Prabodh
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CHAPTER 2
Instructions and Operators

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

Types of instructions.

1. Type declaration instruction
2. Arithmetic instruction
3. Control instruction

Type of declaration instruction

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

Other variables:

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

```
float b = a+3;
float a = 1.1;
```

↓

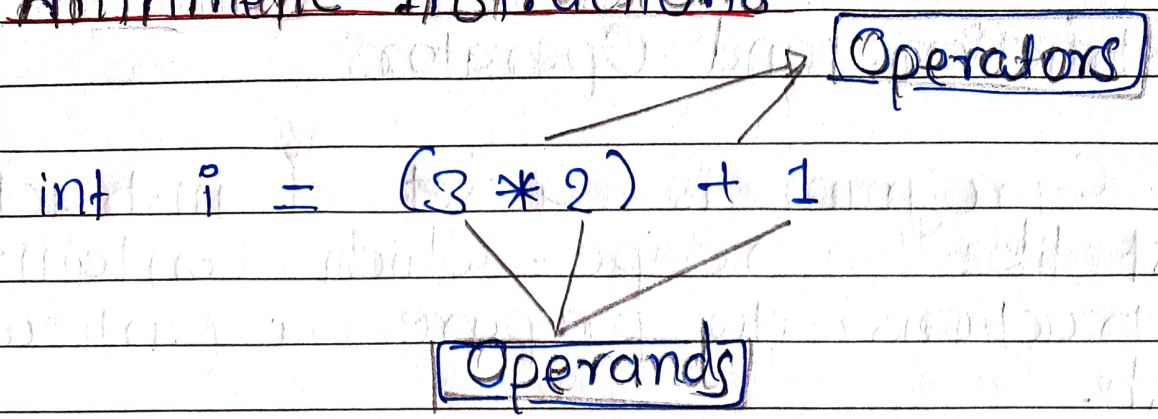
Error! as we use trying to use a before defining it.

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

a = b = c = d = 30;
```

Value of a, b, c and d will be 30 each.

Arithmetic Instructions



Operands can be int/float etc.
+, -, *, / are arithmetic operators.

```
int b=2 , c= 3;
int z;
z= b*c;
```
✓ legal

```
b*c = z;
```
× Illegal (not allowed)

% → Modular division operator
% → Return the remainder
% → Cannot be applied on float
% → Sign is same as of numerator

5%2 = 1

-5%2 = -1

Note:-

1. No operator is assumed to be present.
   int i= ab (Invalid)

   int i= a*b (valid)

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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

5/2 = 2
2/5 = 0

5.0/2 = 2.5
2.5/5 = 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 → 8.0 (promotion to float)

Quick Quiz
1. int k = 3.0/9 Value of k? and why?

Solve.
$\frac{3.0}{9} = 0.333$ but since k is an int. it cannot store floats 2 value 0.33 is denoted to 0 (zero).

Operator precedence in C

$3*x-8y$ 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 and associativity.

Operators precedence: The following table lists the operator priority in C.

Priority	Operators
1st	*, /, ÷
2nd	+, −
3rd	=

Operators of highes 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 case of by associativity.

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

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

*, / follows left to right associativity.

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Control Instruction

Determines the flow of control in a program four type 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

Q.1 Which of the following is invalid in C?

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

Q.2 What data type will 3.0/8 - 2 return?

Q.3 Write a program to check whether a number is divisible by 97 or Not.

Q.4 Explain step by step evaluation of 3*x/y-z+k where x=2, y=3, k=1

Q.5 3.0 + 1 will be:

(a) Integer
(b) floating point number.
(c) Characture