C++ Notes

*Topic-1: (C- A Basic Warm-up)*

**Introduction to C++**

* C++ is very close to hardware, so you get a chance to work at a low level which gives you lot of control in terms of memory management, better performance and finally a robust software development is the most widely used computer language.
* It keeps fluctuating at number one scale of popularity along with Java programming language, which is also equally popular and most widely used among modern software programmers.

**Applications of C++**

* Operating Systems.
* Language Compilers.
* Assemblers.
* Text Editor.
* Databases.

**Hello world!**

*/\**

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*\*/*

*#include* <bits/stdc++.h>

*#include* <conio.h>

*using* *namespace* std;

*int* *main*()

{

*cout* *<<* "Hello World!" *<<* *endl*;

*getch*();

*return* 0;

}

A C program consists of following parts:

* Preprocessor Directive
* Functions
* Variables
* Statements and Expressions
* Comments

*Topic-2: (C++-Basic Syntax)*

**Tokens**

A token is either a keyword, an identifier, a constant, a string literal, or a symbol.

**Semi-Colon**

In C++, semi-colon acts as a statement terminator. It indicates the end of any logical identity.

**Comments**

Comments are that part of the program, which are ignored by the compiler. This is used to make the code more understandable to the decoder.

Comments are of two types

* Single-Line Comments: //
* Multi-Line Comments: /\*\*/

**NOTE: YOU CANNOT HAVE COMMENTS WITHIN COMMENTS**

**Identifiers**

These are the names used to identify any variable, function or user defined items.

There are certain rules to use an identifier.

* They will contain letters A-Z or a-z.
* They will start with these letters or underscore (\_) followed by letters or numbers or even underscores
* They can’t have the following characters

1. @

2. $

3. %

**Keywords**

These are the reserved words in C++. They can’t be used as constants or variables or other identifiers name.

|  |  |  |  |
| --- | --- | --- | --- |
| auto | else | long | switch |
| break | enum | register | typedef |
| case | extern | return | union |
| char | float | short | unsigned |
| const | for | signed | void |
| continue | goto | sizeof | volatile |
| default | if | static | while |
| do | int | struct | \_Packed |
| double |  |  |  |

*Topic-3: (C++-Data Types)*

**Definition**

It is an extensive system used for declaring variables or functions of different data types. This determines how much space is allocated and how the BIT pattern stored in interpreted. There are 4 types of Data Types in C++

* Basic Types: These are the basic arithmetic types.

They are of 2 types:

1. Integer Type (int).

2. Floating Type (float).

* Enumerated Types: These are also of arithmetic type. These are the data types, whose values will be some single discrete values throughout the program.
* Void Types: These data type is used for storing those values for which no value is available
* Derived Types: These data types are the descendants of some primitive data types. These includes:

1. Pointer Types

2. Array Types

3. Structure Types

4. Union Types

5. Function Types

**Integer Data Types**

This Data type allows us to store integer values**.**

|  |  |  |
| --- | --- | --- |
| Type | Storage Size | Range |
| char | 1 byte | -128 to 127 or 0 to 255 |
| unsigned char | 1 byte | 0 to 255 |
| signed char | 1 byte | -128 to 127 |
| int | 2 or 4 bytes | -32,768 to 32,767 or -2,147,483,648 to 2,147,483,647 |
| unsigned int | 2 or 4 bytes | 0 to 65,535 or 0 to 4,294,967,295 |
| short | 2 bytes | -32,768 to 32,767 |
| unsigned short | 2 bytes | 0 to 65,535 |
| long | 8 bytes or (4bytes for 32-bit OS) | -9223372036854775808 to 9223372036854775807 |
| unsigned long | 8 bytes | 0 to 18446744073709551615 |

**Floating Point Data Types**

This Data type allows us to store float values**.**

|  |  |  |
| --- | --- | --- |
| Type | Storage Size | Range |
| float | 4 bytes | 1.2E-38 to 3.4E+38 |
| double | 8 bytes | 2.3E-308 to 1.7E+308 |
| long double | 10 bytes | 3.4E-4932 to 1.1E+4932 |

*Topic-4: (C++-Variables)*

**Definition**

It is the name given to the storage unit that the programs manipulate.

|  |
| --- |
| **Types** |
| **char**  Typically, a single octet (one byte). It is an integer type. |
| **int**  The most natural size of integer for the machine. |
| **float**  A single-precision floating point value. |
| **double**  A double-precision floating point value. |
| **void**  Represents the absence of type. |
| **string**  Represents the absence of sentence/word. |

**Declaration**

It is declared as

type var\_name(s)

Normally, variables are declared inside the main function, but if we use the keyword extern, before declaring the variable, we can declare the variables at any place.

extern type var\_name(s)

**L-Value and R-Value**

* L-Value: It is the expression, that refers to the memory location.

**NOTE: L-Value may appear as either left-hand or right-hand side of the assignment.**

* R-Value: It is the value that is stored at some address in the memory.

**NOTE: R-Value may appear as right-hand side of the assignment but not on left-hand side.**