | %c |
| float | 4 | %f |
| double | 8 | %lf |
| short int | 2 usually | %hd |
| unsigned int | at least 2, usually 4 | %u |
| long int | at least 4, usually 8 | %li |
| long long int | at least 8 | %lli |
| unsigned long int | at least 4 | %lu |
| unsigned long long int | at least 8 | %llu |
| signed char | 1 | %c |
| unsigned char | 1 | %c |
| long double | at least 10, usually 12 or 16 | %Lf |

**int**

Integers are whole numbers that can have both zero, positive and negative values but no decimal values. For example, 0, -5, 10

We can use int for declaring an integer variable.

int id;

Here, id is a variable of type integer.

You can declare multiple variables at once in C programming. For example,

int id, age;

The size of int is usually 4 bytes (32 bits). And, it can take 232 distinct states from -2147483648 to 2147483647.

**float and double**

float and double are used to hold real numbers.

float salary;

double price;

In C, floating-point numbers can also be represented in exponential. For example,

float normalizationFactor = 22.442e2;

What's the difference between float and double?

The size of float (single precision float data type) is 4 bytes. And the size of double (double precision float data type) is 8 bytes.

**char**

Keyword char is used for declaring character type variables. For example,

char test = 'h';

The size of the character variable is 1 byte.

**void**

void is an incomplete type. It means "nothing" or "no type". You can think of void as absent.

For example, if a function is not returning anything, its return type should be void.

Note that, you cannot create variables of void type.

**short and long**

If you need to use a large number, you can use a type specifier long. Here's how:

long a;

long long b;

long double c;

Here variables a and b can store integer values. And, c can store a floating-point number.

If you are sure, only a small integer ([−32,767, +32,767] range) will be used, you can use short.

short d;

You can always check the size of a variable using the sizeof() operator.

#include <stdio.h>

int main() {

short a;

long b;

long long c;

long double d;

printf("size of short = %d bytes\n", sizeof(a));

printf("size of long = %d bytes\n", sizeof(b));

printf("size of long long = %d bytes\n", sizeof(c));

printf("size of long double= %d bytes\n", sizeof(d));

return 0;

}

**signed and unsigned**

In C, signed and unsigned are type modifiers. You can alter the data storage of a data type by using them. For example,

unsigned int x;

int y;

Here, the variable x can hold only zero and positive values because we have used the unsigned modifier.

Considering the size of int is 4 bytes, variable y can hold values from -231 to 231-1, whereas variable x can hold values from 0 to 232-1.

Other data types defined in C programming are:

* bool Type
* Enumerated type
* Complex types

**Derived Data Types**

Data types that are derived from fundamental data types are derived types. For example: arrays, pointers, function types, structures, etc.