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# ECE 375 PRELAB 8

Lab Time: Wednesday 10-12

*Tu Lam*

## QUESTIONS

1. *In this lab, you will be utilizing the Pythagorean theorem to compute distances. Assuming you are working with the Cartesian coordinate system, what is the mathematical expression to measure the distance between the following two points? (X1, Y1) and (X2, Y2)*

**Answer:** To compute the distance using the Cartesian coordinate system, we can compute the equation with the coordination system like this:

$$D(\text{distance}) = \sqrt{((X2 - X1)^2) + ((Y2 - Y1)^2)}$$

2. *The AVR instruction set includes support for primitive mathematical operations such as addition, subtraction, and multiplication. However, there are times when we want to perform more advanced mathematical calculations. Write pseudocode to compute the square root of a number using only the mathematical operators that are supported by the AVR instruction set. If the number is not a perfect square, round the answer upwards to the nearest integer. For example,  $\sqrt{5} = 2.236...$  but for our purposes the answer is 3.*

**Answer:**

LOOP:

Ldi A, 100

Sub A, B

BRCS DONE

INC ANS

SUBI B, -2

RJMP LOOP

3. *What is the difference between integer arithmetic and floating point arithmetic?*

**Answer:** The floating point arithmetic is slower than the integer arithmetic. Meaning that doing addition or division is slower than the integer arithmetic. With one having a whole number (integer) while the other deal with decimal (floating point), they both perform the exact same thing as one is a lot slower than the other when doing the operation.

## REFERENCE

*Computer Organization and Assembly Language Programming: Embedded Systems Perspective* by Ben Lee