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F.Y.B.Tech Academic Year 2021-22

Subject: Programming and Problem solving
Trimester: 1

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Assignment -2(A)

Aim: Write an algorithm and draw a flowchart to find the roots of quadratic equation

Objectives:

1. To learn design and development of algorithm
2. To understand importance of flowchart for any programming model
3. To learn simple flowchart symbols and arrows to define relationships
4. To solve a quadratic equation with real coefficient by factorization and by using quadratic formula

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Theory:

1) Concept of Quadratic Equation

A equation that can be rearranged in standard form as $ax^2 + bx + c = 0$

a, b, c are the coefficients of the equation.

The values of x that satisfy the equation are called solutions of the equation

It can at most have 2 solutions.

2) Algorithm

Step by step description of how to achieve a solution for a given problem

It is a sequence of instructions that are executed in the specified sequence.

Used for data processing, calculation and other related computer and mathematical operations

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3) Flowchart

Flowchart is a pictorial representation of an algorithm

The different steps of an algorithm are shown in different shape and flow is shown by arrows

Boxes represent different operations

4) Pseudocode

It is an artificial and informal language that helps programmers develop algorithms

Algorithm

Step 1: Start
Step2: Enter a, b and c (I|O)
Step3: Discriminant = (b* b - 4* a* c) (Praess)
Step4: If discriminat > 0 (Decision)
root 1 = -b - sqrt of discriminat |2* a (Pro
root 2 = -b + sqrt of discriminant |2* a (Proce
Display root 1 and root 2 (I|O)
Step5: Else if discriminat = 0 (Decision)
root 1 = -b/2* a (Process)
root 2 = root1 (Process)
Display roots are equal (I|O)
Step 6: Else (decision)
Display roots are imaginary (I|O)
Step 7: End

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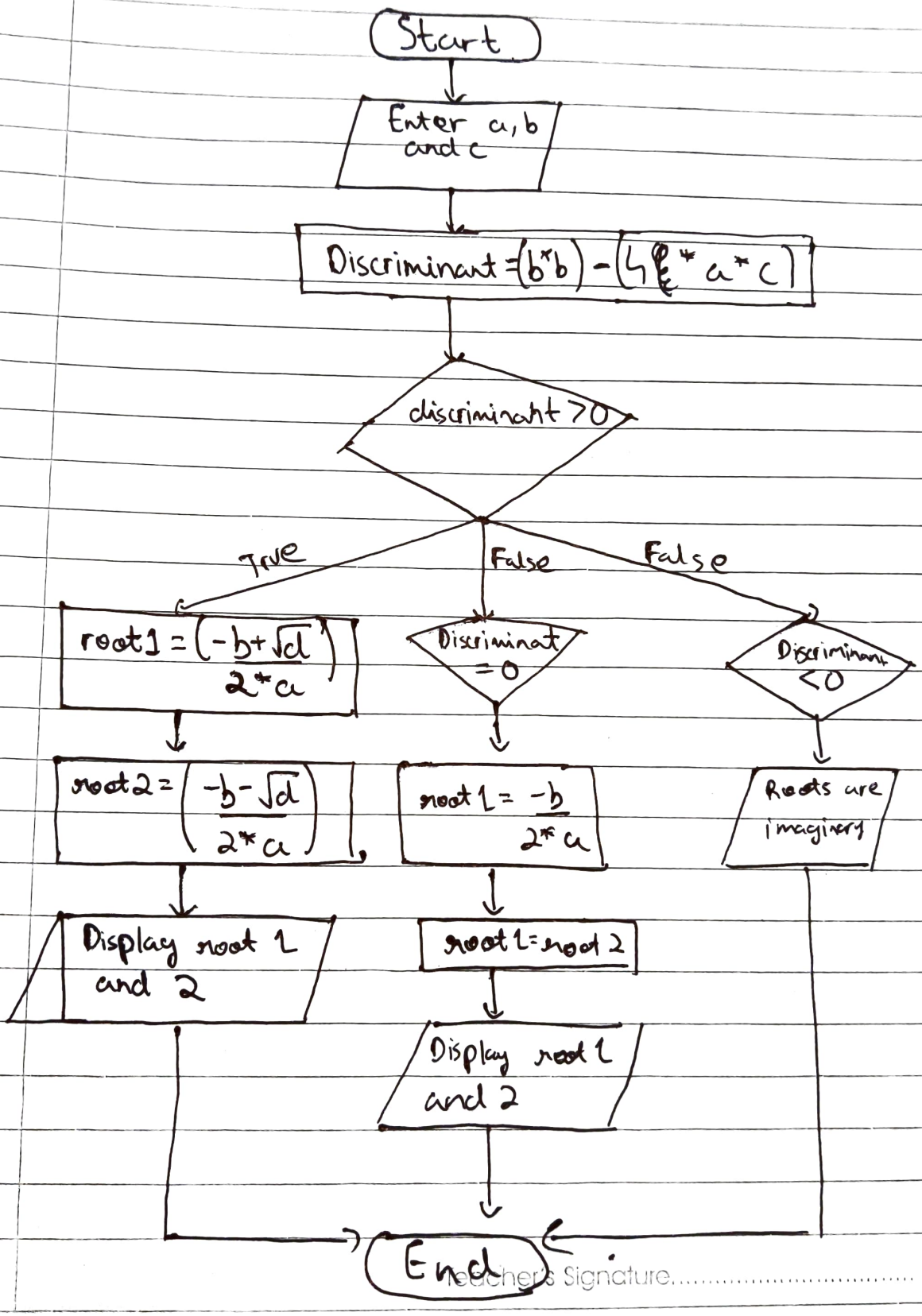
Flowchart



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Conclusion: Thus we have learnt how to draw algorithm and flowchart for how to compute roots for quadratic eqn

FAQ

1. What are different equations? How to calculate roots of quadratic eqn

→ linear equations of degree one, linear equations of degree 2 and so on

The roots are given by $x = [-b \pm \text{sqrt}$ $\sqrt{-b^2 - 4ac}$ / $2a$.

2. Write an algorithm and draw a flow chart to perform arithmetic operations on 2 numbers.

→ Algorithm

Step 1: Start
Step 2: Enter 2 numbers a,b (I/O)
Step 3: Enter arithmetic operation (I/O)
Step 4: If '+' [illegible] (Descision)

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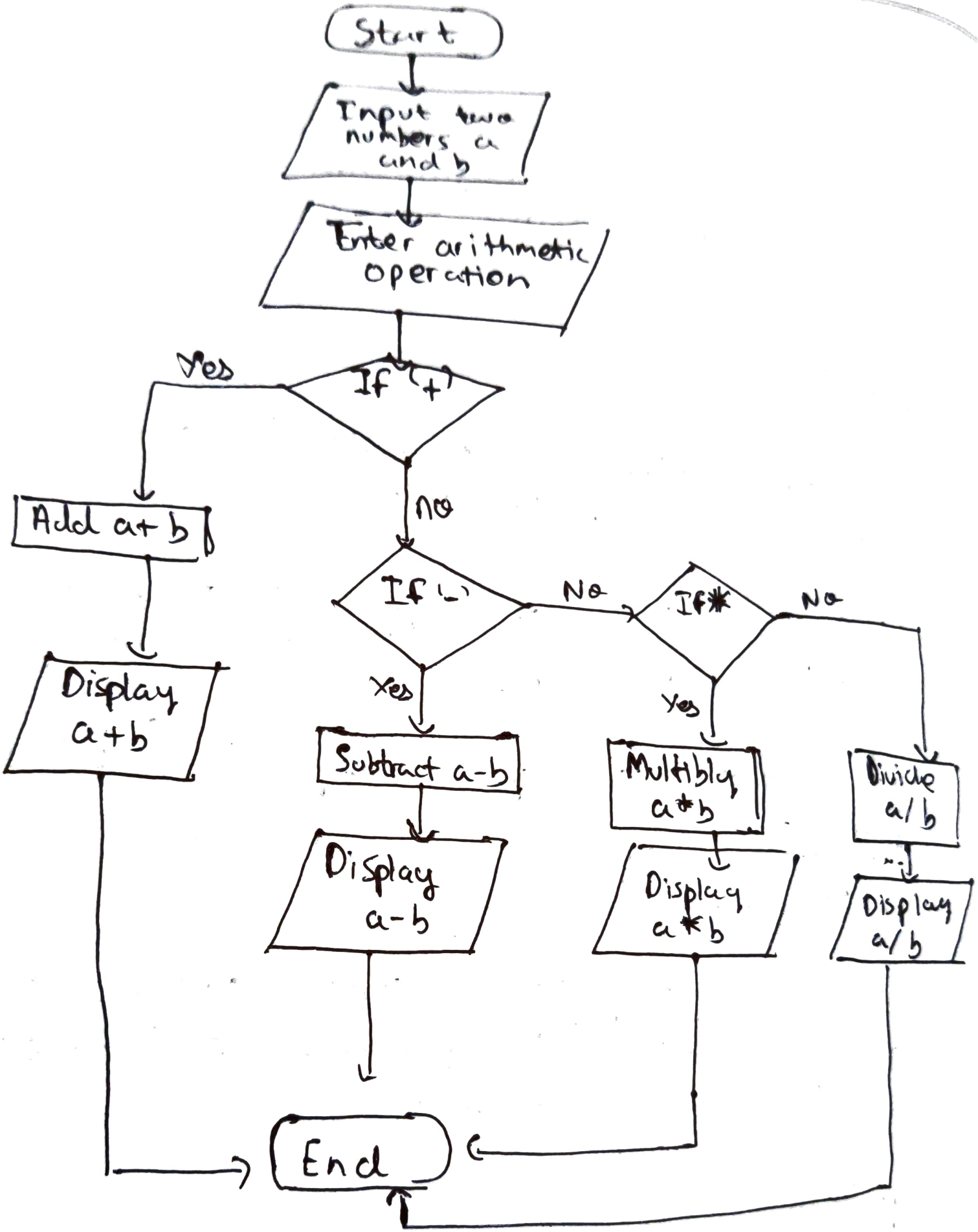
then a+b (Process)
Display a+b (I/O)
Step5: Else if [illegible] then [illegible] (Process)
Display

Step5: Else if '-' (Decision)
then a-b (Process)
Display a-b (I/O)
Step6: Else if '*' (Decision)
then a*b (Process)
Display a*b (I/O).
Step7: Else if '÷' (Decision)
then a/b (Process)
Display a/b (I/O)
Step8: End


Start
Input two numbers a and b
Enter arithmetic operation
If (+)
Yes
No
Add a+b
Display a+b
If (-)
No
If *
No
Yes
Yes
Subtract a-b
Display a-b
Multibly a*b
Display a*b
Divide a/b
Display a/b
End