

## CHAPTER - 2: Instructions And Operators

A C program is a set of instructions just like a recipe - which contains instruction to prepare a particular dish.

### Types of Instruction

- (1) Type declaration Instruction
- (2) Arithmetic Instruction
- (3) Control Instruction

#### Type declaration Instruction

```
int a;  
float b;
```

Other variations:

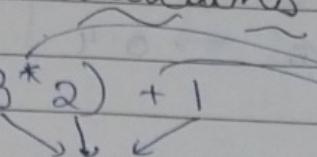
```
int i=10; int j=i; int a=2  
int j = a + j - i;
```

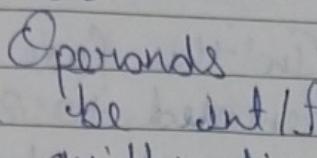
float b = a + 3; float a = 1.1  $\Rightarrow$  ERROR! as we are trying to use a before defining it

```
int a, b, c, d;
```

a = b = c = d = 30;  $\Rightarrow$  value of a, b, c and d will be 30 each

## Arithmetic Instructions

int i = (3 \* 2) + 1       Operator

Operands        
 Operands can be int / float etc.  
 + - \* / are arithmetic Operators

int b=2, c=3

int z; z = b \* c; (✓) legal

int z; b \* c = z; (✗) Illegal (Not allowed)

% → Modular division Operator -

% → Returns the remainder

٪ → Cannot be applied on float

٪ → Sign is same as of numerator ( $-5 \% 2 = -1$ )

$$5 \% 2 = 1$$

$$-5 \% 2 = -1$$

Note :-

(1) No Operator is assumed to be present

int i = ab → Invalid

int i = a \* b → Valid

(2) There is no Operator to perform Exponentiation in C However we can use pow(x, y) from <math.h>  
 (More later)

## Type Conversion

~ ~ ~ An Arithmetic Operation between

Int and Int → Int

Int and float → float

float and float → float

$$\frac{5}{2} \rightarrow 2$$

$$\frac{2}{5} \rightarrow 0$$

$$5.0/2 \rightarrow 2.5$$

$$2.0/5 \rightarrow 0.4$$

Important !!

Note:-

Int a = 3.5; In this case 3.5 (float) will be denoted to 3 (int) because a is not able to store floats

float a=8; a will store 8.0  
 $8 \rightarrow 8.0$  (promotion to float)

Quick Quiz :-

Q) int k = 3.0/9 value of k? and why?

A)  $3.0/9 = 0.333$  but since k is an int, it cannot store floats & value 0.33 is denoted to 0

## Operation / Operator precedence in C

$3^*x - 8^y$  is  $(3x) - (8y)$  or  $3(x - 8y)$ ?

In C language simple Mathematical rules like BODMAS, no longer applies

The answer to the above question is provided by Operator precedence or associativity

Operator precedence :- The following table lists the operator priority in C

Priority

1<sup>st</sup>

2<sup>nd</sup>

3<sup>rd</sup>

Operators

\* / %

+ -

=

Operator of higher priority are evaluated first in the absence of parenthesis

Operator Associativity :- When operators of equal priority are present in an expression, the tie is taken care of by associativity.

$$x * y / z \Rightarrow (x * y) / z$$

$$x / y * z \Rightarrow (x / y) * z$$

\* , / follows left to right associativity

Control Instruct

Determines the flow of control in a program. Four types of Control Instructions in C are:-

- (1) Sequence Control Instruction
- (2) Decision Control Instruction
- (3) Loop Control Instruction
- (4) Case Control Instruction

## CHAPTER 2 - Practice Set

Q13 Which of the following is Invalid in C ?

- (i) int a; b = a;
- (ii) int v = 3^3;
- (iii) char dt = '21 Dec 2020';

?) Statement 3 is Invalid because in char we

Can Store Only One Character

Q23 what data type will  $3.0/8-2$  return?

→ first operation  $3.0/8$  its between float  
and int so it will be float  
then after that float and int (Operation)  
will still give float.

Q33 Write a program to check whether a  
number divisible by 97 or not?

→ `#include <stdio.h>`

`int main()`

`int a;`

`printf("Enter the number: ")`

`Scanf("%d", &a)`

`printf("The value of a%97 is %d", a%97);`

`return 0;`

→ (\*) If this code will give a

output of 0 then the no  
is divisible and if not it  
is not divisible by 97

→ we will further do some same types

of problems but with other features  
which will make our code more  
readability and the output will be  
more clear.

Q43 Explain step by step Evaluation of  $3^*x/y - z + k$   
where  $x=2$   $y=3$   $z=3$   $k=N$



2) the step by step evaluation will be like

$$\textcircled{3}^* \textcircled{x}/\textcircled{y} - \textcircled{z} + \textcircled{k}$$

there are three components

its start with 1<sup>st</sup> component

$$\begin{matrix} \textcircled{3}^* & \textcircled{2}/\textcircled{3} \\ 2 & - 3 + 1 \end{matrix}$$

$$-1 + 1$$

0 the value will be 0

Q5 3)  $3.0 + 1$  will be:

- (a) Integer
- (b) floating point number
- (c) character

$\Rightarrow$  floating point number