

Programming Lab #4a

Solving Quadratics

Topics: Instructions for integer arithmetic, calling a C function from assembly.

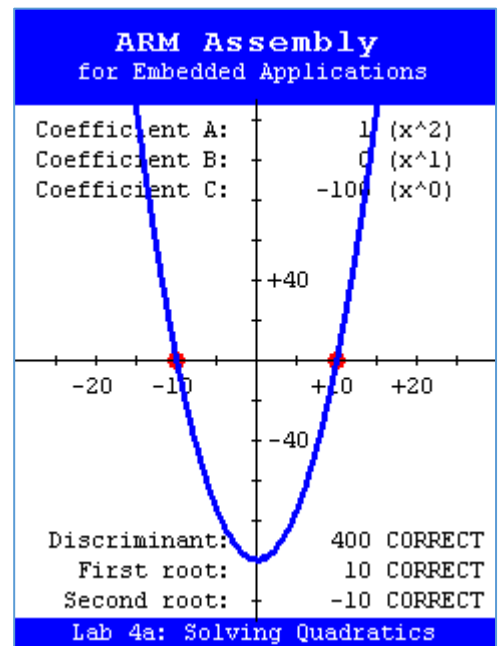
Prerequisite Reading: Chapters 1-5

Revised: August 27, 2019

Create a single ARM Cortex-M4 assembly source code file containing four functions. (Note that functions *Root1* and *Root2* should both contain calls to functions *Discriminant* and *SquareRoot*.) Functions *Discriminant*, *Root1*, *Root2* and *Quadratic* are called by a main program (download from [here](#)) that will test your functions for three test cases. All of the parameters and return values are of type `int32_t`:

1. $\text{Discriminant}(a, b, c) = b^2 - 4ac$
2. $\text{Root1}(a, b, c) = \frac{-b + \text{SquareRoot}(\text{Discriminant}(a, b, c))}{2a}$
3. $\text{Root2}(a, b, c) = \frac{-b - \text{SquareRoot}(\text{Discriminant}(a, b, c))}{2a}$
4. $\text{Quadratic}(x, a, b, c) = ax^2 + bx + c$

Note: Function *SquareRoot* is a function written in C implemented in the same source code file as the main program. It requires a single unsigned integer parameter and returns an unsigned integer result. It should be called from your assembly language functions *Root1* and *Root2*.



If your code is correct, the three test cases should look similar to the image above. Incorrect values will be displayed as **white text on a red background**.