

Coding

- Coding sometimes called computer programming, is how we communicate with computers. Code tells a computer action to take, up writing code is like creating a set of instructions.

Programming

- Programming is the process of creating a set of instructions that tell a computer how to perform a task.

Code

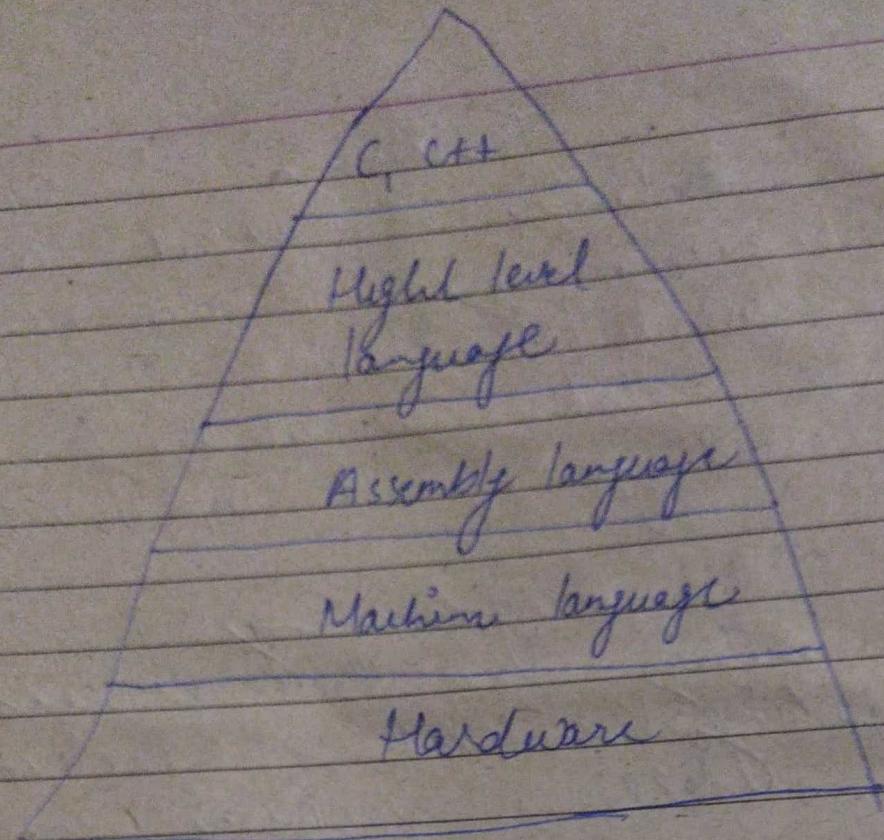
- Code refers to statements written in a programming language, processed by a compiler to run on a computer.

Pseudo Code

- Pseudo code is an artificial or informal language that helps programmers develop algorithms. Pseudo-code is "text based" detail (algorithm) design tool. The rules of pseudo code are reasonably are straightforward.

Algorithm

- An algorithm is a set of commands that must be followed for a computer to perform calculations or other problem-solving operation.
- An algorithm is defined as a step-by-step process that will be designed for a problem.



• High-level language

- A high-level language (HLL) is a programming language such as C, Fortran, or Pascal that enables a programmer to write programs that are more or less independent of a particular type of computer.

• Assembly language

- An assembly language is a type of low-level language that is intended to communicate directly with a computer's hardware ex: MIPS, INTEL64 / AMD64, ARM64.

• Machine Language

- Machine code, also known as machine language is the elemental language of computers. It is read by the computer's central processor but is composed of digital numbers of long bits very long sequence of zeroes and ones.

Assembler

- An assembler is a program that takes basic computer instructions & converts them into a pattern of bits that the computer processor can use to perform

Interpreter

- An interpreter translates code into machine code, instruction by instruction to CPU execute each instruction before the interpreter moves on to translate the next instruction.

Compiler

- The language processor that reads the complete source program written in high-level language as a whole in one go & translates it into an equivalent program in machine language is called compiler.
ex: C, C++, C#, java

Programming language

- A programming language is a kind of computer language, and are used in computer programming to implement algorithms.

* C++ Programming Language

→ C++ is an object-oriented programming language which gives a clear structure to programs, up allows code to be reused, lowering development costs.

Designed by: Bjarne Stroustrup.

* Hello World Program

// Hello world program in C++

```
#include <iostream>
using namespace std;

int main()
{
    cout << "Hello World" << endl;
    return 0;
}
```

2. Comments:

The two slash(//) signs are used to add comments in a program. It does not have any effect on the behaviour or outcome of the program. It is used to give description of the program you're writing.

2. #include <iostream>

- it is pre-processor directive i.e we have to include files in our program.
- Here we are including the iostream standard file which is necessary for the declarations of basic standard input/output library in C++.

3. Using namespace std:

- All elements of the standard C++ library are declared with namespace, here we are using std namespace.

4. int main()

- The execution of any C++ program starts with the main function, hence it is necessary to have a main function in your program.
- 'int' is the return value.

5. cout << "Hello World" \n".

- This is a C++ statement. cout represent the standard output stream in C++.
- It is declared in the iostream standard header std namespace.

6. return 0;

- return signifies the end of a function. here the function is main, so when we hit return 0, it exit the program. We are returning 0 because we mentioned the return type of main function as integer. if a one indicate that something has gone wrong.

Variable

- A variable is a container used to hold data.
- Each variable should be given a unique name (Identifier)

Fundamental Data Types in C++

- Data types are declaration of variable.
- This determines the type & size of data associated with variable which is crucial to know since different data types occupy different size of memory.

Data Type	Meaning	Size (in Byte)
int	Integer	4
float	Floating Point	4
double	double floating-point	8
char	Character	1
wchar_t	wide Character	2
bool	Boolean	1
void	empty	0

- int → -2147483648 to 2147483647
- float & double → decimal w/ exponential upto 7 digits
- char → " " double quotes, ASCII code used
- bool → 2 values True or False, 1 → T & 0 → F.

Decision Making

1. if / else
 - The if block is used to specify the code to be executed if the condition specified in if is true, the else block is executed otherwise.

2. else if
 - To specify multiple if conditions, we first use if and then the consecutive statement uses else if.

3. nested if
 - To specify condition within conditions we make the use of nested ifs.

Loops in C++

- A loop is used for executing a block of statements repeatedly until a particular condition is satisfied.
- A loop consists:
 - i. initial statement
 - ii. test statement
 - iii. increment statement.

* Loops are -

1. For loop: syntax for(int i=0; i<n; i++)
2. While loop: syntax while(i < n) { }
3. Do while: syntax do { } while(i < n)

Jumps in Loops -

- Jumps in loops are used to control the flow of loops.
- There are two statements, i.e. continue, i.e. Break.
- We are using this when we want to change the flow of the loop, when some specified condition is met.

1: Continue:

- continue statement is used to skip to the next iteration of that loop.
- This means that it stops one iteration of the loop.
- All the statements present after the continue statement in that loop are not executed.

2: Break:

- Break statement is used to terminate the current loop.
- As soon as the break statement is encountered in a loop, all further iterations of the loop are stopped up control is shifted to the first statement after the loop.

Switch Statement *

- switch case statement are a substitute for long if statements that compare a variable to multiple values. After a match is found, it executes the corresponding code of that value case.

operator in C++

→ Operators are nothing but symbol that tell the compiler to perform some specific operation.

* Operators are of following type -

1. Arithmetic Operator



Unary

→ one operand



Binary

→ two operand.

• Pre-increment : It increments the value of the operand instantly.

ex. $a = 5 \rightarrow 6$.

$b = +a \rightarrow b = 5, a = 6$.

• Post-increment : It stores the current value of the operand temporarily at only after that statement is completed, the value of the operand is incremented.

ex. $a = 5, a++ , a = 6$

$a = 5, +a, b = +a, b = 5, a = 6$ sol?

* Pre-decrement & Post-decrement same works as post up pre-decrement.

2. Relational operators

→ Relational operations define the relⁿ b/w 2 entities

→ They give a boolean value as result i.e true or false.

3. Logical operators

- logical operators are used to connect multiple expression or conditions together.
- & → give true if both are true
- || → give true if either one is non-zero
- ! → reverse the logical state. !A is true

4. Bitwise operators

- Bitwise operator are the operators that operate on bits of performs bit-by-bit operat'.
- & And
- | Binary OR
- ^ Binary XOR
- ~ Binary ones
- << Binary left
- >> Binary Right Shift

5. Assignment operators

- =
- +=
- -=
- *=
- /=

6. Misc Operators

- sizeof() → If a is integer then sizeof(a) will return 4.
- condition ? : .
- Cast (comma(),) → Casting operator converts one data type to another.

C++ strings

- String are used for storing text.
- A string variable contains a collection of characters surrounded by double-quotes.
- * We have to include a header file for strings i.e. `#include <string>`
- * Concatenation
 - i. The + operator can be used to concatenate to add or join two or more strings
 - ii. We also can use the append() function to concatenate or join string.

☞ We use string keyword to make string.

```
ex) string firstName = "John";
    string lastName = "Doe";
    string fullName = firstName.append(lastName);
    cout << fullName;
// output
John Doe.
```

String Length.

- To get the length of the string we use length() or size() function.

Access string.

- We simply access the element of string like we access in array from 0 to n-1.