HOMEWORK 5

CS 125

due at 12:45pm (classtime) on Thursday, September 10

Write a Python *function* to solve each of the following problems. Plan each function on paper before you implement it in code.

Prepare your solutions in a single Python file. Use comments to clearly state the problem number for each of your solutions. Provide test cases to show that your functions produce the desired output. Upload your file to the Homework 5 assignment on Moodle.

1. **Logical opposites:** Without using the `not` operator, give the logical opposites of each of these conditions. In other words, write an expression that always evaluates to the opposite of each given expression.

   a. `a < b`

   b. `a < 6 and val == 4`

   c. `a < 6 or val != 7`

2. **Divisibility:** Write a function `divisible(n, k)` that takes two integers `n` and `k`, and returns `True` if `n` is divisible by `k` and `False` otherwise. Provide test cases to show that your function works.

3. **Quadratics:** Recall that a quadratic equation $ax^2 + bx + c = 0$ has solutions given by the quadratic formula

   $$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

   Note that there are two solutions if $b^2 - 4ac > 0$, one solution if $b^2 - 4ac = 0$, and no solutions if $b^2 - 4ac < 0$. Write a function `solveQuadratic(a, b, c)` that takes coefficients a, b, and c as parameters. Your function should print the number of solutions to the quadratic equation along with the values of any solutions found. Provide test cases to show that your function works.

4. **Right triangle:** Recall that a triangle with side lengths a, b, c is a right triangle if $a^2 + b^2 = c^2$. Write a function `isRightAngled(a, b, c)` that accepts three lengths and returns `True` if the lengths form a right triangle and `False` otherwise. You may assume $a \leq b \leq c$. Also, testing equality between floating-point numbers is not always accurate, so instead of `a**2 + b**2 == c**2`, use `math.isclose(a**2 + b**2, c**2)`. Provide test cases to show that your function works.