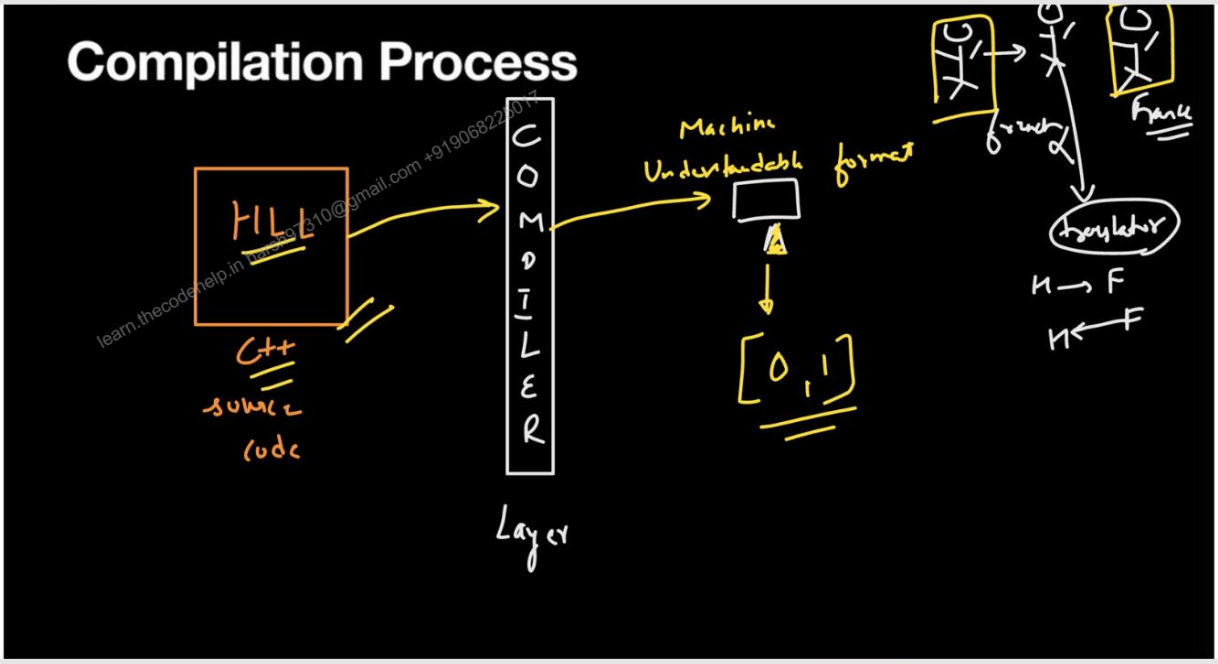
Create your First Program

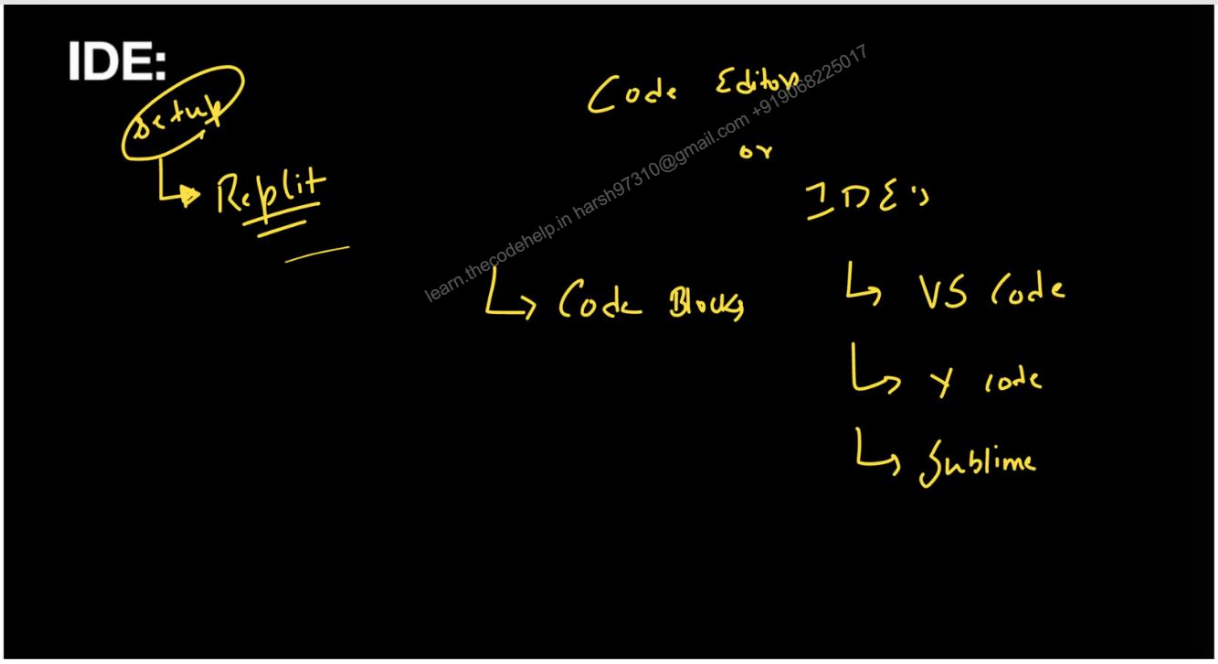
Instructor: Love Babbar

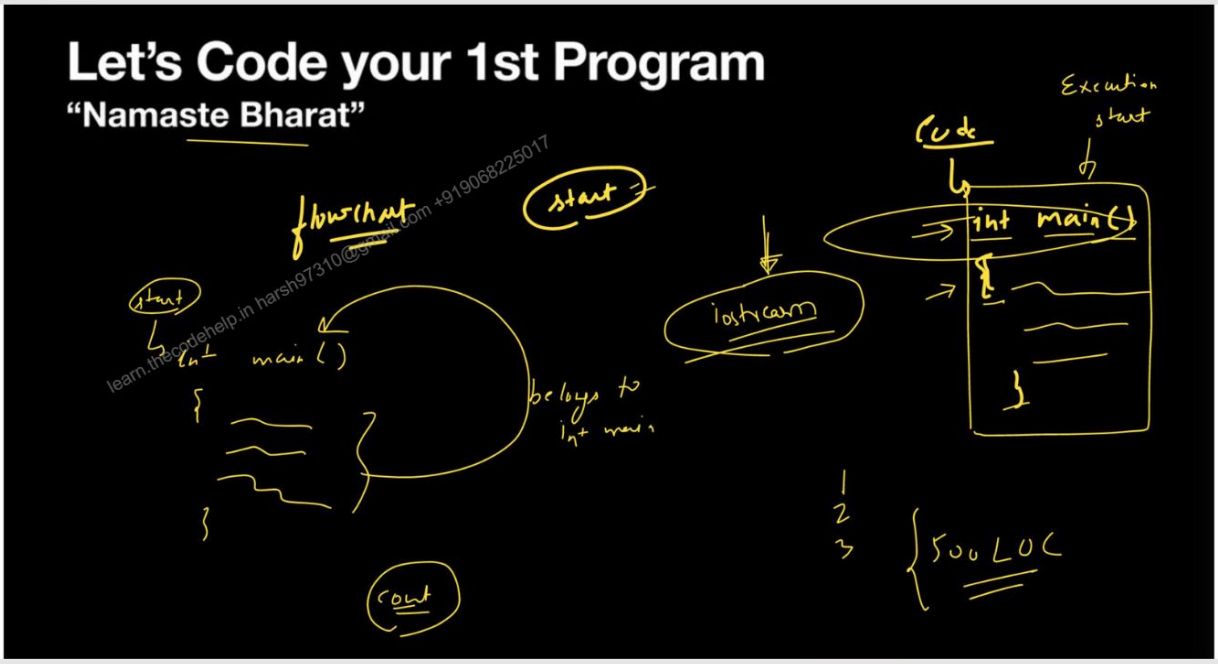
Programming Languages

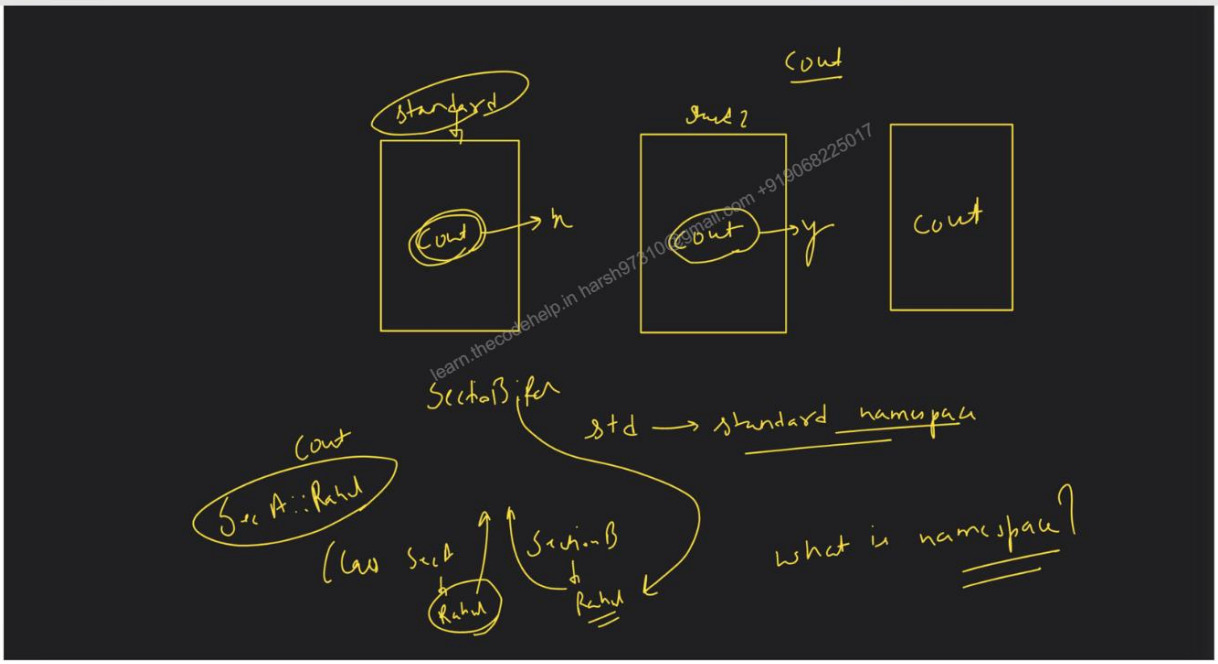
Why we need it ?

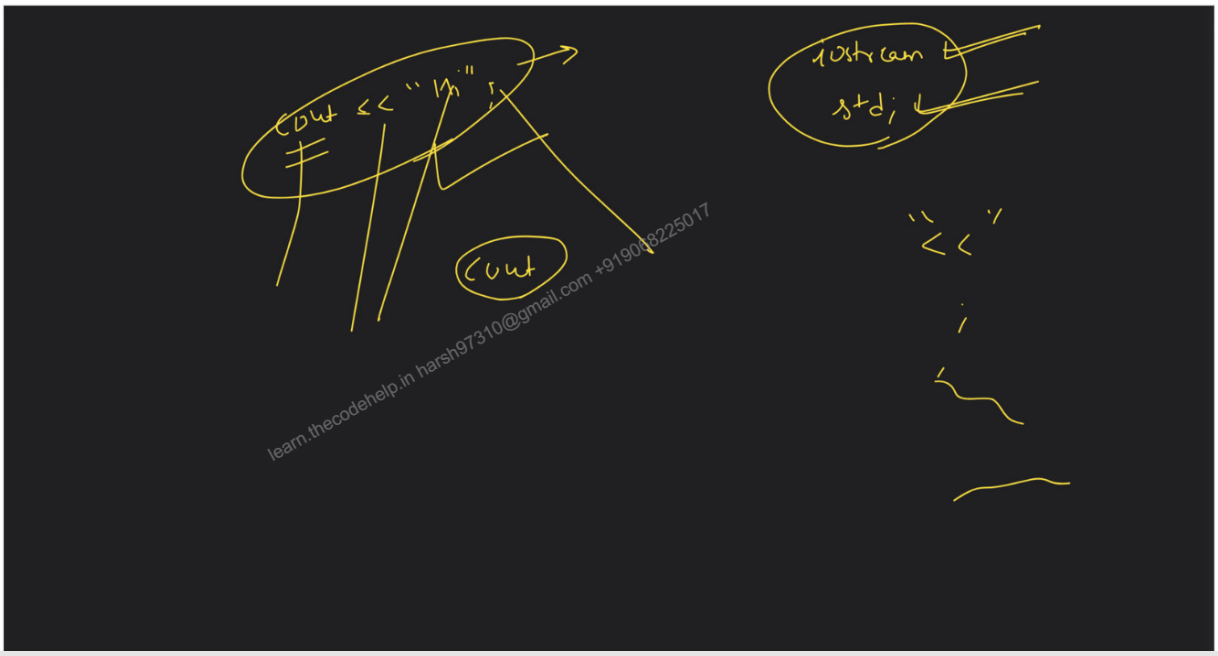
- A Language using which, we can instruct the computer to carry out real life tasks and computations is called a programming language. It acts as a language in which we could easily express our thoughts to the machine.
- Like natural languages, programming language has a fixed set of rules according to which programs could be written in it. These programs are then converted into a language which machines can understand. This task is carried out by a special software called compiler.
- Every language has its own compiler/Interpreter. → Refresh
- Once a program is compiled and linked, its executable is created and the computer can run our program now.

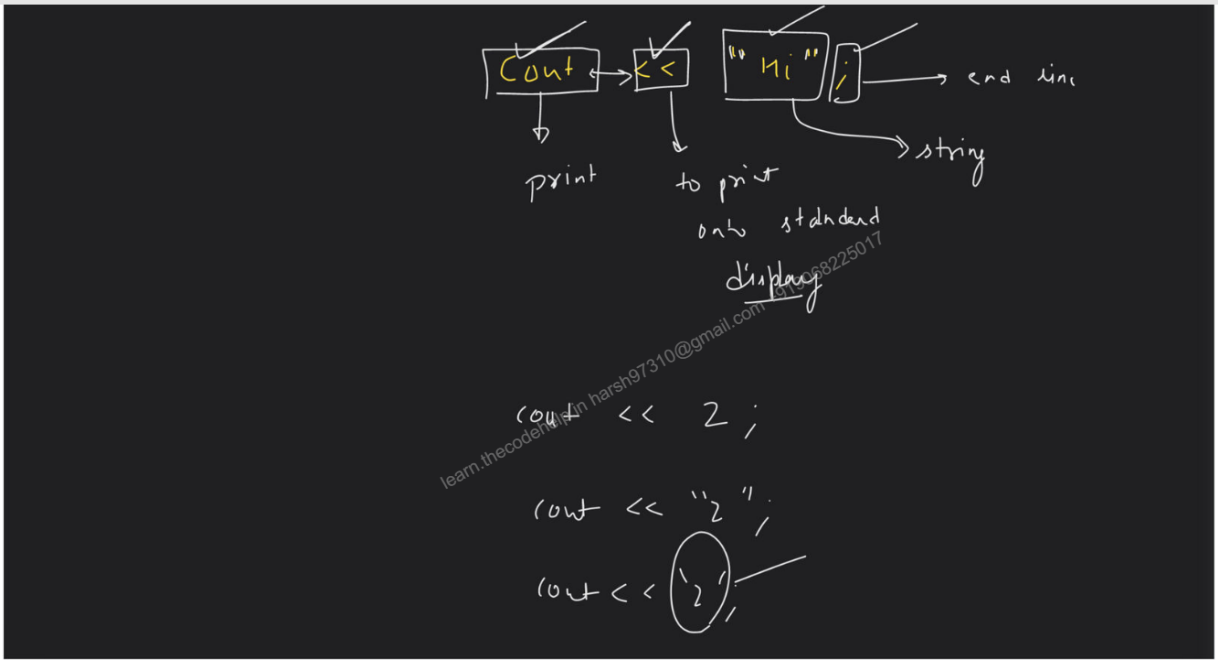












Taking Input in C++

print -> cout

input -> cin

Skip

Datatypes & Variables

Datatype

A variable in C is a memory location associated with some name in order to store some form of data and retrieve it when required & data types are used to tell the variables the type of data they can store.

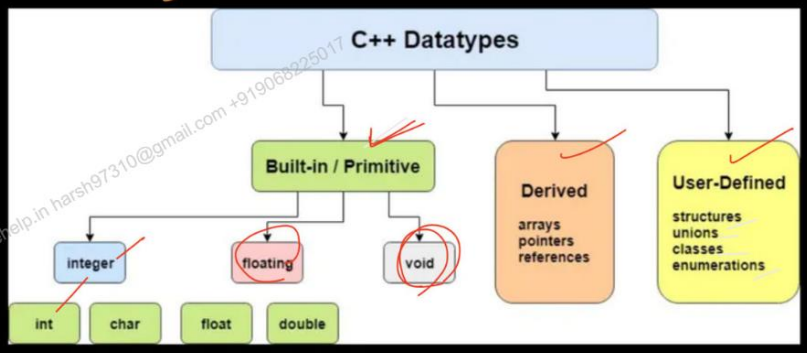
int b = 7

b

type of data

Void ?

variable ?

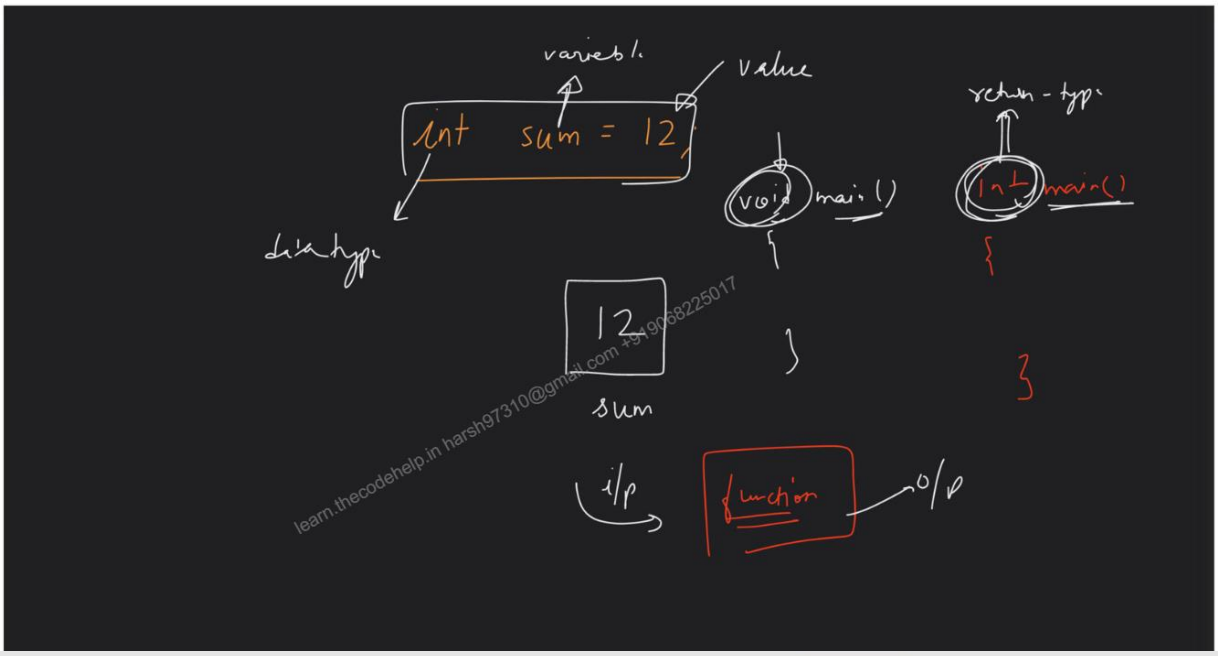


void main()

{

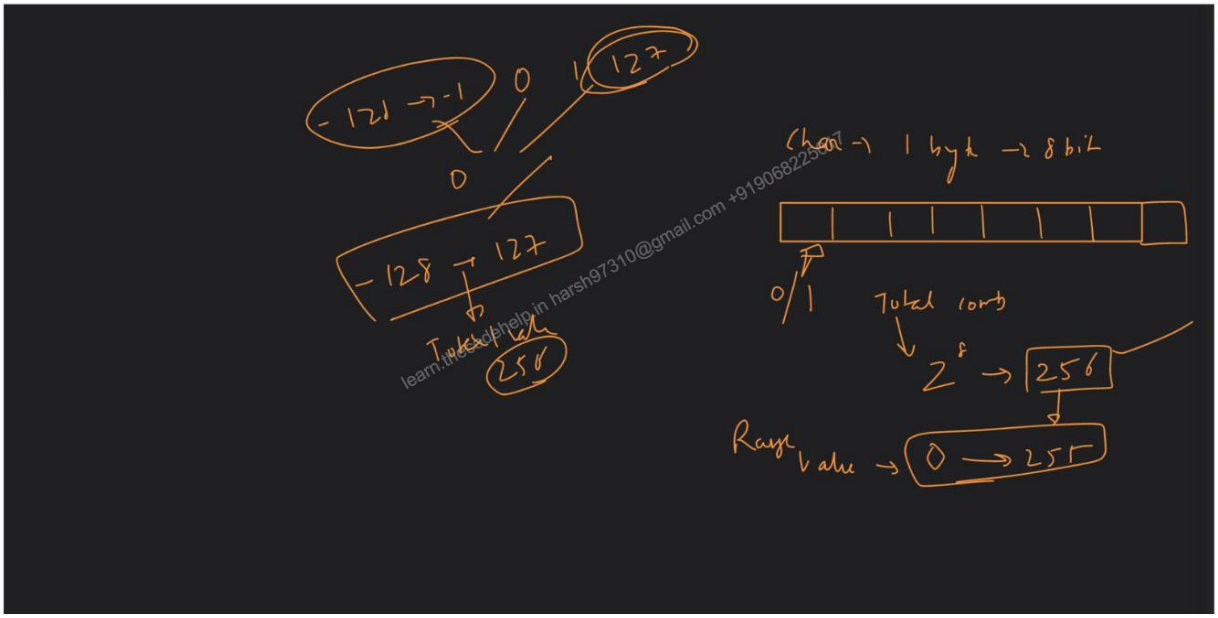
int a = 5

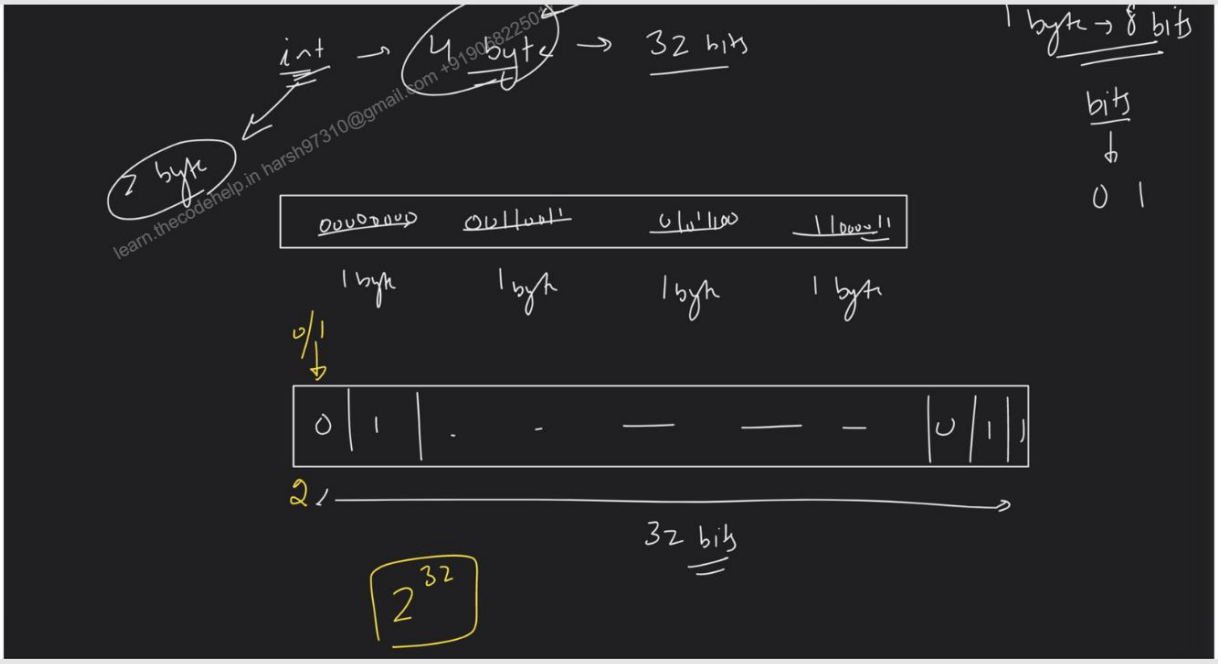
5

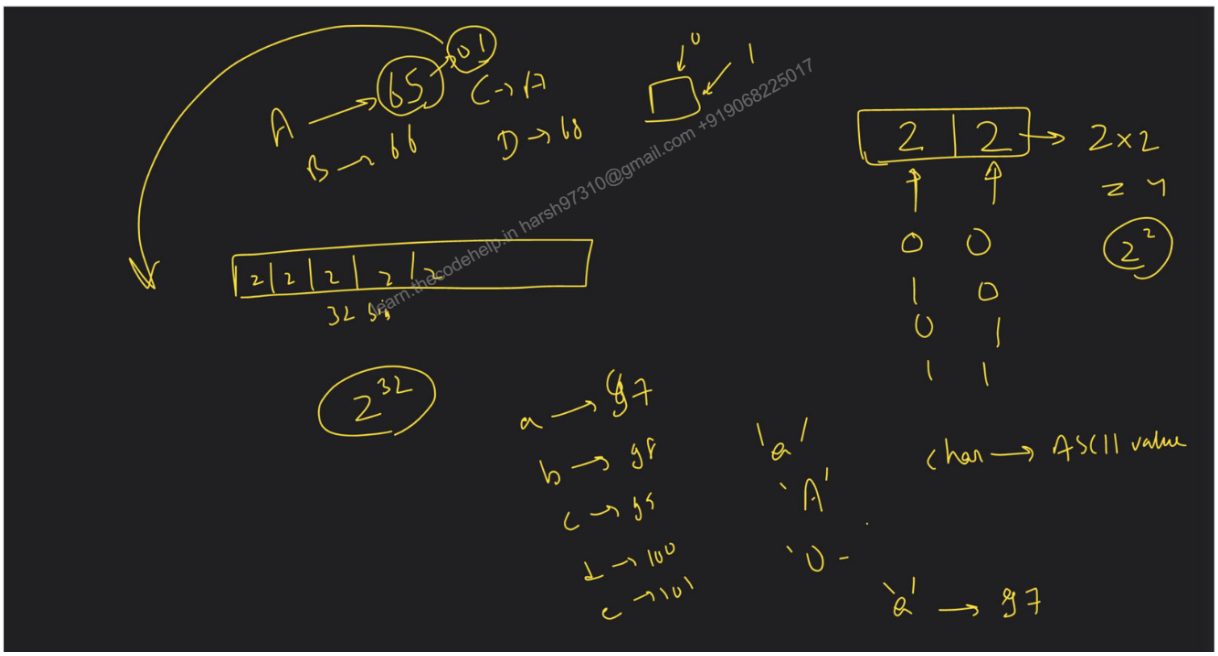


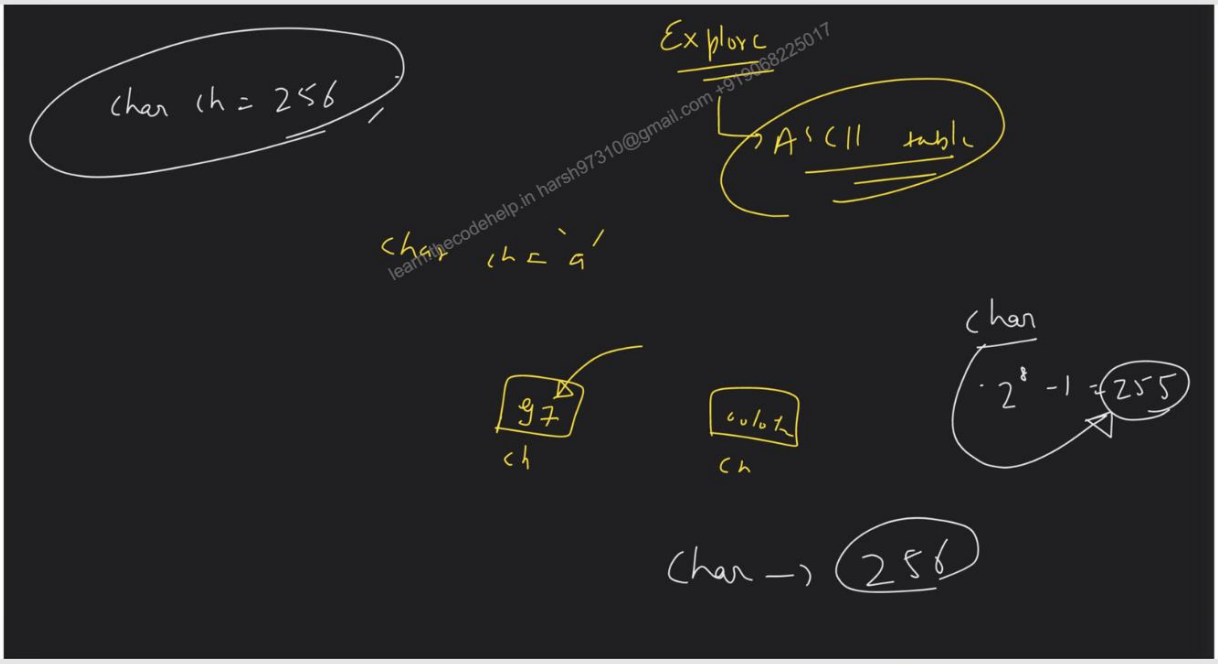
DataTypes: → which type of data u will store

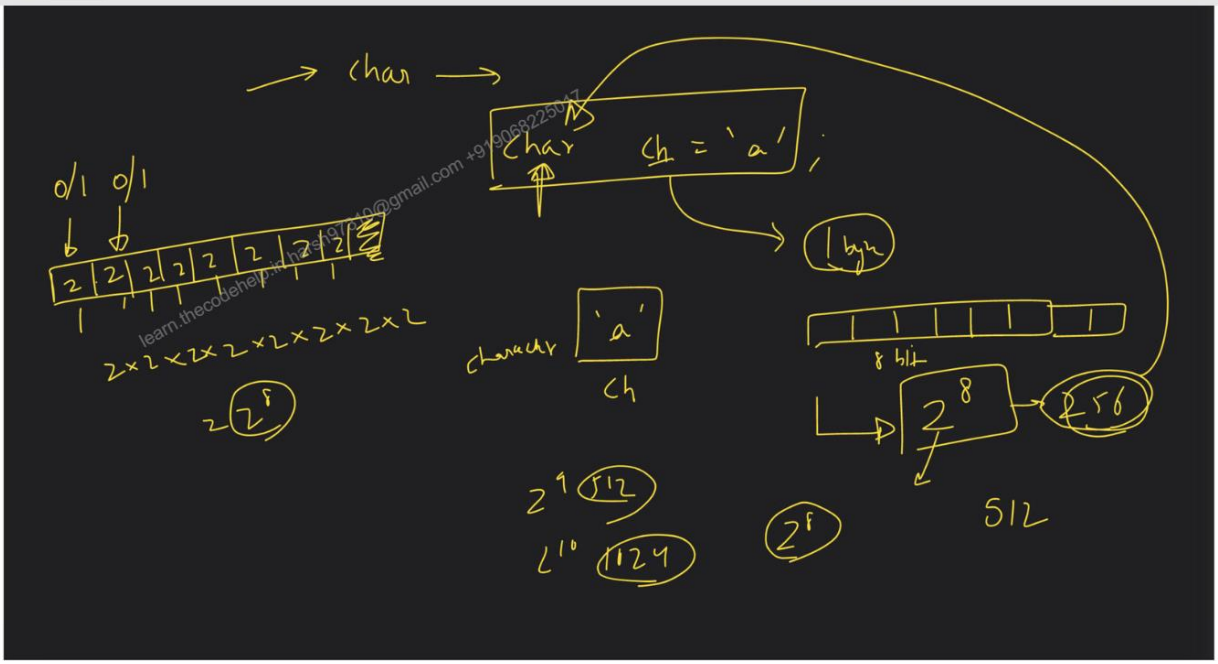
C Basic Data Types	32-bit CPU		64-bit CPU	
	Size (bytes)	Range	Size (bytes)	Range
char	1	-128 to 127	1	-128 to 127
short	2	-32,768 to 32,767	2	-32,768 to 32,767
int	4	-2,147,483,648 to 2,147,483,647	4	-2,147,483,648 to 2,147,483,647
long	4	-2,147,483,648 to 2,147,483,647	8	-9,223,372,036,854,775,808-9,223,372,036,854,775,807
long long	8	9,223,372,036,854,775,808-9,223,372,036,854,775,807	8	9,223,372,036,854,775,808-9,223,372,036,854,775,807
float	4	3.4E +/- 38	4	3.4E +/- 38
double	8	1.7E +/- 308	8	1.7E +/- 308

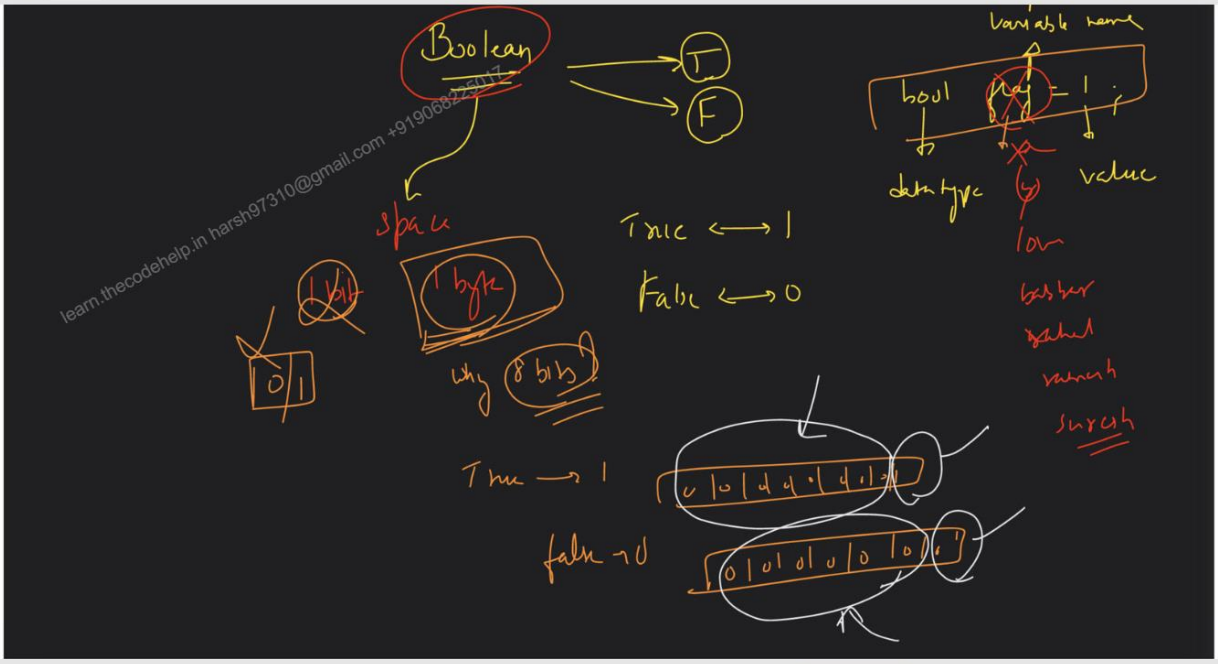


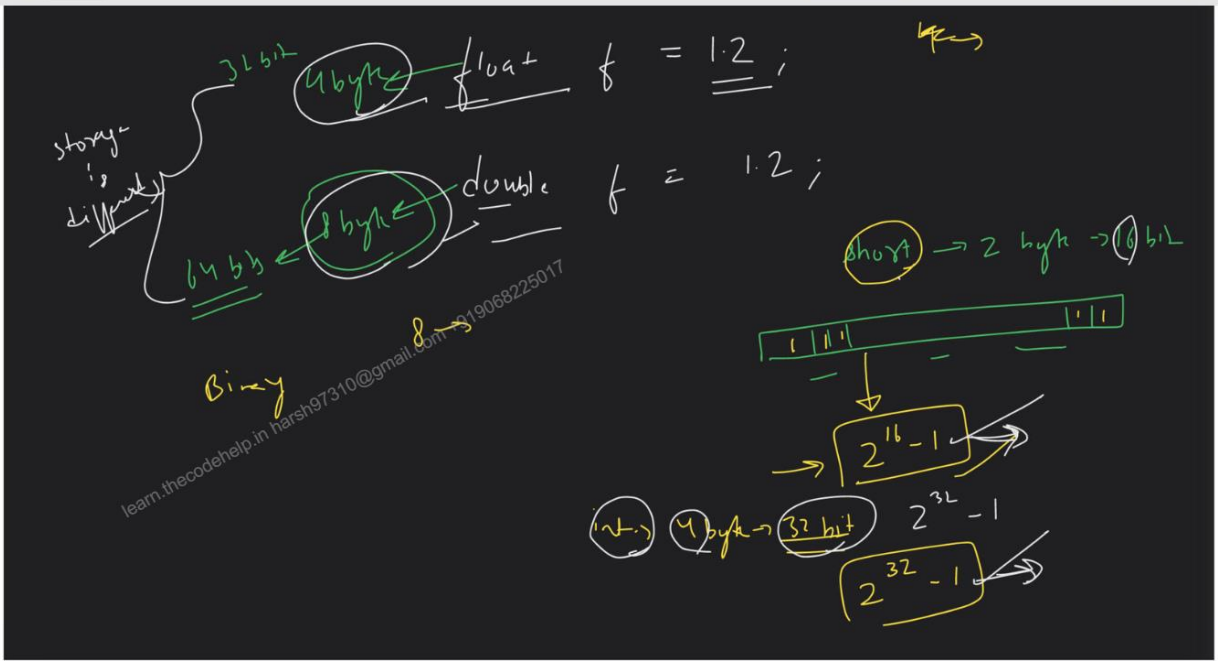


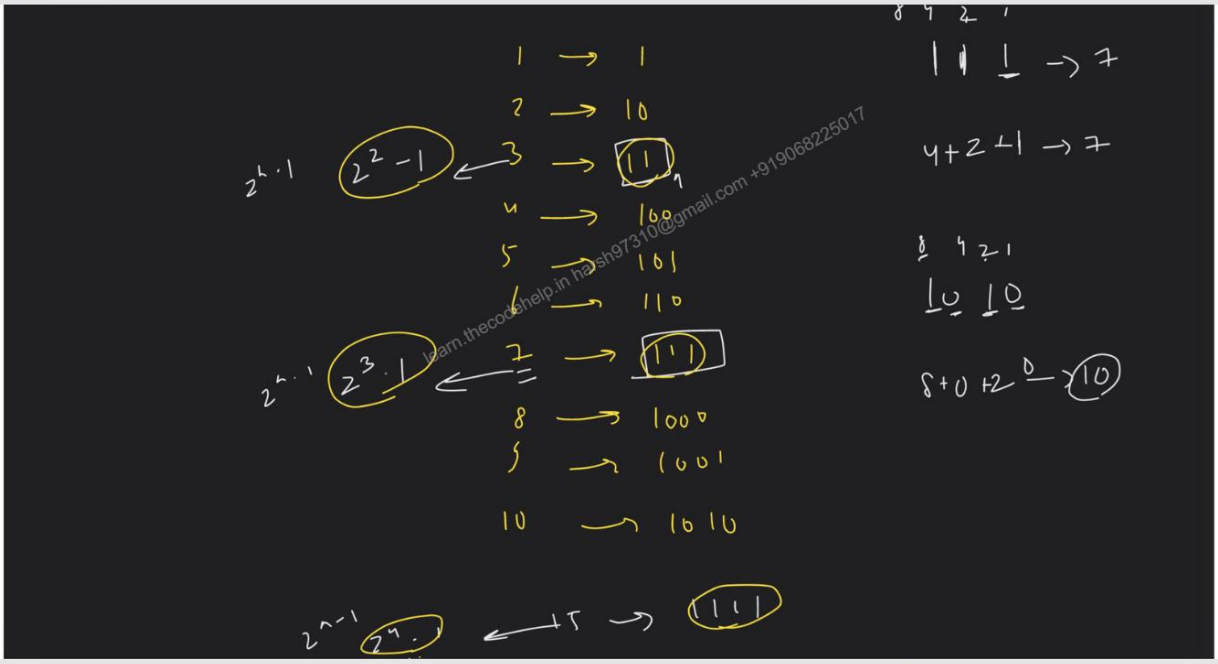


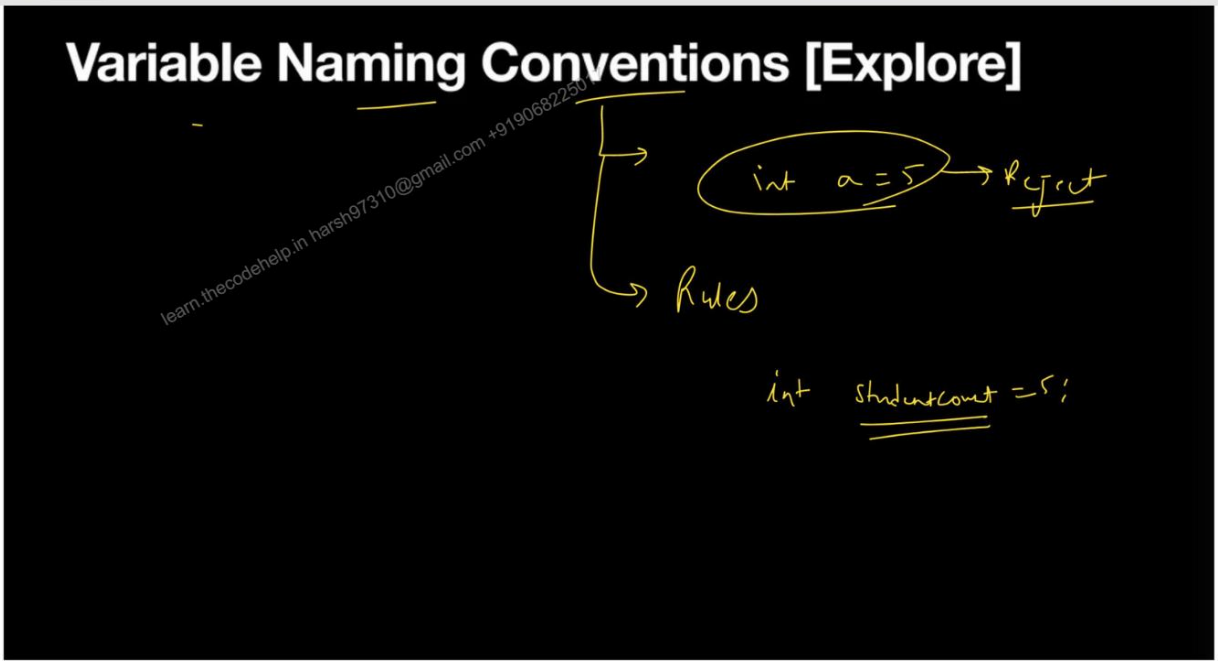


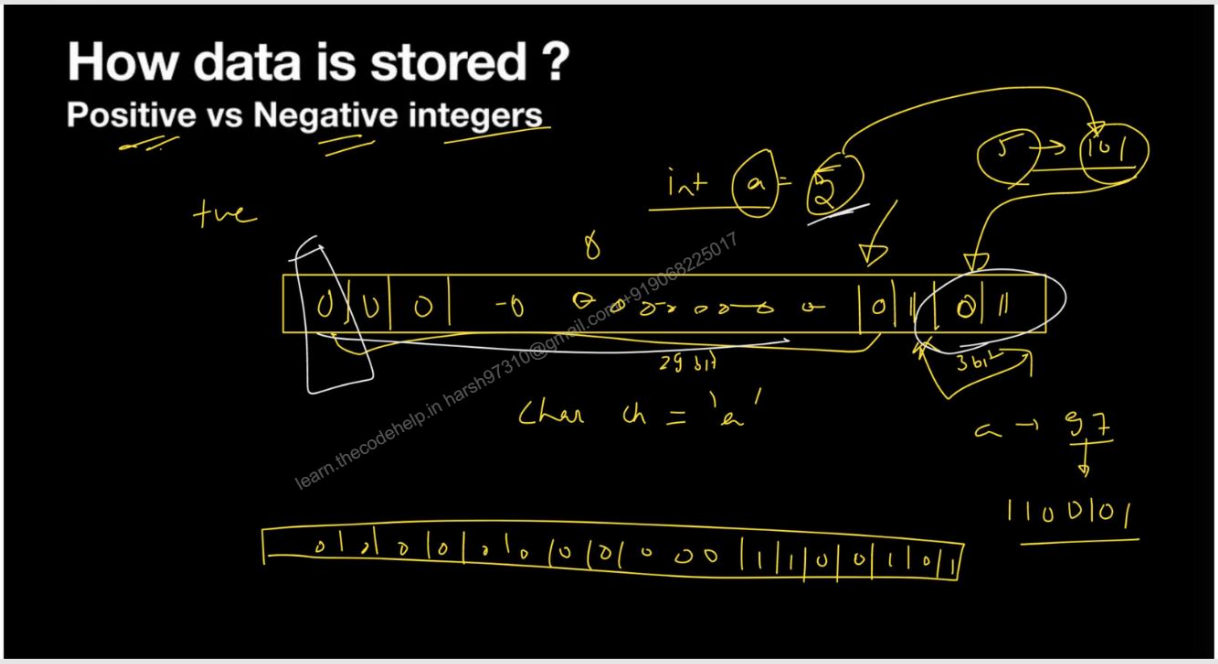




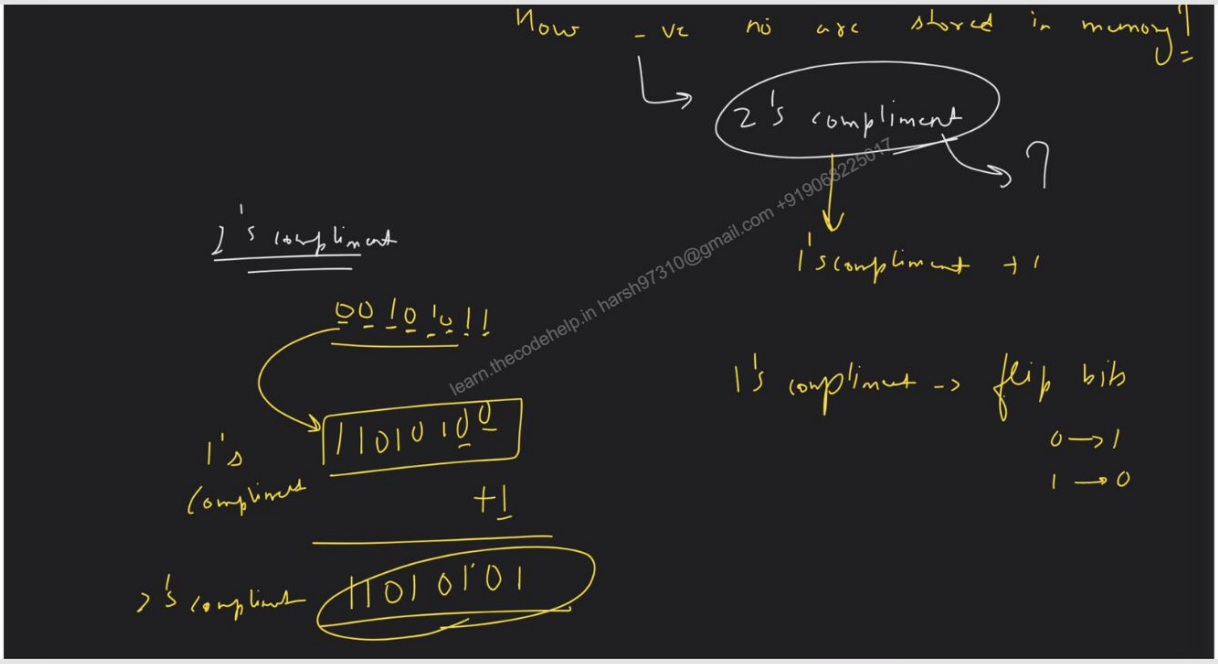


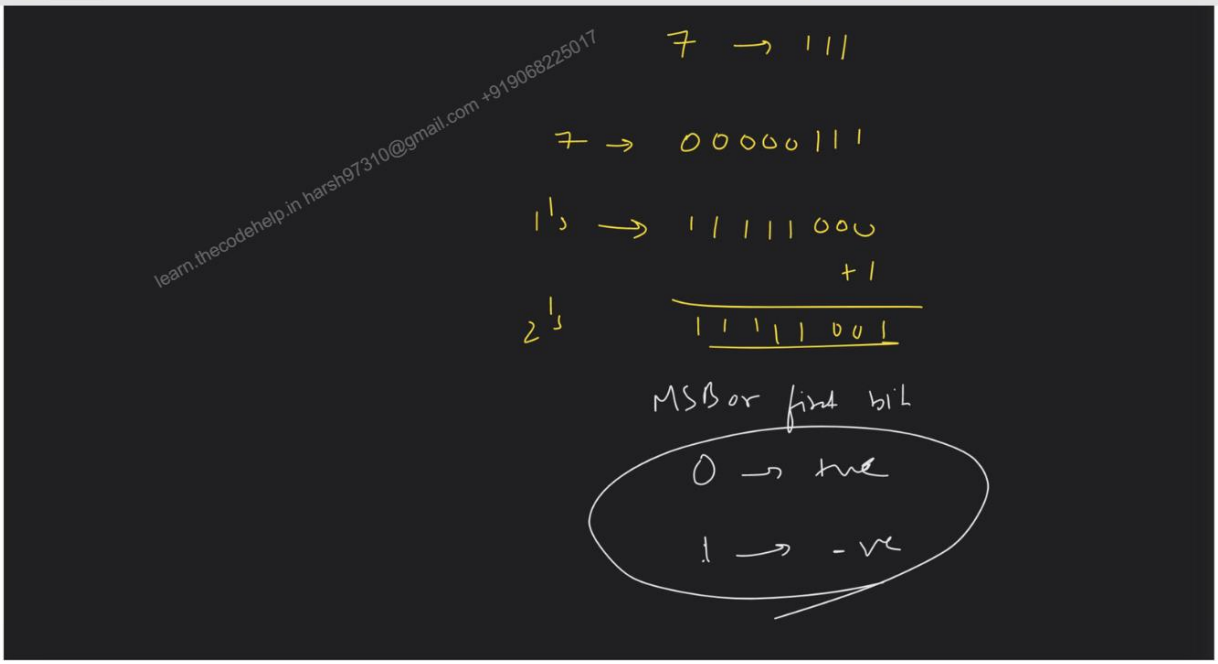


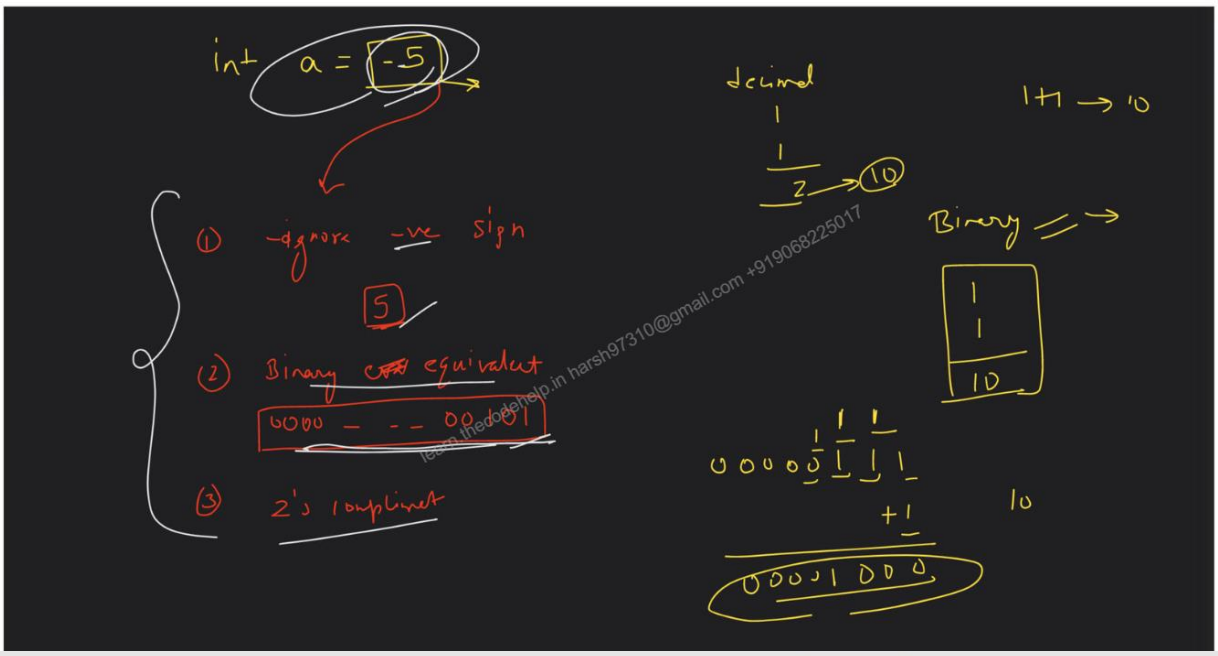


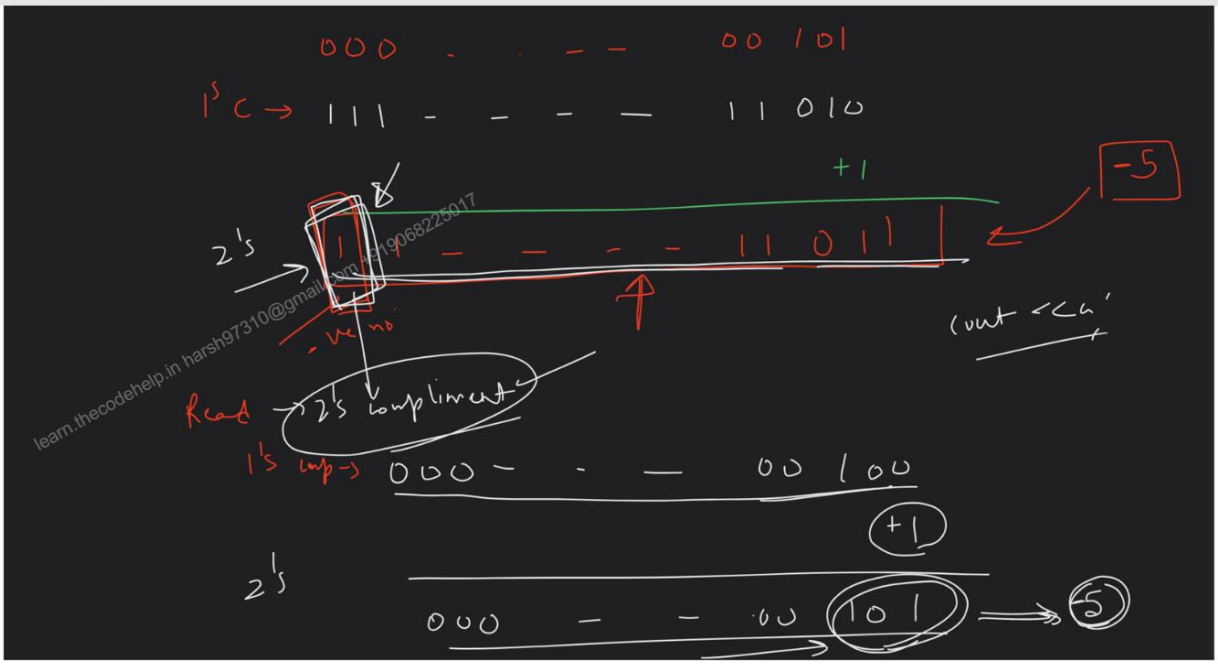

How data is stored ?
Positive vs Negative integers
int a = 5
true
29 bit
3 bit
char ch = 'a'
a → 97
1100101
learn.thecodehelp.in harsh97310@gmail.com +919068225017

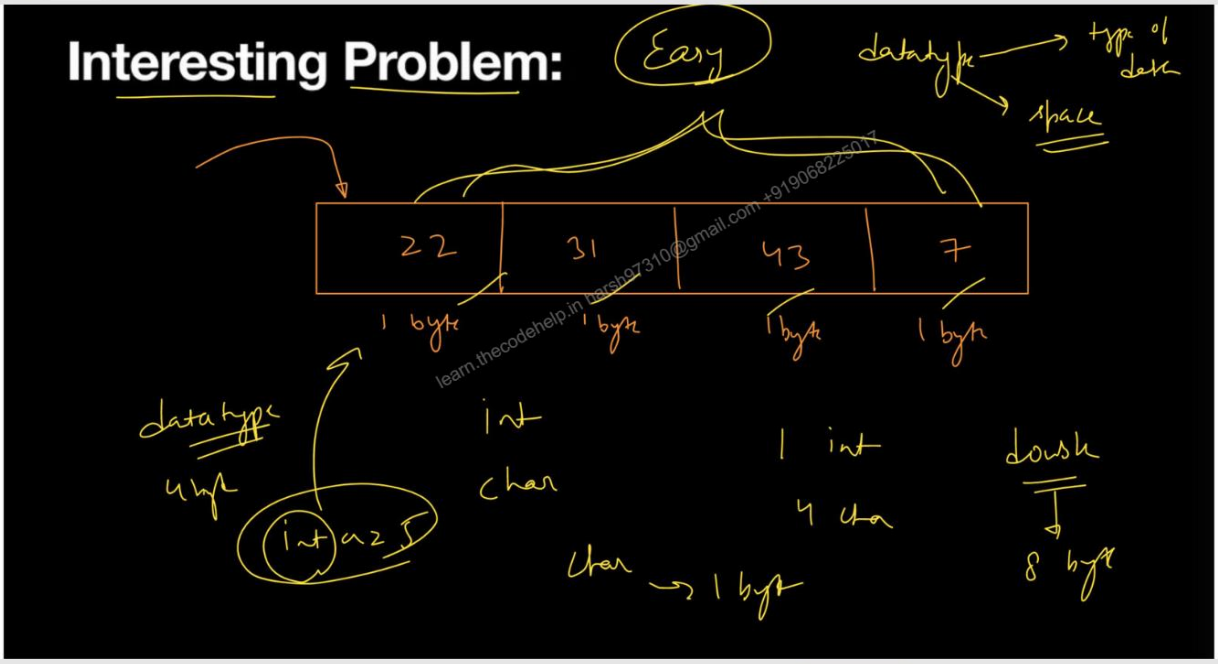

MSB
LSB
true
first bit
-ve
learn.thecodehelp.in harsh97310@gmail.com +919068225017

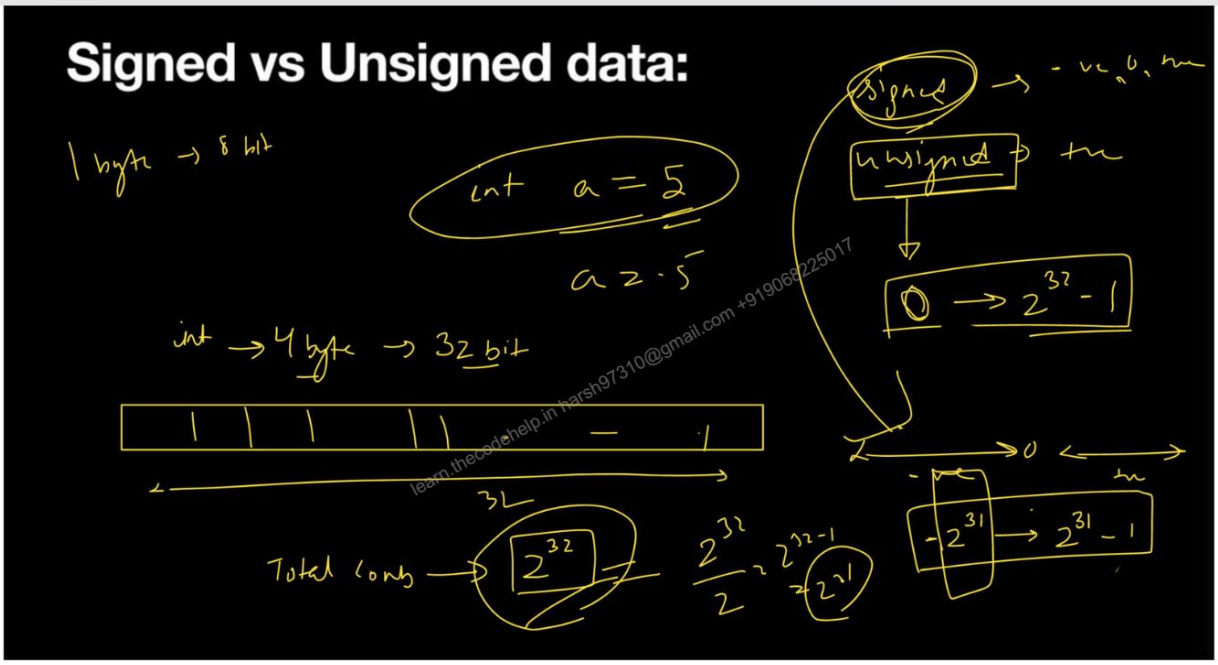


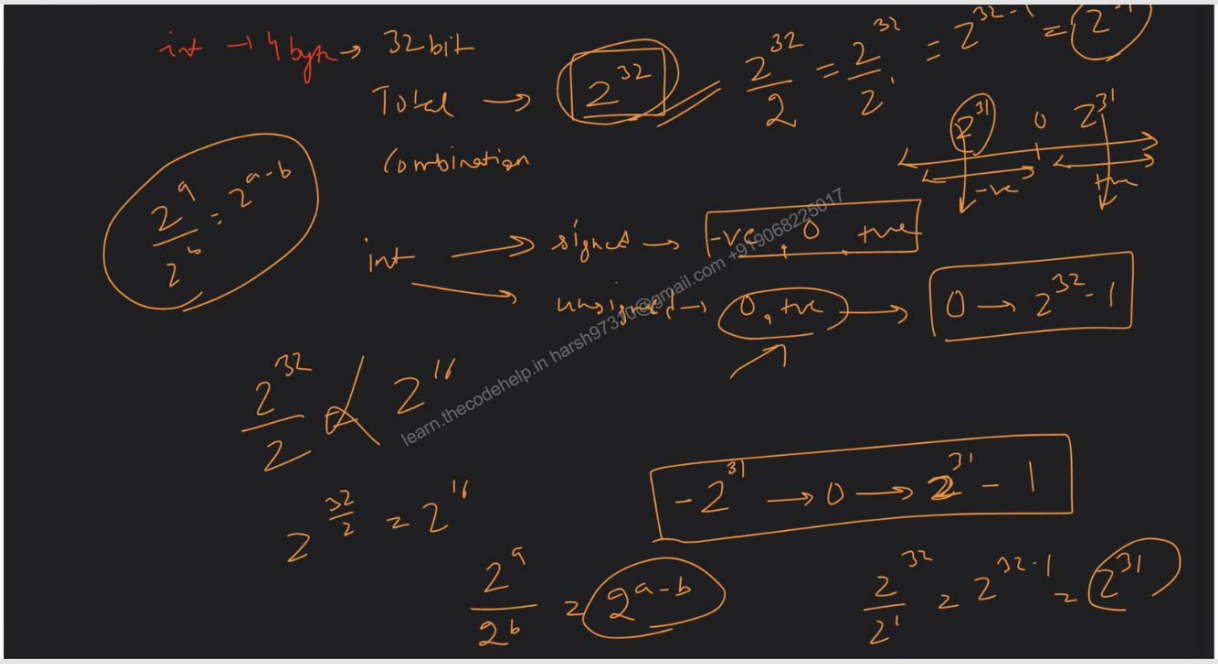











int → 4 byte → 32 bit
Total combination
2^{32}
$\frac{2^{32}}{2} = \frac{2^{32}}{2^1} = 2^{32-1} = 2^{31}$
$\frac{2^a}{2^b} = 2^{a-b}$
int → signed → -ve 0 +ve
unsigned → 0, +ve → $0 \to 2^{32}-1$
$\frac{2^{32}}{2} \neq 2^{16}$
$2^{\frac{32}{2}} = 2^{16}$
$-2^{31} \to 0 \to 2^{31}-1$
$\frac{2^a}{2^b} = 2^{a-b}$
$\frac{2^{32}}{2^1} = 2^{32-1} = 2^{31}$
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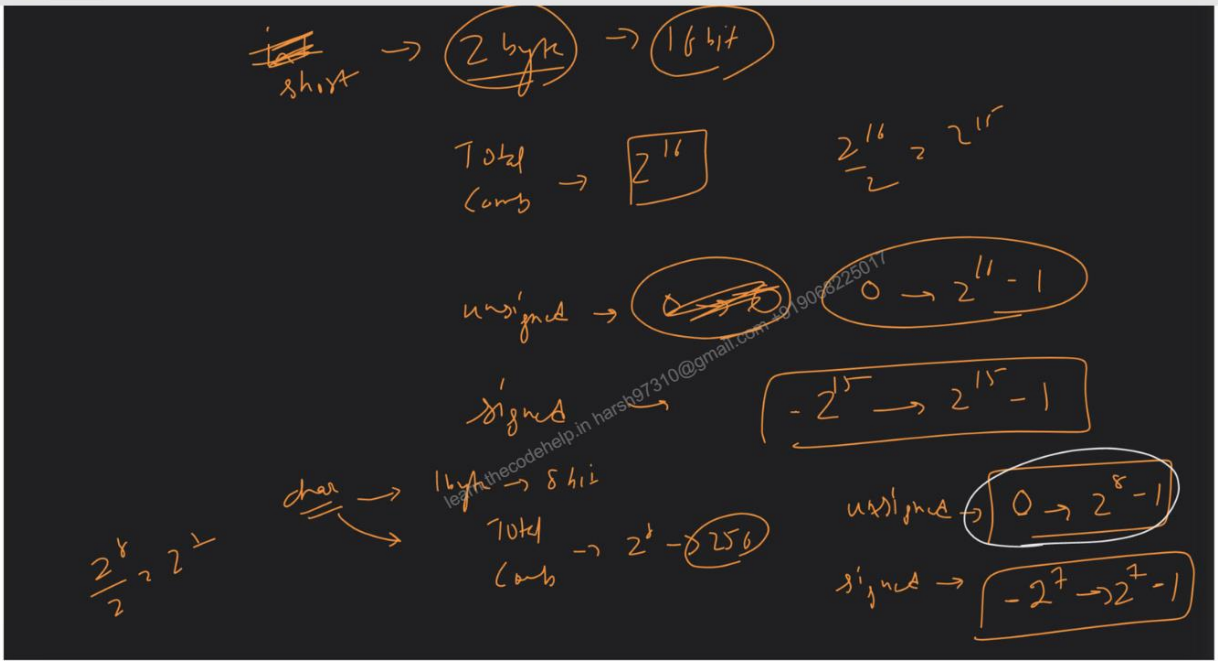
short → 2 byte → 16 bit
Total Comb → 2^{16}
$\frac{2^{16}}{2} = 2^{15}$
unsigned → $0 \to 2^{16}-1$
signed → $-2^{15} \to 2^{15}-1$
char → 1 byte → 8 bit
Total Comb → $2^8 = 256$
$\frac{2^8}{2} = 2^7$
unsigned → $0 \to 2^8-1$
signed → $-2^7 \to 2^7-1$
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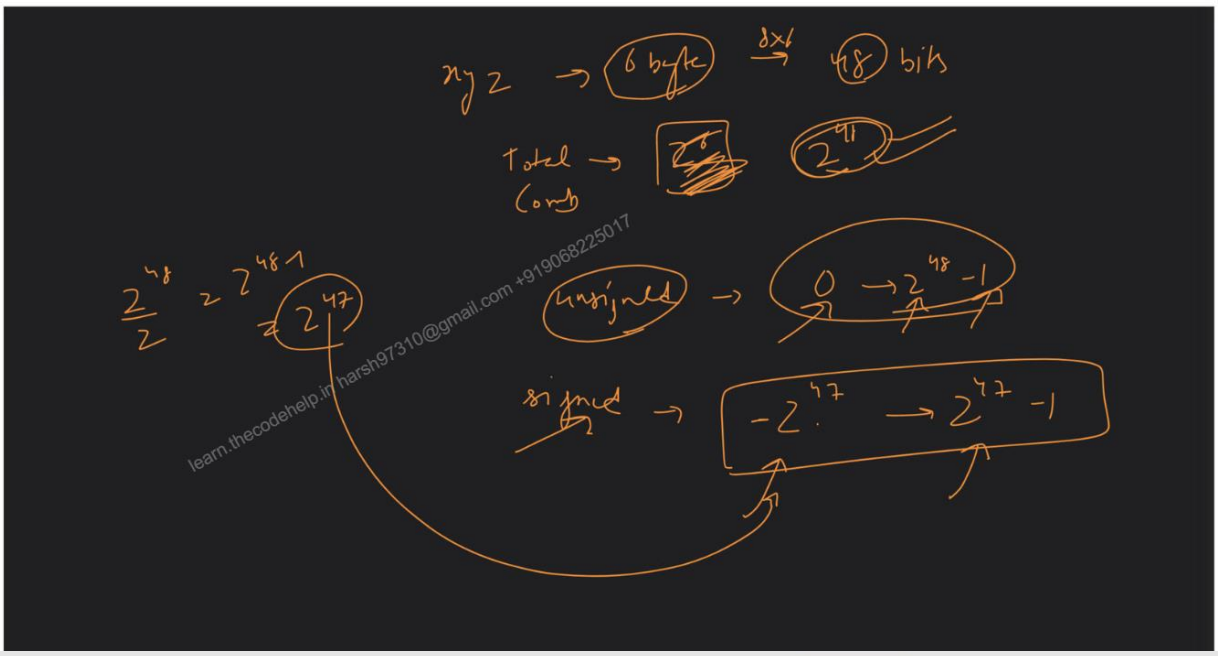
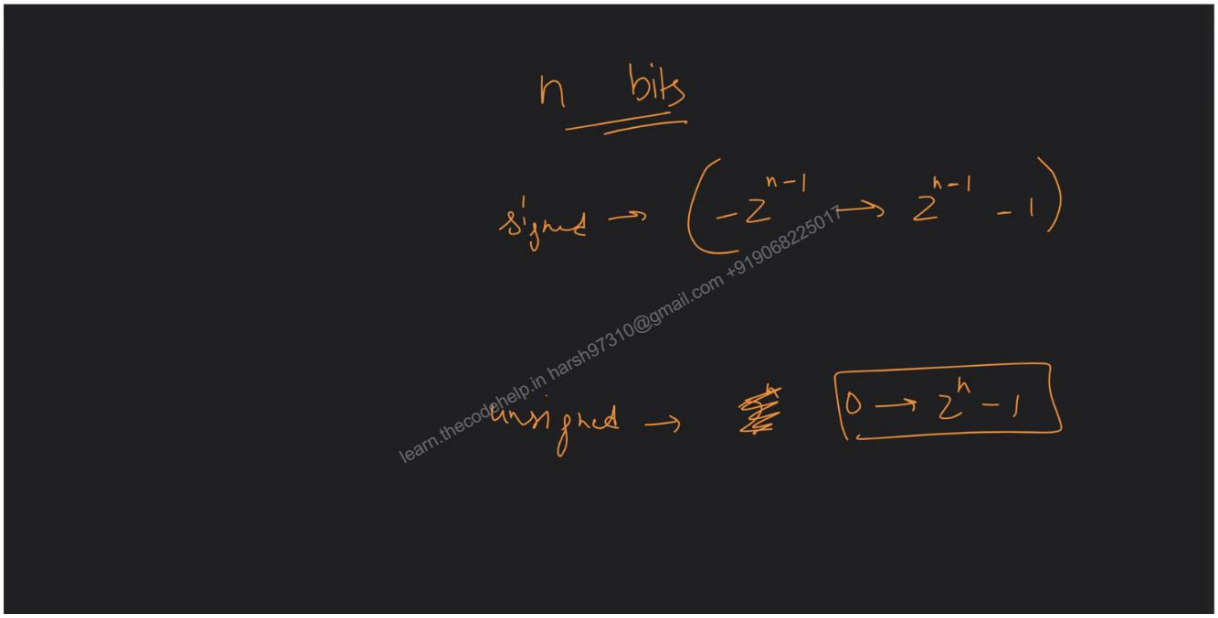




TypeCasting

Implicit vs Explicit

- Type casting refers to the conversion of one data type to another in a program. Typecasting can be done in two ways: automatically by the compiler and manually by the programmer or user. Type Casting is also known as Type Conversion.

Implicit Type Casting or Implicit Type Conversion

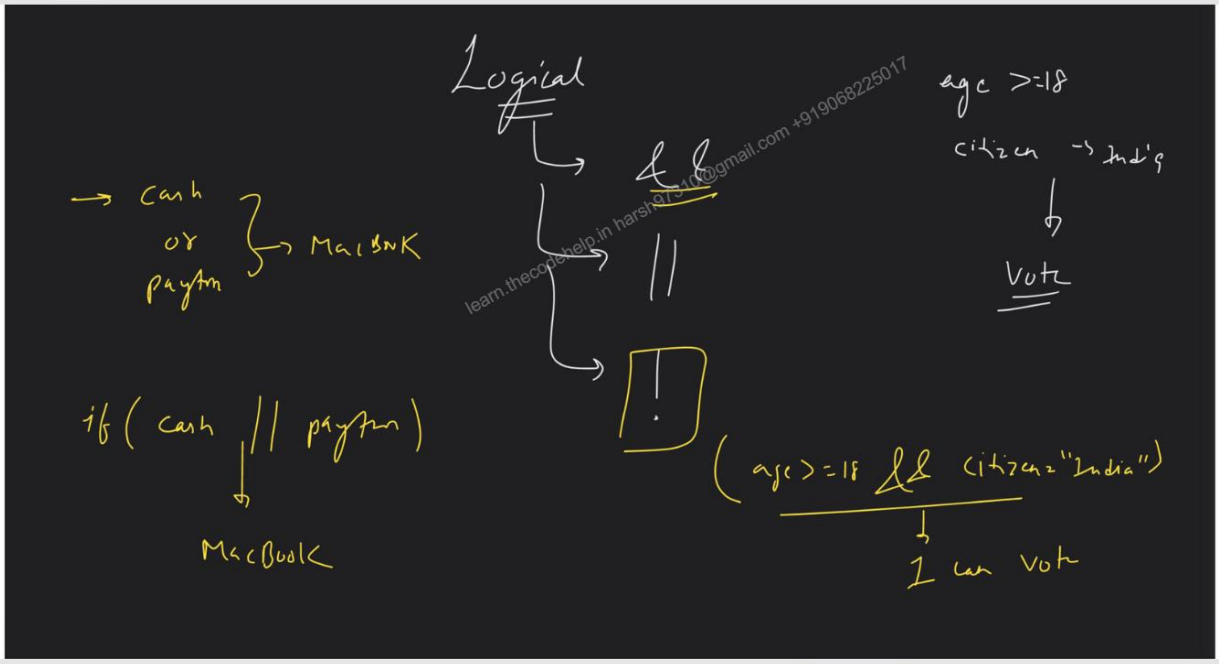
- It is known as the automatic type casting.
- It automatically converted from one data type to another without any external intervention such as programmer or user. It means the compiler automatically converts one data type to another.
- All data type is automatically upgraded to the largest type without losing any information.
- It can only apply in a program if both variables are compatible with each other.

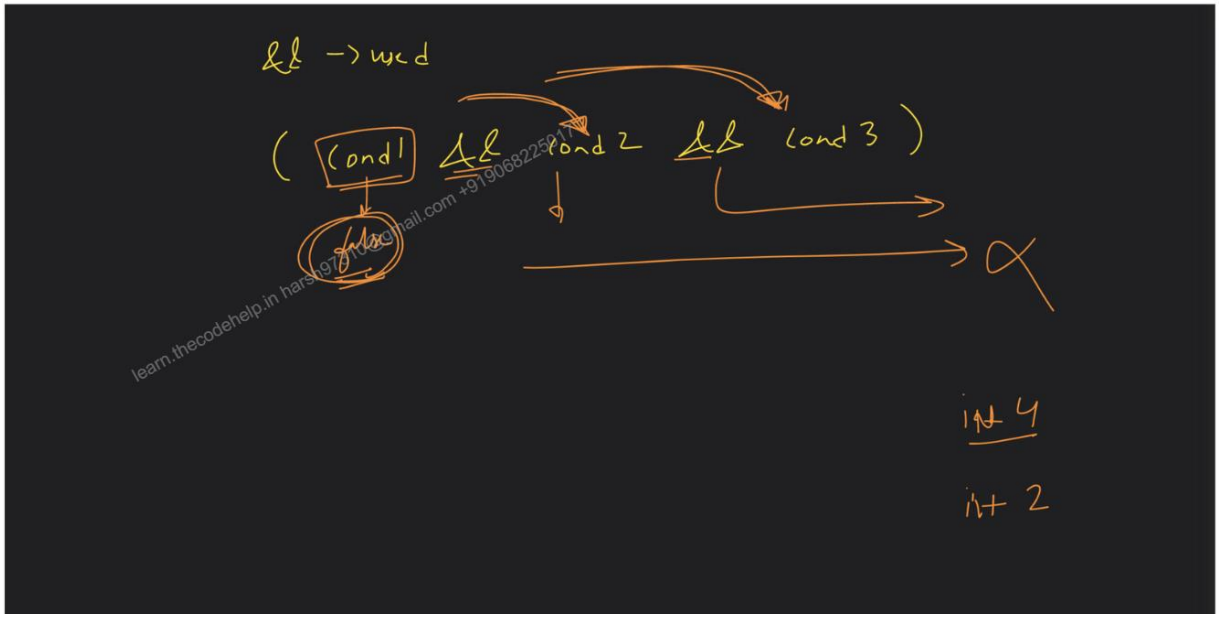
Explicit Type Casting or Explicit Type Conversion

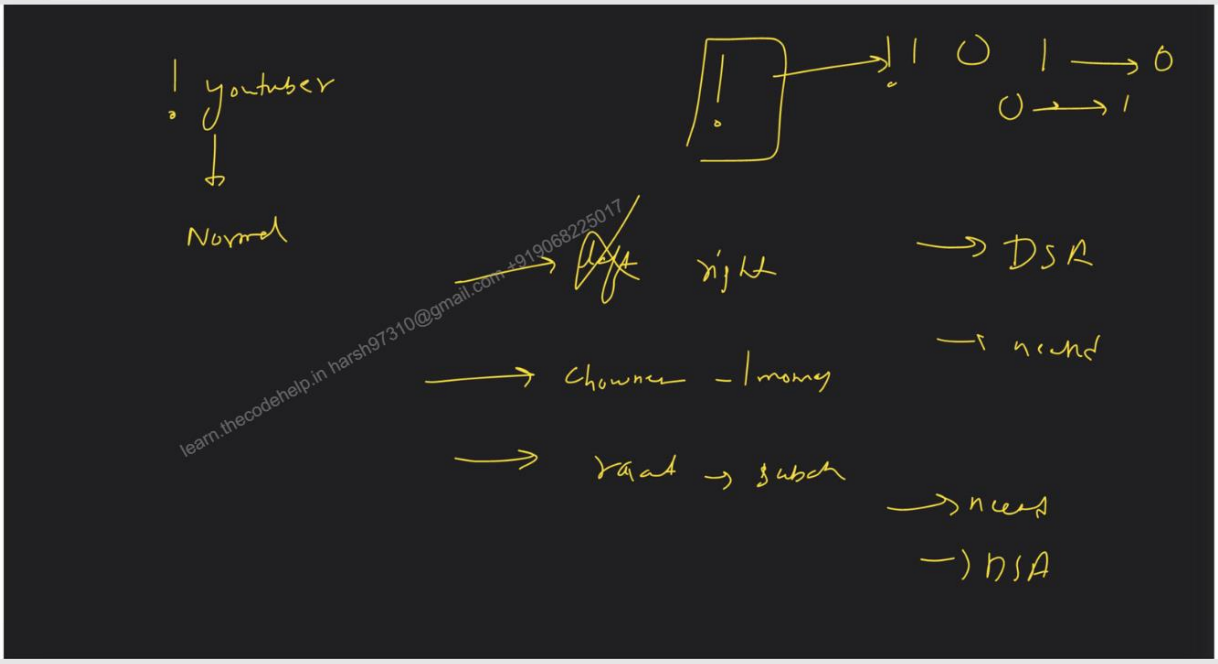
- It is also known as the manual type casting in a program.
- It is manually cast by the programmer or user to change from one data type to another type in a program. It means a user can easily cast one data to another according to the requirement in a program.
- It does not require checking the compatibility of the variables.
- In this casting, we can upgrade or downgrade the data type of one variable to another in a program.
- It uses the cast () operator to change the type of a variable.

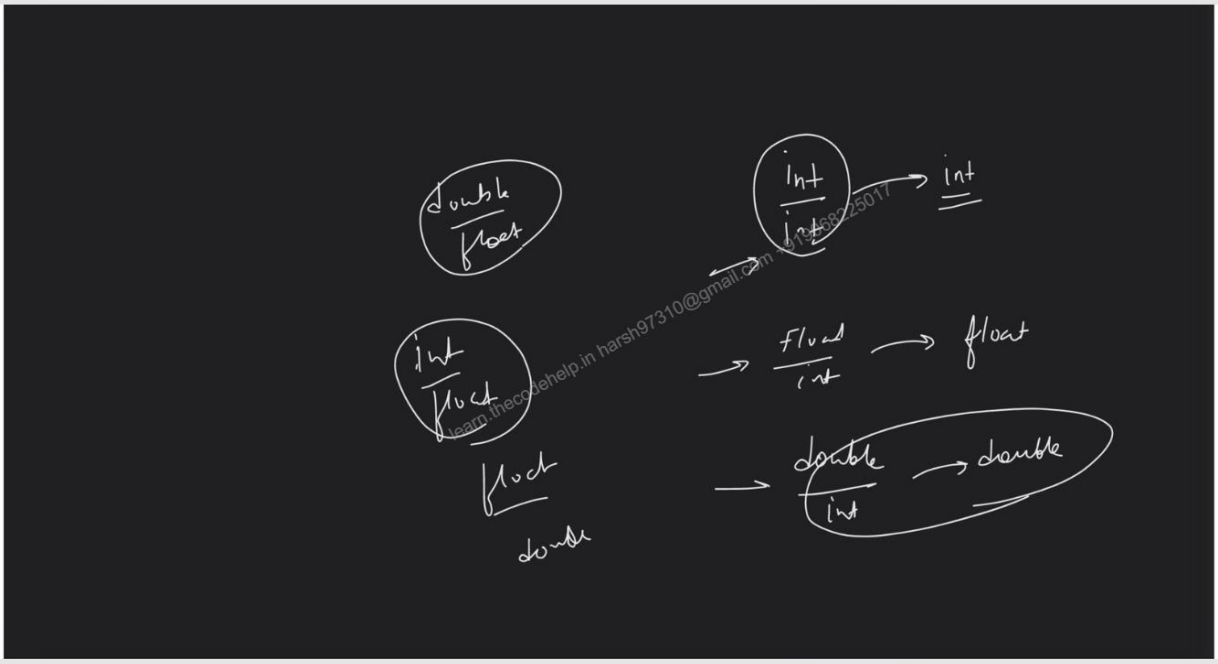
Operators:

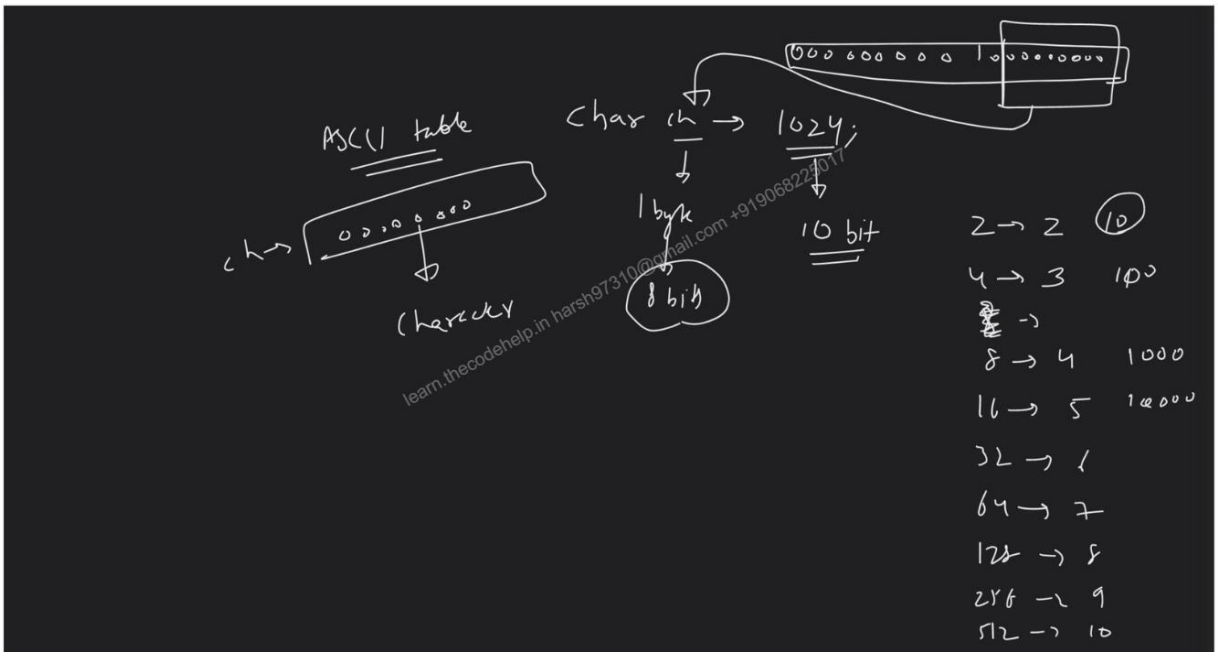
- Arithmetic
- Relational
- Assignment
- Logical
- Bitwise

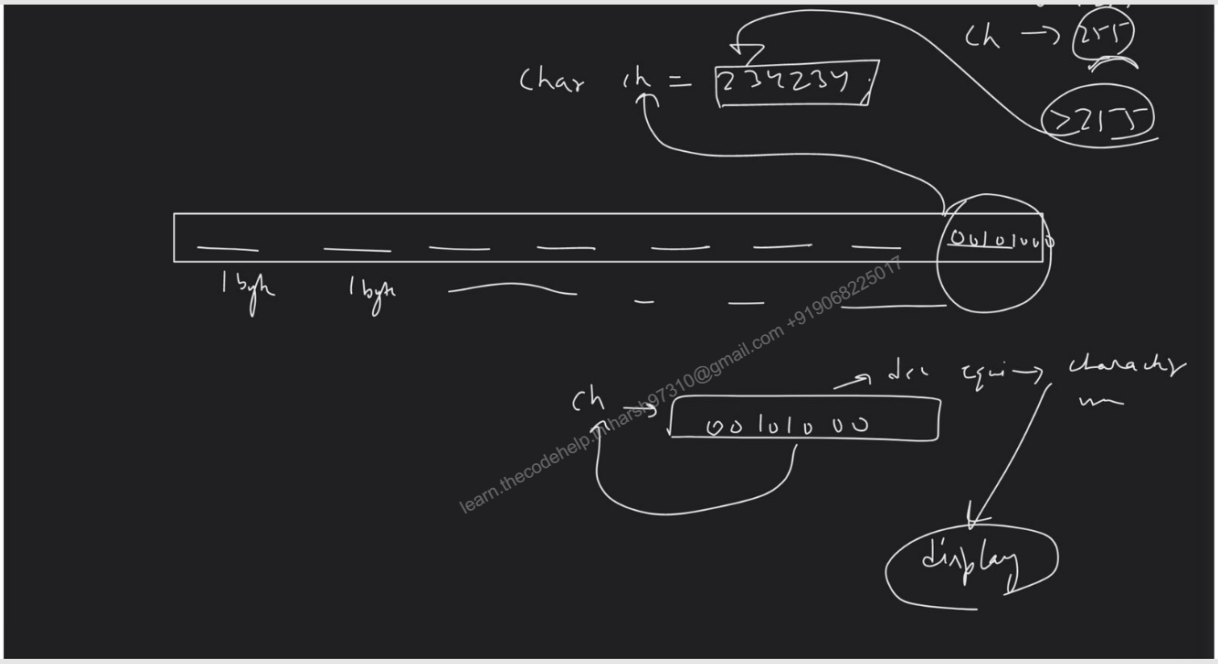












Conditionals