Assignment 1: Calculator

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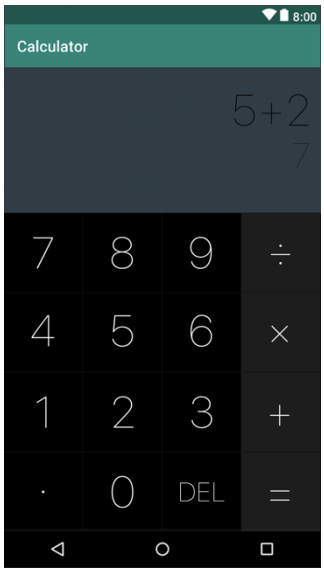
Introduction

For our first assignment we were tasked with the job of designing and programming a functional calculator application for Android devices. The calculator needed to support basic operations such as addition, subtraction, multiplication and division. The calculator was also expected to support floating point and negative numbers, as well as a clear and delete button.

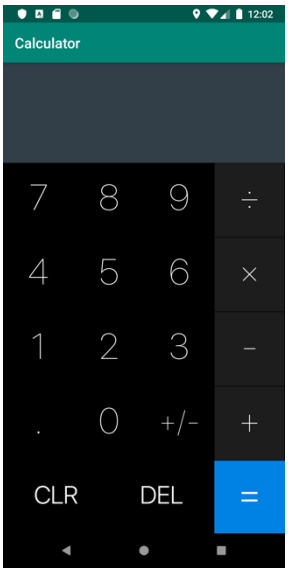
Before starting any work on the calculator, I first set out to use and test several calculators, looking at their design, functionality and methods of accomplishing certain tasks. I found that almost all the calculators I tried had different ways of displaying information, but they all functioned very similarly. Throughout the creation of the calculator I referred to some of these to see what features I wanted to mimic.

Design and Implementation

The first step taken for developing the app was to come up with a template design for how the app would look and how the buttons would be arranged within the screen. This was done in photoshop to act as a reference for the design. After creating a photoshop template, I began recreating it in Android Studio. Below are photos of both the initial photoshop design and the Android Studio design.



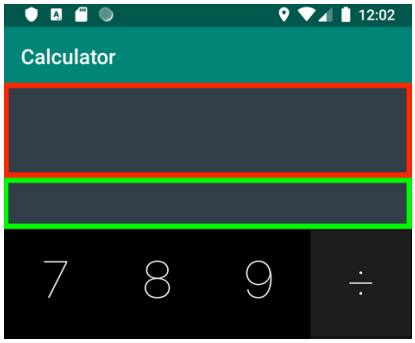
Photoshop



Android Studio

As you can see, the designs are very similar, however, there are some minor differences between the two. The most obvious differences are the inclusion of the support of positive and negative values, as well as a clear button. The equal button's color was also changed to have it stand out and to be easily located. This concluded the designing aspect.

After completing the design, the next step was to program the core functionality of the calculator. The method of obtaining values and computing expressions changed several times during this step. The initial intent was to allow the user to be able to input an expression that could consist of multiple operands and operators. After the user pressed the equal button, the result of the equation would be calculated. This worked, however, order of operations was not being taken into consideration. Consequently, the answer would be mathematically incorrect. Because of this, I decided to change the method of inputting information into the calculator. The calculator could now only accept one operand at a time which are distinguished by the operators and the equal sign. Another major change made was to display operands and operators in separate text views to allow an easier way of obtaining and displaying data. As seen from the image below, even though the screen seems to be one, it is actually separated in two, where operands are displayed in the red highlighted portion of the screen, and operators are displayed in the green highlighted portion of the screen.



Using this method of having two text views allowed for only obtaining an operand once even if the user deletes or changes values since the number is only recorded when pressing an operand or equal. These values are then stored into number objects that contain other information about that number like whether it has a decimal point, and whether it is positive or negative. Once two numbers have been obtained and an operator or equal is pressed, the result is calculated and displayed.

Conclusion

After finishing the design and implementation, several cases were tested to discover any bugs or potential errors that could provide improper results or cause the application to crash. These bugs were immediately fixed as they were found. There is one issue that currently exists which is in reference to the formatting of results. The results will sometimes be displayed in scientific notation when it does not require it, but the it is still mathematically correct. Overall the calculator functions as intended and this assignment provided insight into learning how to use Android Studio.