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

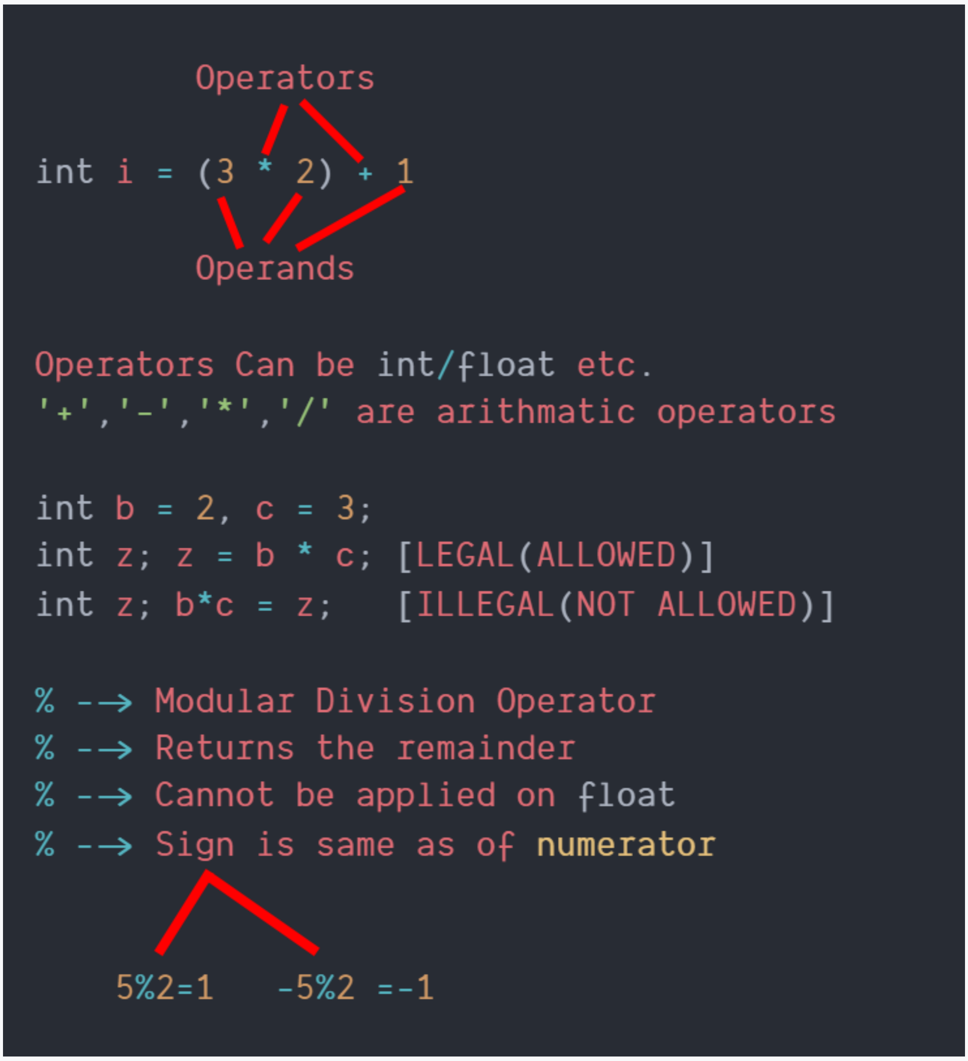
2. Arithmetic instruction

3.Control instruction

Type of declaration instruction:

```
int a;
float b;

other variations:

int i = 10; int j = i, int a = 2;
int j1 = a + j - i;

float b = a+3; float a = 1.1;       ==>Error! As we are trying to use a before
 defining it.

int a,b,c,d;

a=b=c=d=30;                         ==> Value of a,b,c & d will be 30 each.
```

Arithmetic Instructions



```
         Operators

int i = (3 * 2) + 1

         Operands

Operators Can be int/float etc.
'+','-','*','/' are arithmatic operators

int b = 2, c = 3;
int z; z = b * c; [LEGAL(ALLOWED)]
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
```

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

5/2 --> 2               5.0/2 --> 2.5 //IMPORTANT!!
2/5 --> 0               2.0/5 --> 0.4 //IMPORTANT!!

NOTE:
int a = 3.5; //In this case, 3.5 (float) will be denoted to a 3 (int) because
a cannot store floats.

float a = 8; // a will store 8.0 [8-->8.0(Promotion to float)]
```

Quick Quiz:

Question- int k=3.0/9 value of k? and why?

Solution- 3.0/9=0.333, but since k is an int, it cannot store floats & value 0.33 is demoted to 0.

Operator Precedence in C

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

In the c language, simple mathematical rules like BODMAS no longer apply.

The answer to the above question is provided by operator precedence & associativity.

Operator precedence

The following table list the operator priority in C

Priority	Operators
1st	* / %
2nd	+ -
3rd	=

Operators 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 =>  (x *  y) / z
x  /  y  *  z  =>  (x / y) * z

*, / follows left to right associativity.
```

Control instructions

Determines the flow of control in a program.

Four types of control instruction in C are:

1. Sequence Control Instruction

2. Decision Control Instruction

3. Loop Control Instruction

4. Case-Control Instruction

Homework Problems

Q1. Which of the following is invalid in c?

```
1. int a; b=a;

2. int v=3^3;

3. char dt= '21 Dec 2020' ;
```

Q2. What data type will 3.0/8 – 2 return?

Q3. Write a program to check whether a number is divisible 97 or not.

Q4. Explain step by step evaluation of 3*x/y-z +k

Where x=2, y=3, z=3 and k=1

Q5. 3.0+1 will be:

1. Integer
2. Floating number
3. Character

KEEP LEARNING & KEEP PRACTICING :)