HW01: Quadratic Equations with Dynamic Documents

STAT 370

Assigned: February 10, 2017; Due: February 17, 2017

1. Create a GitHub repository to use for this class. Maybe call it "Stat370." Tell me if you want to make it private. This will be extra steps which we won't take if nobody cares.
2. Open the empty project in R Studio.
3. Create a script with a function called "quad()" which implements the quadratic equation: $y = ax^2+bx+c$ where y is the return value and (x, a, b, c) are the arguments. Provide defaults values for a, b, and c, but not for x. The default values should be 0. Note: there already is a quadratic() function, which does the same thing, but uses different default values for a, b, and c. You can call quadratic() within quad, or use the formula above.
4. Save your script as qscript.R.
5. In the Console, define x as a vector of values consisting of a range of values for the independent variable. Start the vector with negative values and end the vector with positive values. See page 24 of *The Book of R* for hints as to how to do this.
6. In the Console, pass the vector x to the function you just created and pass non-zero values for the other arguments. What do you get?
7. Define y as the output of your function.
8. To plot your function (that's the letter 'l', not the number 1), use:

```
plot(x,y,'l')
```

9. Define a different dependent variable, call it y2, with the same values for x but different values for a, b, and c.
10. To superimpose the plots, use:

```
lines(x,y2)
```

11. Try superimposing several plots.
12. Now that you are set up, your assigment is to make a dynamic document which studies the properties of the quadratic equation when different parameters (a, b, or c) are zeros. Each parameter can be zero or non-zero, so there are 8 possibilities. But you can ignore the case when all 3 are non-zero, and all 3 are zero, so I want you to study the other 6 cases.
13. In each code chunk, you will have to "source" the script you wrote with the quad() function. Use the same command that is printed in the Console when you save with "Source on Save" checked.
14. For the 6 cases, make a plot of the superimposed quadratic graphs, picking different values for the non-zero values. Put the graph into the dynamic document with discussion about what you find.
15. Make it easy to read. You are trying to explain what you understand.
16. When you are done, or before you leave, commit and push your changes to GitHub. Doing this frequently, to save your work, is also a good idea. Before you turn off the machine, check GitHub to make sure your changes are there.
17. Email me the link to the your Stat370 repository.