

## Chapter-3

### Getting started with Python

#### Programming:-

In irrespective of the programming language being used, the first and foremost thing while writing a program is to analyze the problem well and try to solve it in a logical manner. The process of writing a program is called "programming".

→ Problem-solving, therefore, is the process of identifying a problem, developing an algorithm for the identified problem and finally implementing the algorithm to develop a computer program

#### Steps for Problem-solving

Step 1:- ~~##~~ Understand the problem / Analyzing a problem

Step 2:- Create a plan / Developing an Algorithm

Step 3:- Execute the plan / Coding

Step 4:- Check & Reflect / Testing and Debugging

#### Coding:-

After finalizing the algorithm, we need to convert the algorithm into a format which can be understood by the ~~com~~ computer to generate the desired solution. Different high level programming language can be used for writing a program. It is equally important to

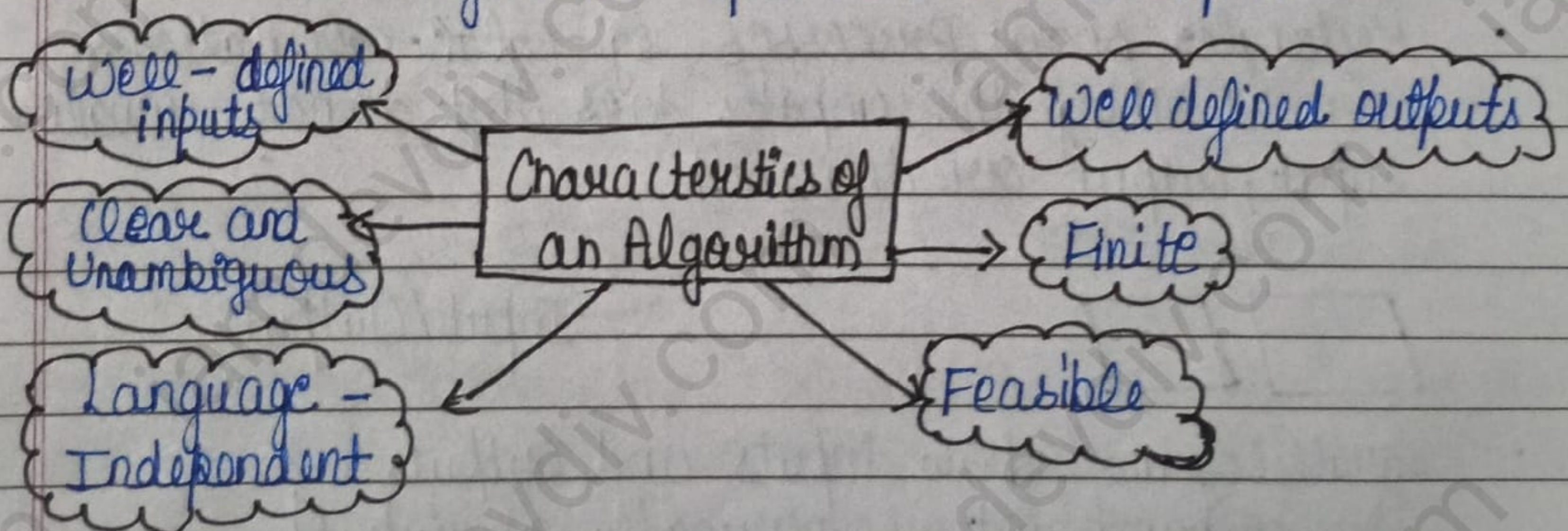
received details of the coding procedures followed and documents the solution. This is helpful when revisiting the program at a later stage.

★ What is an Algorithm?

Input  $\longrightarrow$  Set of ~~the~~ rules to obtain the expected output from the given input  $\longrightarrow$  Output

### Characteristics of a good algorithm

- **Precise**:- the steps are precisely stated or defined.
- **Unique**:- Results of each step are well defined and only depend on the input and the result of the preceding steps.
- **Finite**:- the algorithm always stop after a finite number of steps.
- **Input**:- the algorithm receives some input
- **Output**:- the algorithm produces some output

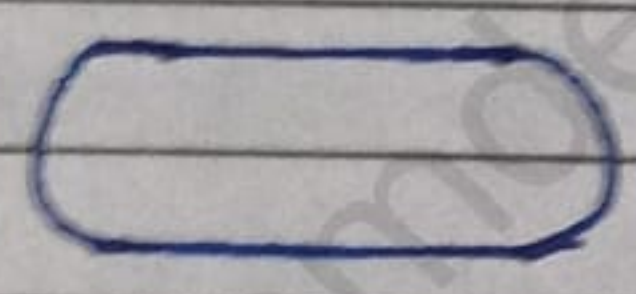


(B) While writing an algorithm, it is required to clearly identify the following:-

- The input to be taken from the user
- Processing or computation to be performed to get the desired result.
- The output desired by the user.

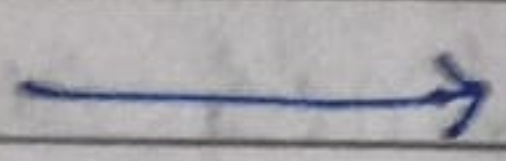
Symbol

Name



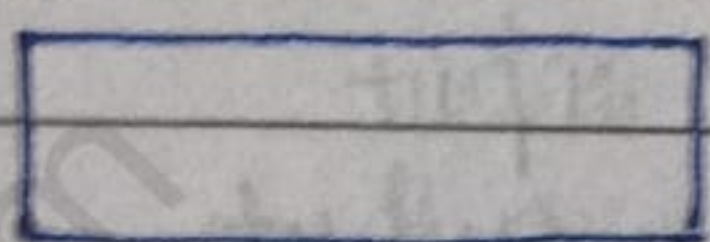
Start/End

- Ovals show a start point or end point in the code.



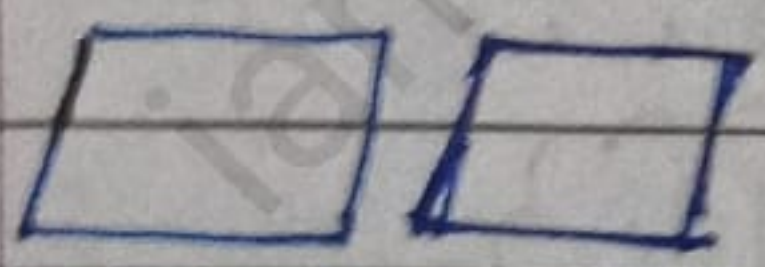
Connection

- Arrows show connection between different parts of the code, called connectors.



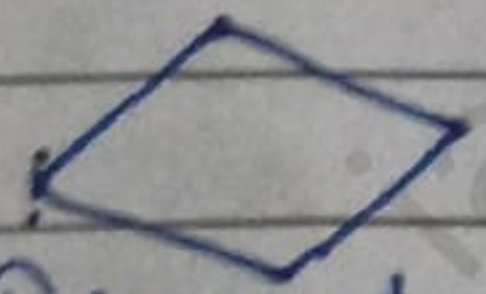
Process

- Rectangles show processes eg:- ~~code~~ calculations (most thing the computer does that do not involve an input, output or decision)



Input/Output

- Parallelograms show inputs and outputs (remember print is normally an input)



Conditional/Decision

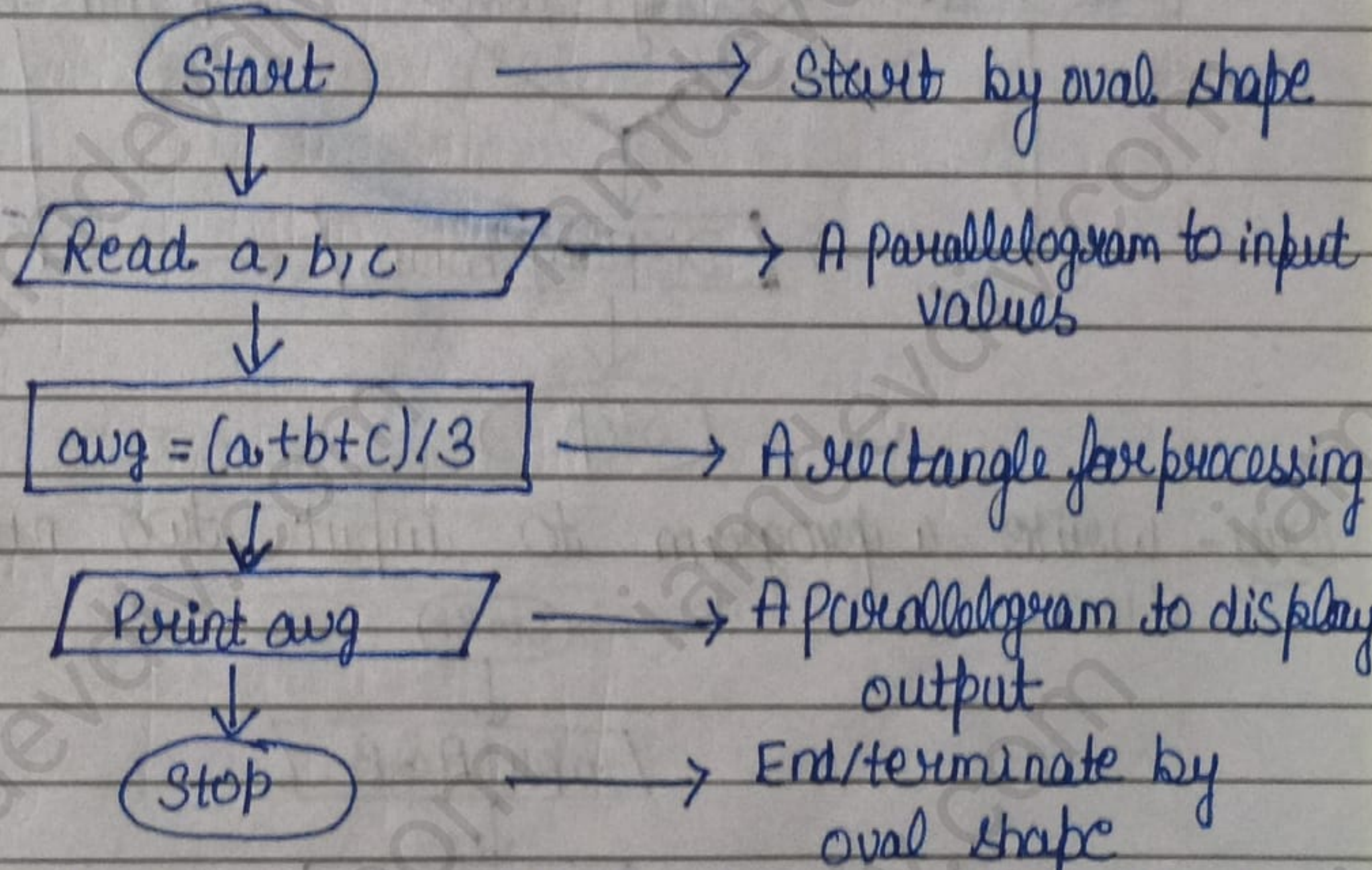
- Diamond show a decision/condition (this normally depicts if, if-else, if-elif-else, while and for)

## How to make a flow chart

- Step 1 know the purpose of your flow chart
- Step 2 Start with a template
- Step 3 Add shapes and symbols
- Step 4 connect your shapes with lines and arrows
- Step 5 Split paths or add decisions.
- Step 6 Customize your flow chart's appearance.
- Step 7 Download or share your flow chart

### Example:-

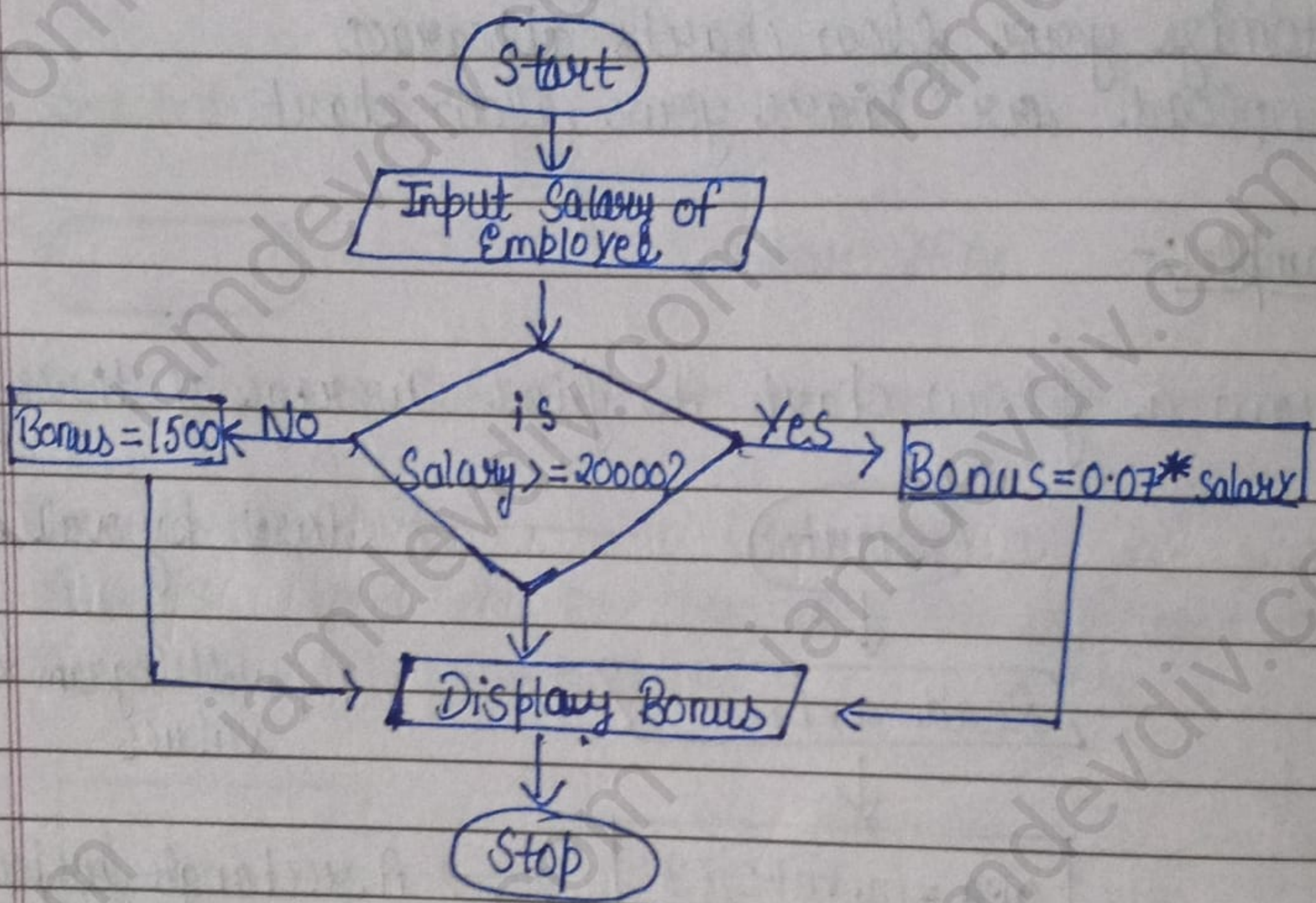
Draw a flow chart to find average of three numbers



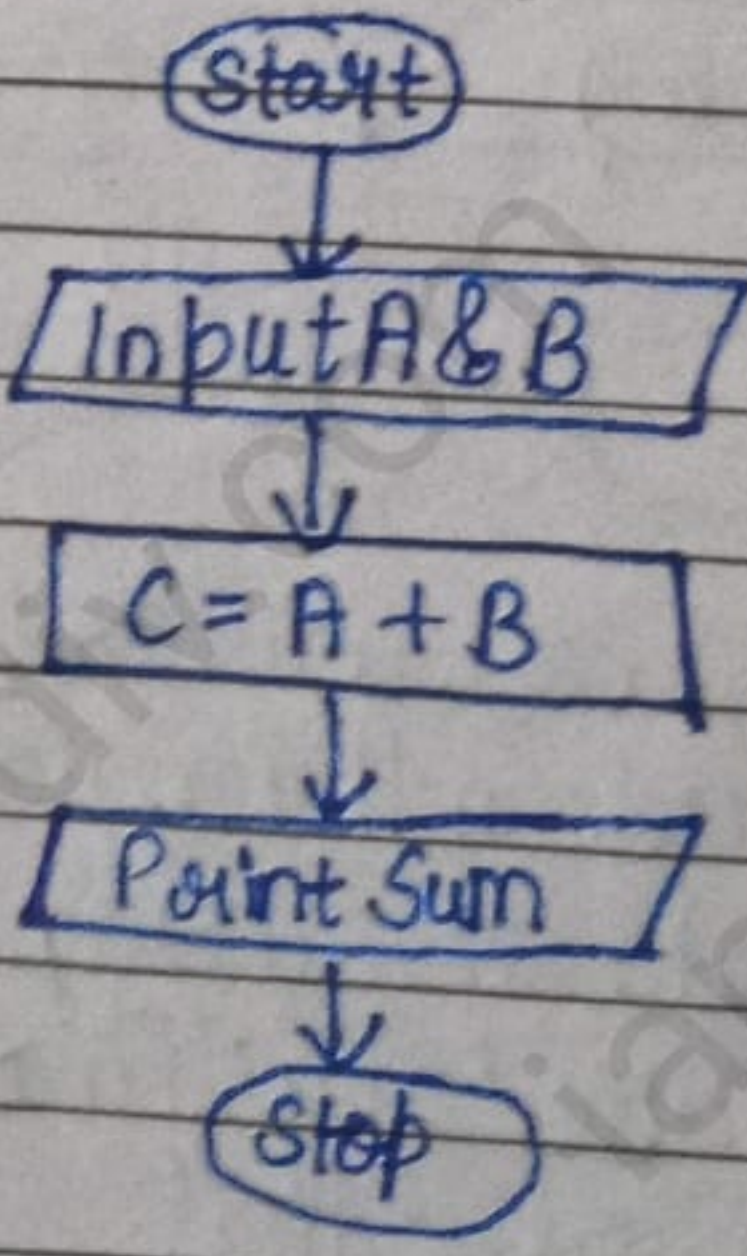
To solve this problem, we will ask the user to enter three values which get stored in three variables a, b, c respectively. We will then calculate the average of three variables and store it in a variable 'avg'. Finally, we will print the value stored in the variable 'avg'.

→ Example 2:-

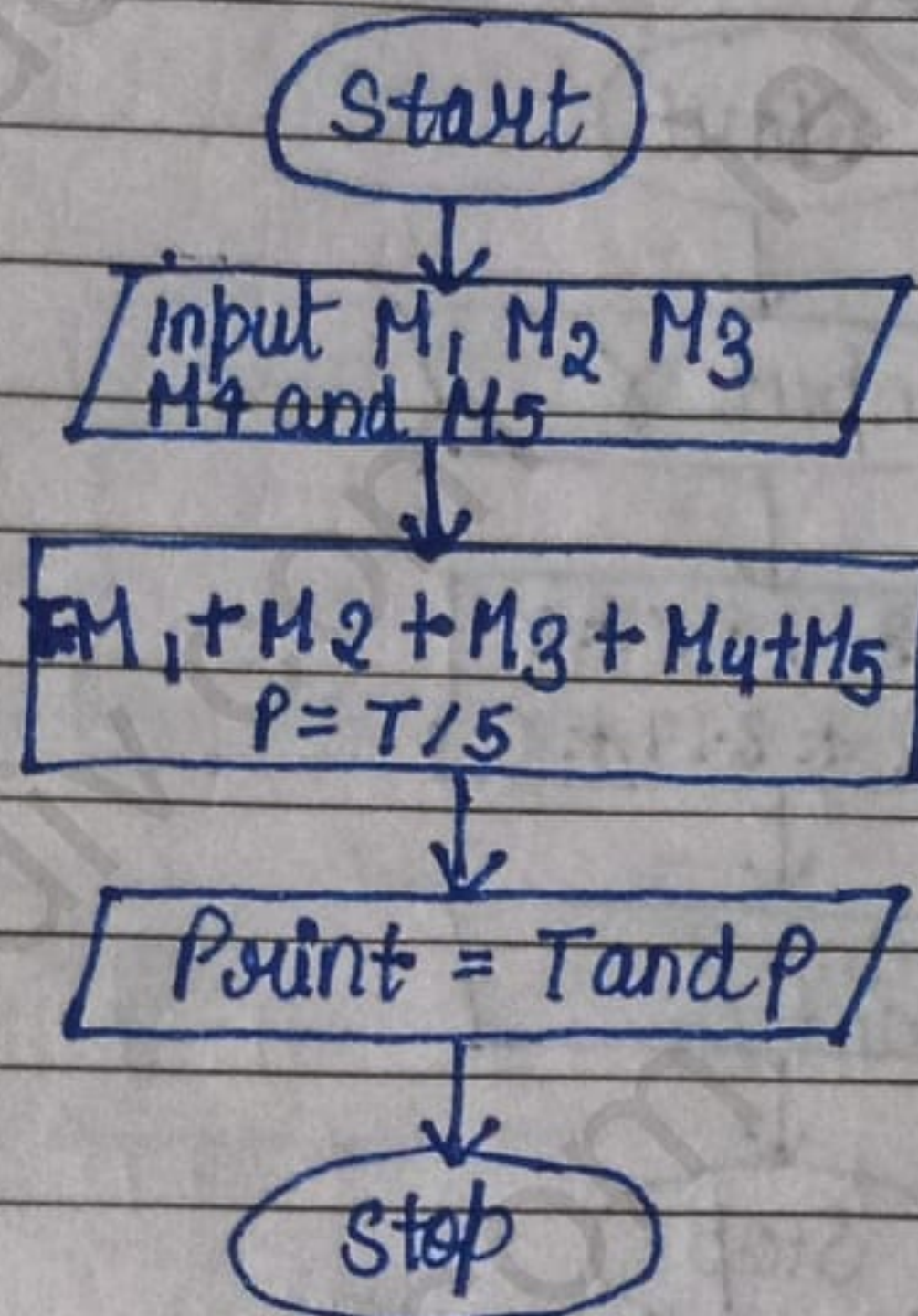
Speed Net Ltd. plans to give a 7% year-end bonus to each of its employees earning ₹ 20,000 or more per month and a fixed ₹ 1,500 bonus to the remaining employees. Draw a flow chart for calculating the bonus for an employee.



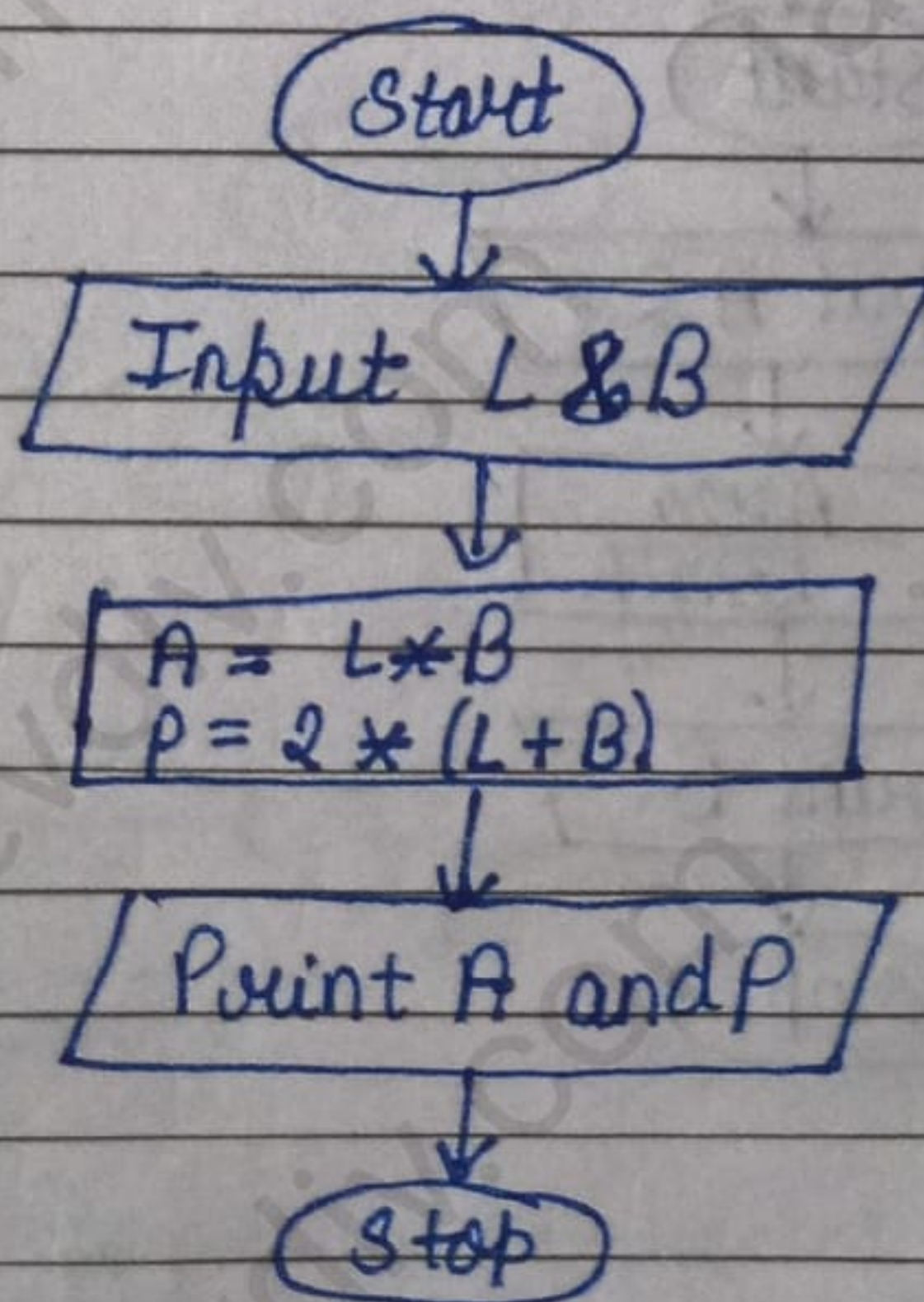
Ques - Write a program to input two numbers and find sum



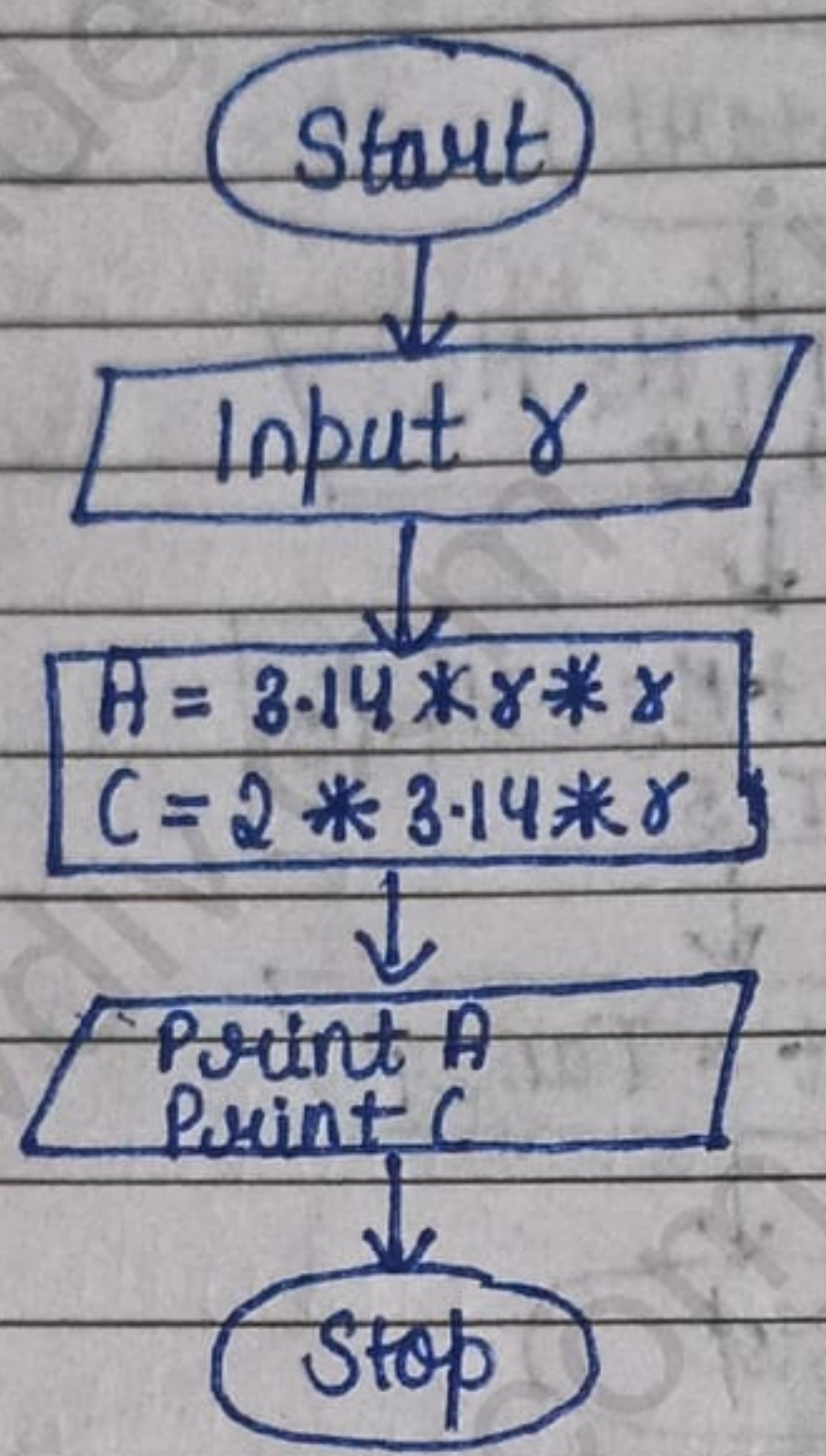
Ques - Write a program to input marks in 5 subject and print total marks and percentage



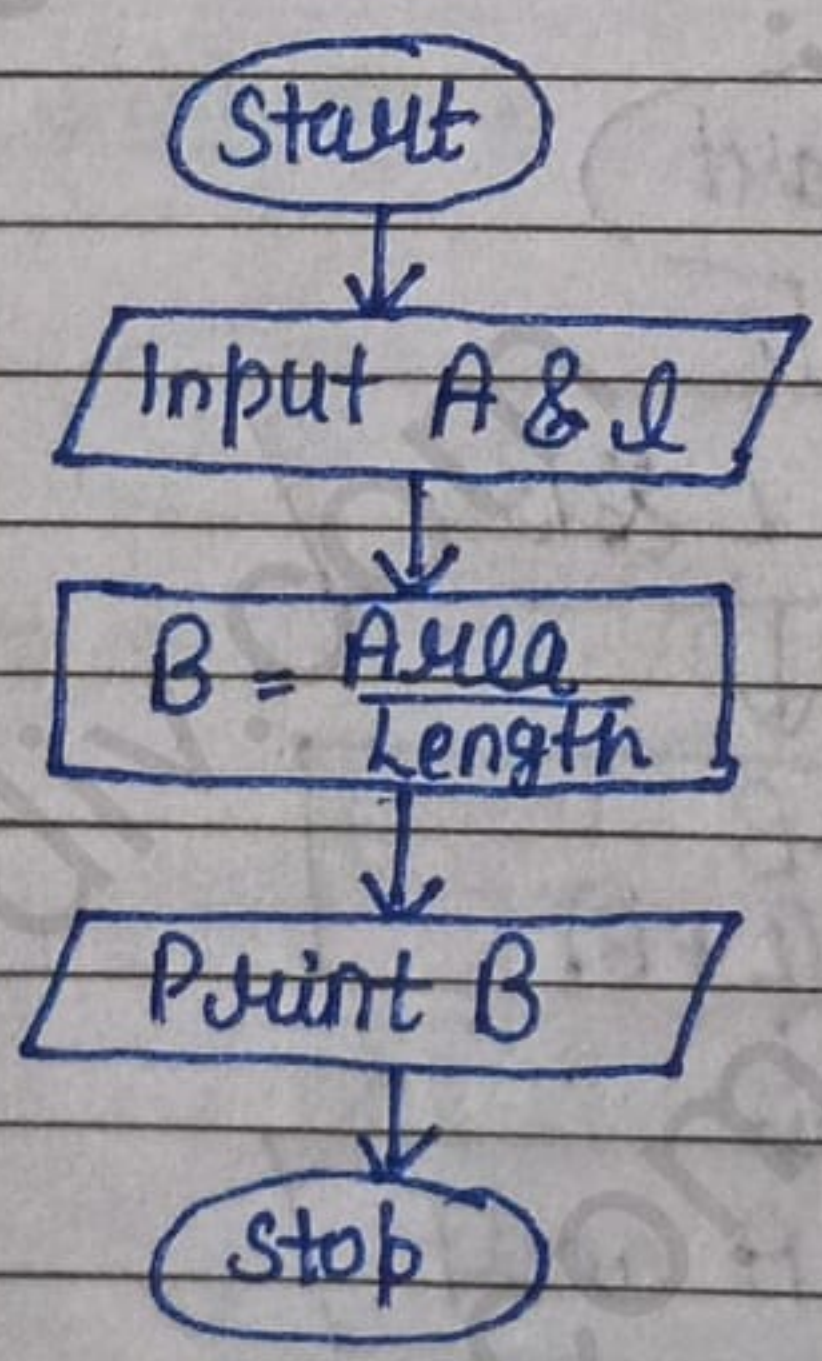
Ques - Write a program to input L and B of rectangle Print Area and Perimeter.



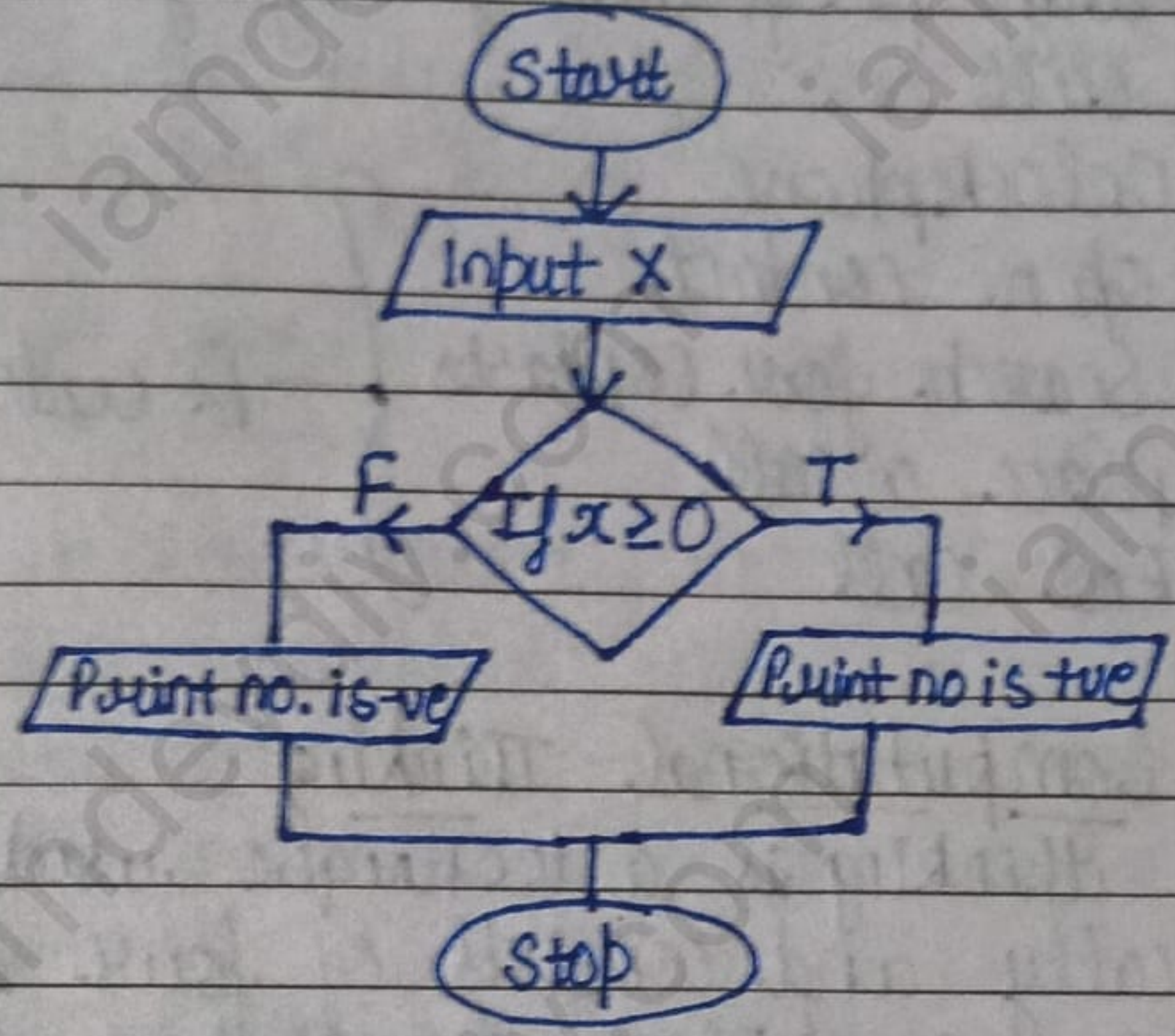
Ques - Write a program to input radius of circle  
Print Area and perimeter



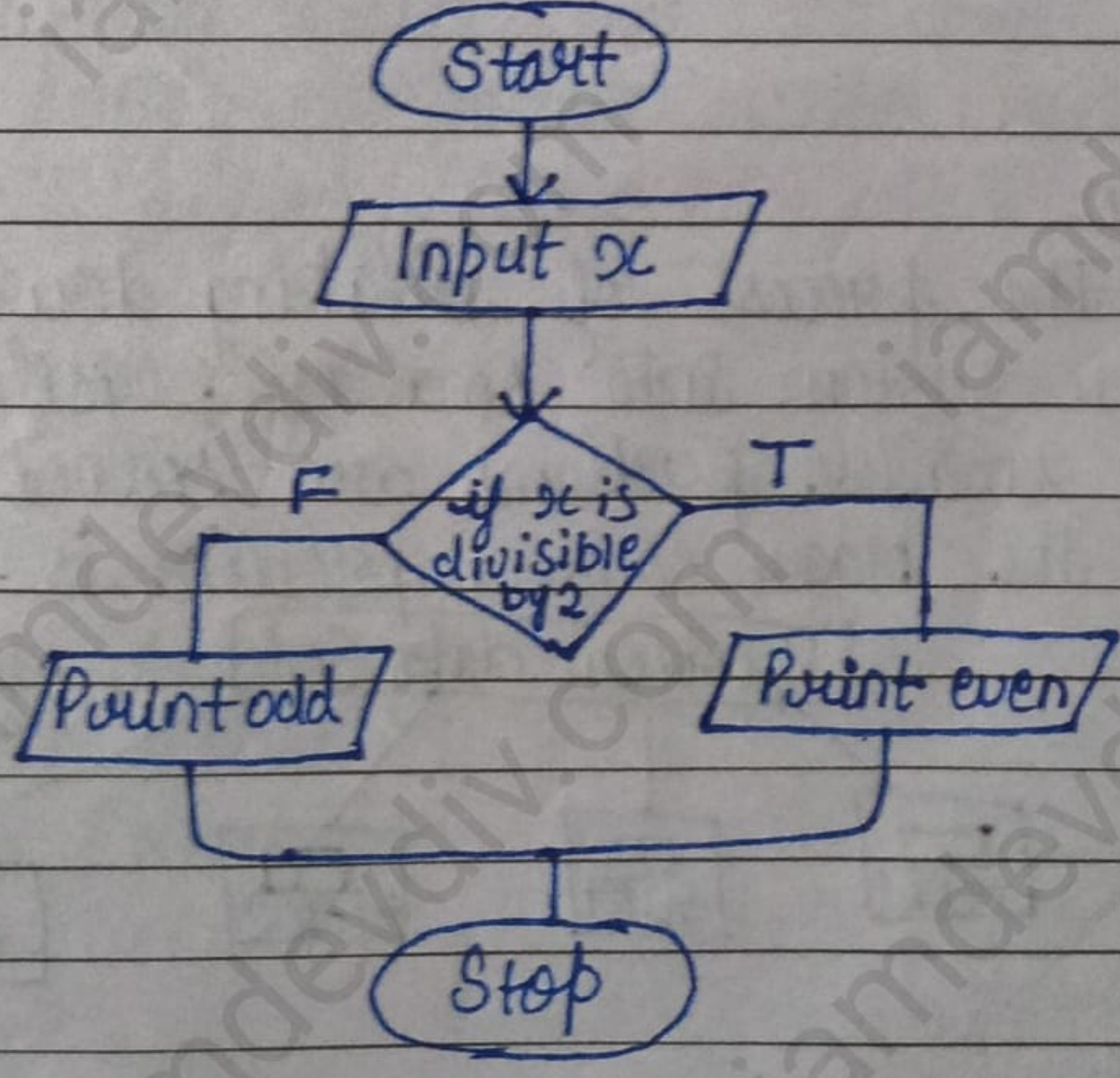
Ques - write a program to input Area and Length  
and print breadth.



Ques - Write a program to input a number and check whether the no. is positive or negative.



Ques - Write a program to input a no. whether a no. is even or odd





## Pseudo-Code

Pseudo-code is used to express our logic independent of any programming language.

Ex:- Making a phone call

1. Unlock phone
  2. open contacts
  3. Search for contacts
  4. Place a call
  5. End call
- } Pseudo-Code

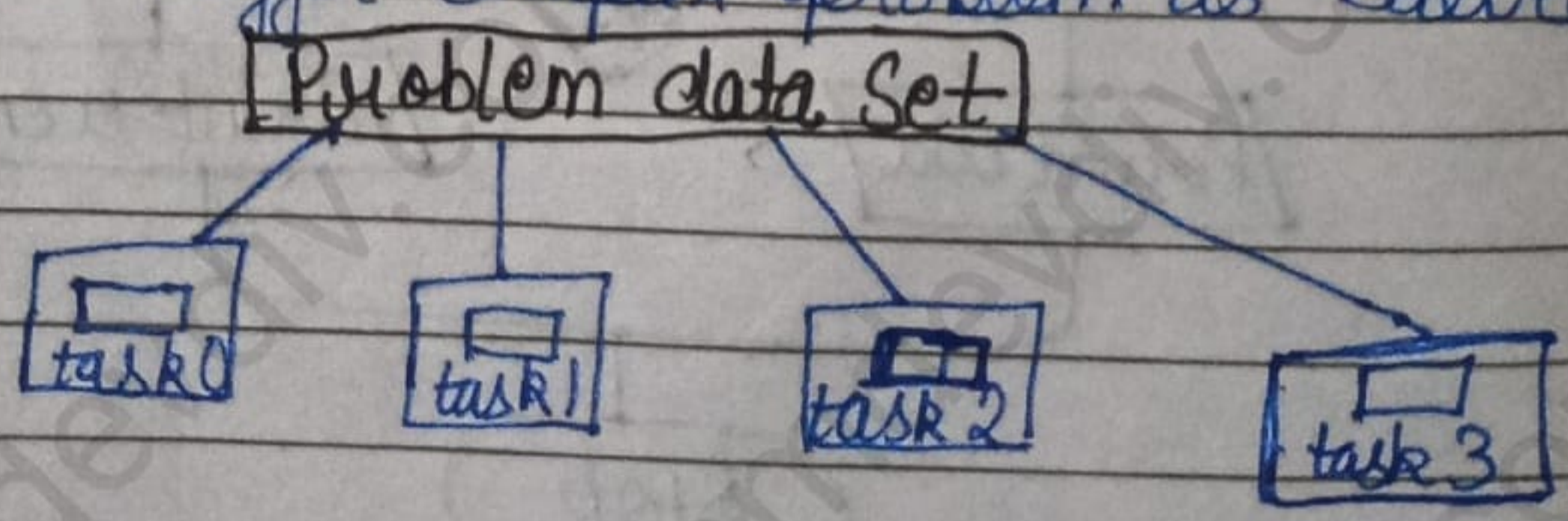
## Components of Computational Thinking

Computational thinking is a technique used to solve problems logically and consists of four ~~solve problems~~ key components or pillars described as follows:-

- Decomposition
- Pattern Recognition
- Abstraction
- Algorithms

## Decomposition

It is the process of breaking down a complex problem or system into smaller, easily manageable parts. These smaller problems are solved one after the other until the bigger complex problem is solved.



## Python Programming Language

Python is based on the ABC language and the name was inspired by the famous BBC comedy show Monty Python's 'Flying Circus'.

### Features of Python

- Python is interpreted, interactive, directly executed, with pre-compiled code. This means that it is processed at run-time by the interpreter and we need not compile the program before executing it.
- It is a loosely typed object-oriented programming language with few keywords.
- It is a free, open-source and portable language having a large repository of libraries.
- It supports GUI and Garbage collection.
- It is easily compatible with other languages like C, C++, ~~C++~~ C++ Java, etc.

### Limitations of Python

1. Speed
2. Mobile development
3. Memory Consumption
4. Database Access
5. Runtime Errors

## Interacting with python (Python IDLE)

IDLE is a simplest Integrated development Learning Environment that comes with python. The most important feature of IDLE is that it is a program that allows the user to edit, run, browse and debug a python program from a single interface.

⇒ Python IDLE comprises python shell (Interactive mode) and python Editor (Script mode).

Ques - Write a pseudo-code to print all multiples of 5 between 10 and 25 (including both 10 and 25)

Ans A = 5  
Print (A \* 2)  
Print (A \* 3)  
Print (A \* 4)  
Print (A \* 5)

Ques - Write an algorithm that performs the following:-  
Ask a user to enter a number.

If the no. is between 5 and 15, write the word GREEN  
If the no. is between 15 and 25, write the word BLUE  
If the no. is between 25 and 35, write the word ORANGE  
If it is any other no. write that all colours are beautiful.

