

WRITE YOUR FIRST C++ PROGRAM

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① → Why do we need programming language?

- A language using which, we can instruct the computer to carry out real life tasks and computation is called a Programming language.
- It acts as a language in which we could easily express our thought to the machine.
- It has set of rules by which programs could be written in it.



Note
Every language has its own compiler & interpreter.

② →

COMPILER	INTERPRETER
1) A compiler takes the entire program in one go.	1) An interpreter takes a single line of code at a time.
2) The compiler generates an intermediate machine code.	2) The interpreter never produces any intermediate machine code.
3) The compiler is best suited for the production environment.	3) An interpreter is best suited for a software development environment.
4) The compiler is used by programming languages - C, C++, Java, C# etc.	4) An interpreter is used by programming languages - Python, PHP, Perl, Ruby, etc.

How compiler work?



How interpreter work?



③ → What to code?



code block



X-code



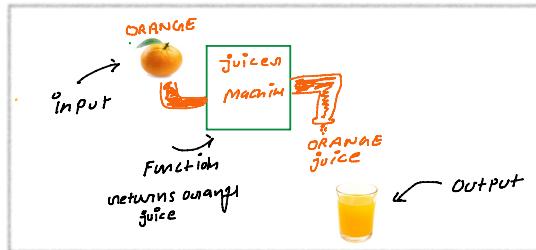
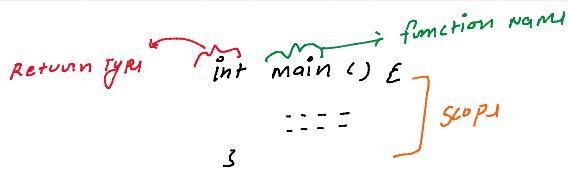
Sublime

④ → Let's write down the first code:

- 1) Code execution always starts from `int main()` function.
- 2) `int main()` is an inbuilt method.
- 3) Function is an entity/block of code in which we provide inputs and we may get output.

2) int main() is an Inbuilt Method.

3) function is an entity / block of code in which we provide inputs and we may get output.



(5) → Print Love babbar

① #include<iostream> → Standard namespace
② using namespace std;
③ int main() { cout << "Love babbar" << endl; } → Semicolon is used to end of the line.
↓ ↓ ↓
Used to point String it's a keyword to return the cursor in the new line

* endl — new line/next line

* "\n" — new line character

* // — comment

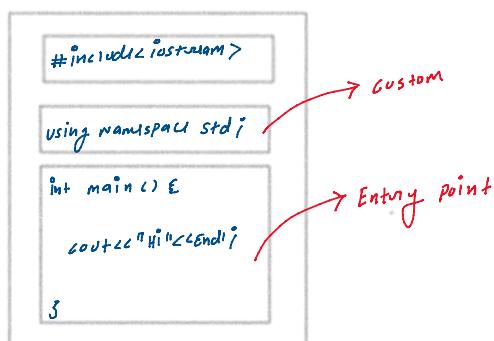
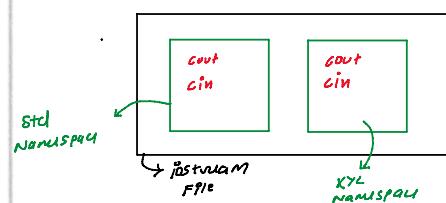
* cin — taking input in c++

Example If you want to take an integer number of user.

int a;
cin >> a >> endl; // 5 Input
cout << a << endl; // 5 Output

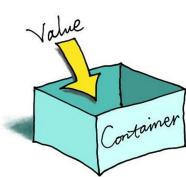
WHY use of ① and ②?

Compiler does not understand the cout & cin because both's implementation are contained in ① which belongs to ②.
↓
std namespace
↓
iostream file



(6) → Variables and Datatypes:

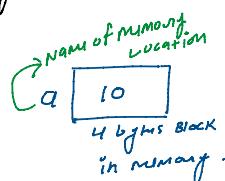
Variable → It is a container that is used to store the data values.



- 1) Variable can store some information.
- 2) we can use that information later.
- 3) we can change that information later.
- 4) a variable name given to a memory location.
- 5) All the operations done on the variable effects that memory location.

Example

int → 4 bytes
int a = 10;



1 byte = 8 bits
1 bit = 0/1

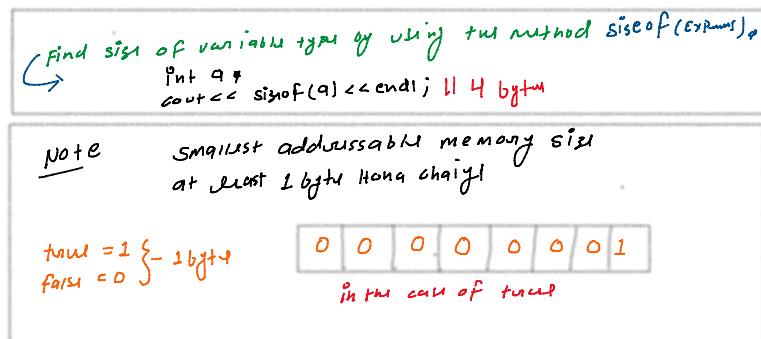
variable naming convention Rules :

- 1) You can't start with numbers (0 to 9).
- 2) You can use only underscore - and dollar symbol \$.
- 3) You can't use white spaces

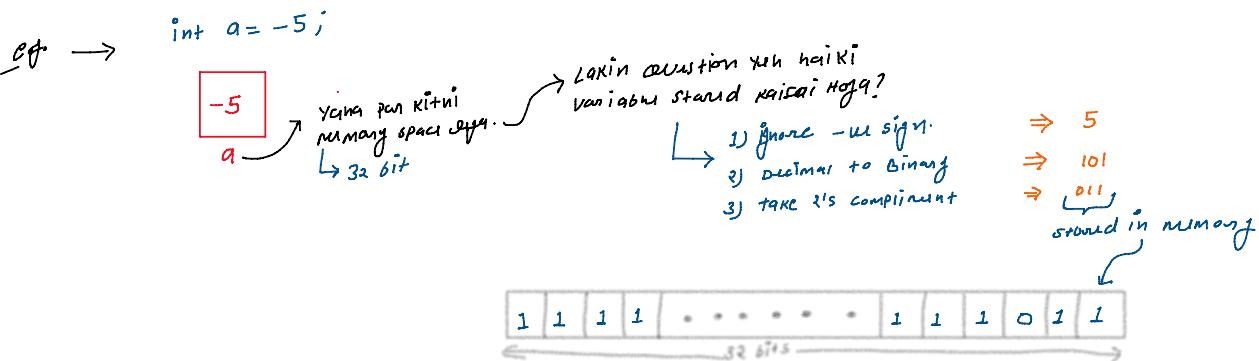
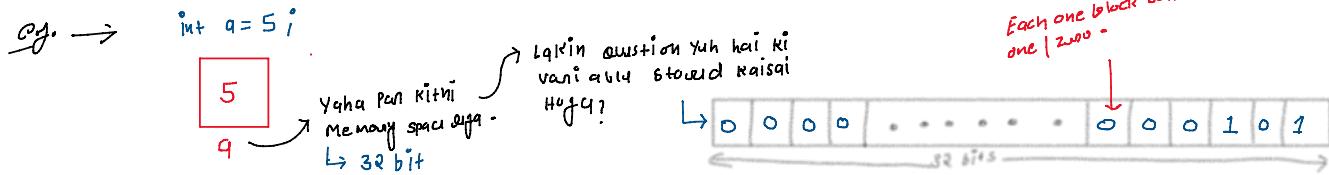
C++ Data types = type of data + size		
① Built-in / Primitive	② derived	③ user-defined
integral - int, long, short, long long floating - float, double character - char Boolean - boolean void	arrays pointers unions structures classes enumerations <p>These are derived from built-in datatypes</p>	<p><u>Note</u> Data types \Rightarrow</p> <ol style="list-style-type: none"> ① Which type of data ② How much space the data will occupy.

↳ size of datatypes are machine dependent

Data types	32 bit	64 bit
char	1 byte	1
short	2	2
int	4	4
long	4	8
long long	8	8
double	8	8
float	4	4

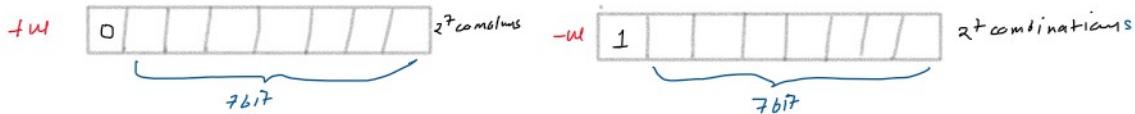


⑦ → How data is stored? [+ve, -ve numbers]



⑧ → signed and unsigned data

(+ve, -ve)



- ① $\text{int} \rightarrow 4 \text{ bytes} \rightarrow 32 \text{ bits}$
 $\hookrightarrow \text{Total Combinations} = 2^{32}$
 $\hookrightarrow \text{Range in the case of signed} = -(2^{31}) \text{ to } +(2^{31}-1)$
 $\hookrightarrow \text{Range in the case of unsigned} = 0 \text{ to } (2^{32}-1)$

- ② $\text{long} \rightarrow 8 \text{ bytes} \rightarrow 64 \text{ bits}$
 $\hookrightarrow \text{Total Combinations} = 2^{64}$
 $\hookrightarrow \text{Range in the case of signed} = -(2^{61}) \text{ to } +(2^{61}-1)$
 $\hookrightarrow \text{Range in the case of unsigned} = 0 \text{ to } (2^{64}-1)$

General Formula
For n bit

unsigned
Range = $0 \rightarrow (2^n - 1)$

signed
Range = $-(2^{n-1}) \rightarrow +(2^{n-1} - 1)$

combinations = 2^n

⑨ → OPERATORS :

- 1) Arithmetic → $+, -, *, /, \%$
- 2) Relational → $>, <, \geq, \leq, ==, !=$
- 3) Assignment → $=$
- 4) Logical → $\&&, |||, !$
- 5) Bitwise → $\&, |, ^, \sim$

Logical operators are used when multiple conditions are occupied.

Arithmetic

X	5	Y	10
---	---	---	----

```

cout << x+y; // 15
cout << x-y; // -5
cout << x*y; // 50
cout << x/y; // 0.5 OR 0
cout << x%y; // 5
    
```

calc:01
first $x = 5$ { op $\Rightarrow 0.5$
int $y = 10$

calc:02
int $x = 5$ { op $\Rightarrow 0$
int $y = 10$

calc:03
double $x = 5$ { op $\Rightarrow 0.5$
int $y = 10$

Note Hit & Trial
to check the output
as well as better
understanding also.

Relational \leftarrow $T \text{rm} = 1$
 $F \text{alse} = 0$

X	5	Y	10
---	---	---	----

```

cout << (x < y); // 1
cout << (x > y); // 0
cout << (x <= y); // 1
cout << (x == y); // 0
cout << (x != y); // 1
cout << (x != 5); // 0
    
```

Assignment +

X	5	Y	10
---	---	---	----

```

int x = 5;
int y = 10;
int c = y+x; // 10+5 = 15
c // 15
    
```

Logical AND

lets see EXAMPLES:

When you want to vote then
Electron's party. So two
conditions must be followed

$\Rightarrow \text{age} = 19 \& \text{country} = \text{India}$
 $\hookrightarrow \text{op} \Rightarrow 1$

... $\Rightarrow \text{age} = 19 \& \text{country} = \text{India}$

When you want to vote in
election's party. So **two**
conditions must be followed
to vote anyone party.

- 1) age greater than 18
- 2) you are Indian

$$\hookrightarrow o/p \Rightarrow 1$$

$$\Rightarrow agi = 18 \quad 88 \quad \text{country} = \text{India}$$

$$\hookrightarrow o/p \Rightarrow 0$$

$$\Rightarrow agi = 20 \quad 88 \quad \text{country} = \text{USA}$$

$$\hookrightarrow o/p \Rightarrow 0$$

$$\Rightarrow agi = 18 \quad 88 \quad \text{country} = \text{USA}$$

$$\hookrightarrow o/p \Rightarrow 0$$

Logical OR

lets see example:

When you want to vote in
election's party. So **at least**
one condition must be followed
to vote anyone party.

- 1) age greater than 18
- 2) you are Indian

$$\Rightarrow agi = 19 \quad 11 \quad \text{country} = \text{India}$$

$$\hookrightarrow o/p \Rightarrow 1$$

$$\Rightarrow agi = 18 \quad 11 \quad \text{country} = \text{India}$$

$$\hookrightarrow o/p \Rightarrow 1$$

$$\Rightarrow agi = 20 \quad 11 \quad \text{country} = \text{USA}$$

$$\hookrightarrow o/p \Rightarrow 1$$

$$\Rightarrow agi = 18 \quad 11 \quad \text{country} = \text{USA}$$

$$\hookrightarrow o/p \Rightarrow 0$$