ECE 375 PRELAB 8

Lab Time: Wednesday 12-2

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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)

   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.

   -Setup a loop for how many bits you have

   -Divide remainder by 2

   -Add to remainder

   -Divide by 2 again and check if the new remainder is smaller than original

   -Decrement loop if so

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

   The main difference is that floating point arithmetic uses more of a scientific notation with an exponent and a mantissa. This is good for big or small numbers but sacrifices efficiency.

REFERENCE

https://sites.google.com/site/avrasmintro/home/2b-basic-math