1 Description

This goal of this project is to demonstrate the ability to produce and implement an API adhereing to JavaDoc standards. This will be accomplished by producing a specified API and then implementing that API.

2 Requirements

Figure 1: It should look similar to this

You will create an API in JavaDoc which describes a GUI calcululator as shown above. This calculator must be capable of performing addition, subtraction, division, multiplicationm, and exponential functions on the Real numbers (no Complex values). The methods for mathematical operations may be used by another program as some later date and should not truncate or round. Any truncating or rounding must be done after values are passed back to the GUI.

Moreover, the final program should exhibit the following behaviors.

1. It should compile.
2. The API should be written in such a way that code reuse is simple.
3. The implementation should take advantage of java library methods. You may only use the Java standard library.
4. The API should be well-documented (if you fill out the JavaDoc correctly you will have done this).
5. Code should be self-documenting, don't enter comments saying what a switch statement is doing. Commenting explains blocks of code. If you have to read snippets from multiple classes to understand what a section of code is doing put a comment.

3 Part 1: Designing the API

The calculator will consist of at least two classes at your discretion. `MathMethods.java` is the container for all mathematical operations. It consists entirely of static methods and has no global variables. Furthermore, each of the methods in MathMethods must return a double. Mathmethods javadoc must make mention of when it will throw exceptions due to the operation requested, e.g square root of a negative number. `CalcGUI.java` contains the GUI component of this assignment. You may implement both the JFrame and JPanel/JButtons/components in this class or separate them. `CalcGUI.java` will have a menubar with a File menu and an About menu. File menu consists of one item, and exit button the program. About menu consist of one item, an about entry which creates a new window listing the names of the members of the team. All buttons indicated in the figure above must be present on the calculator. The calculator can only perform binary operations. "`2+2=`" is a valid operation, "`2+2+2=`" is not. If a user enters the following "`2+2=`" and follows this with a "`+2=`" the calculator should display "`6`". The "`C`" button should clear all input. The `x^y` button means to compute x^y. The display should display a "`^`" for both exponentials or roots. "`5^.5`" is $\sqrt{5}$, "`5^5`" is 5^5.

4 Part 2: Implementation

Implement `MathMethods.java`.

5 Extra Credit

Implement an alogrithm to serve as a proof of concept that $P = NP$. Add capacity for CalcGUI.java to recevie keyboard input.