Introduction to Programming

Week – *2*, Lecture – *2*

Variables, Constants and Library Functions

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Variables in Pseudocode

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Algorithm for solving Quadratic Equations

1. Check if the equation is in the standard form, i.e. $ax^2 + bx + c = 0$
2. If it is not, you can also do that by bringing all the terms on LHS, making the RHS 0
3. Calculate the discriminant, D as $b^2 - 4ac$
4. If $D = 0$
   - Find $\frac{-b}{2a}$; this is the only root of this equation
5. Else, if $D > 0$
   - Find $\frac{-b + \sqrt{D}}{2a}$ and $\frac{-b - \sqrt{D}}{2a}$; these are the two roots of this equation
6. Else
   - Wait till you study complex numbers… till then, enjoy your life !!

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It is just a special case where the roots will evaluate to the same value

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In this “algorithm”, what are the “variables”?

- a, b and c – their values are provided to us by the user of our algorithm
- x_1 and x_2 – their values will be different, based on the values of a, b and c

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Actually, we probably have many, e.g.

- In b^2, the power of b, is a constant, i.e. 2
- In 4ac, the multiplier of ac, is a constant, i.e. 4
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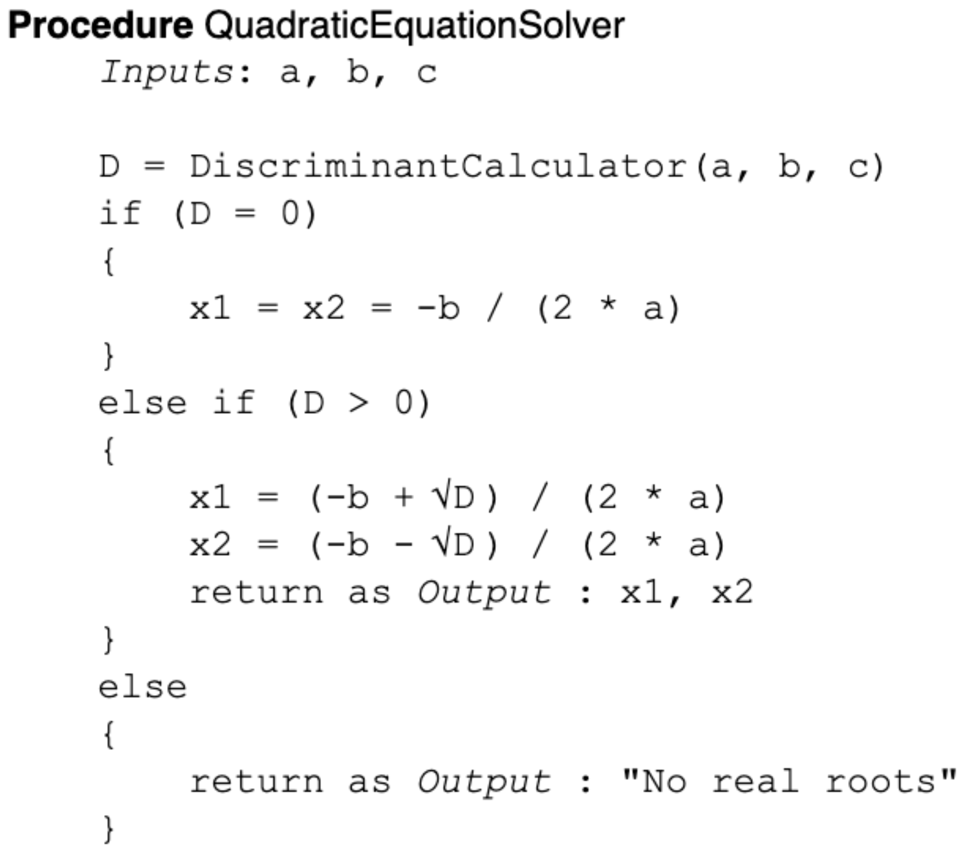

Procedure QuadraticEquationSolver

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    Inputs: a, b, c

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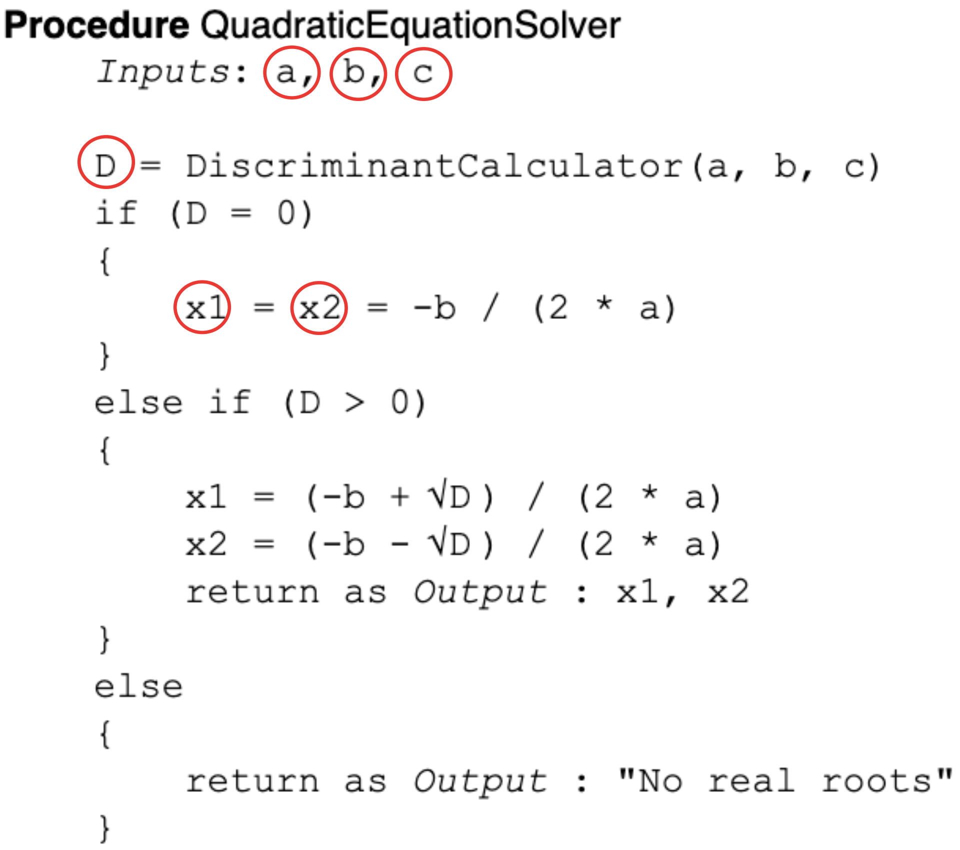

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These are all the variables in this pseudocode

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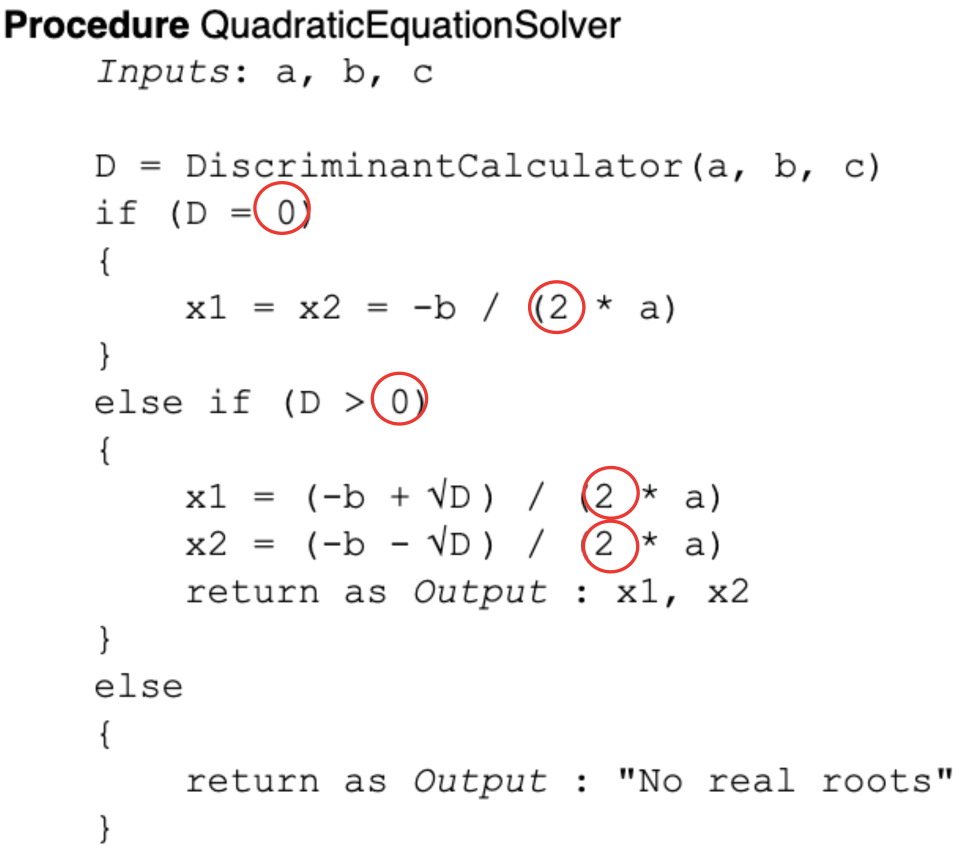

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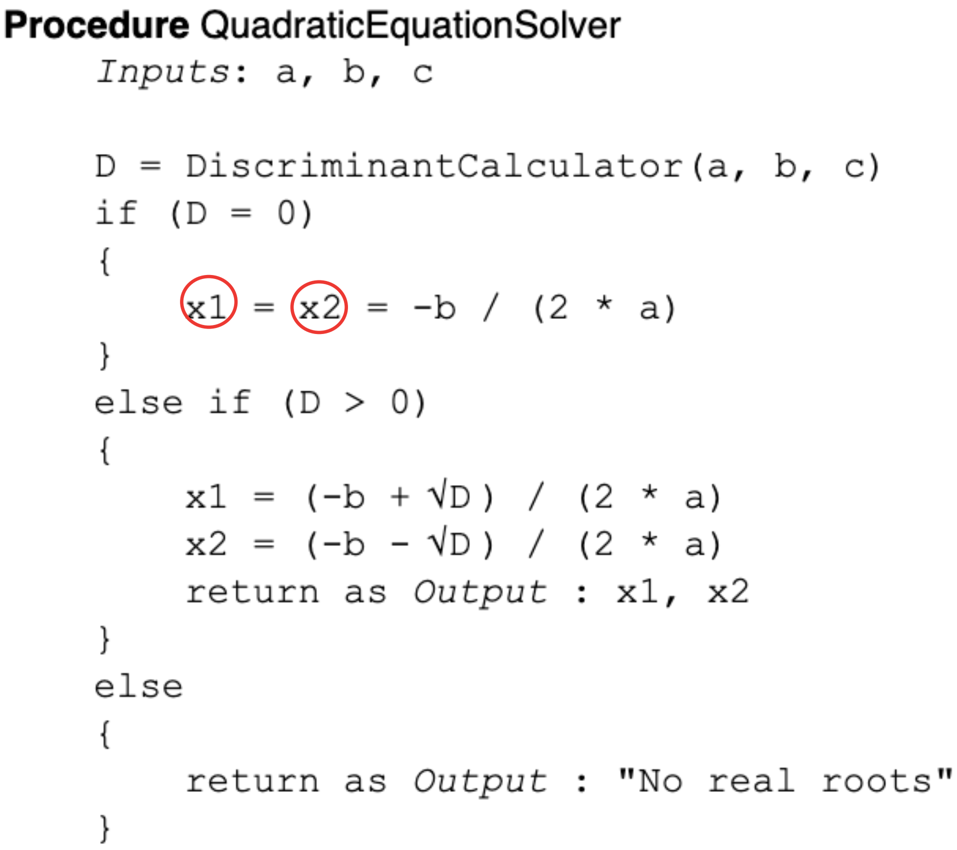

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These are all the constants in this pseudocode

By the way, the `1` and `2` in `x1` and `x2` are NOT constants, they are just a part of the name of variables

Library Functions

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Another common case where you will use Library Functions, are for mathematical operations

Homework !!

In the pseudocode you wrote for solving a system of Linear Equation in three variables

- Identify all variables
- Identify all constants

Assume that you have a procedure called `sqrt`, which returns the square root of a passed value

- Change the pseudocode for solving Quadratic Equations to reflect that