

CSCI 4237 Project Proposal

Convert-It-All

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Project Abstract

Convert it all aims to be a (near-)universal solution for converting values, using common formulae, and generally simplifying life. Intended features include unit conversions of volume, mass, energy, area, and length with potential for other areas to be added as time permits. Additionally the application will have several specialty areas, for example finding the value of a resistor by color bands or vice versa, calculations for common formulae like ohm's law, simple energy calculations such as potential energy based on height, kinetic energy based on velocity.

Strategy

Using the android sdk will allow the application to be written in Java and deployed using the Google Play store. The application will take advantage of the provided APIs to build an intuitive UI. Taking advantage of threaded operations will allow any large calculations to be run without blocking the UI thread.

Unknowns & Problems

Finding a straightforward method to store conversions for a large variety of units without simply creating a map of all possible conversions.

Determining if all calculations can be handled by the native Java libraries, or if external libraries will be required.

Determining the simplest UI design approach - i.e. tabs vs select menu, hierarchy of the application.

Implementation Plan

Milestones

Build list of desired units for conversion, possibly implement useful method for metric units with mapping between prefix and exponent (i.e. micro=>-6)

Decide on formulae desired to be included

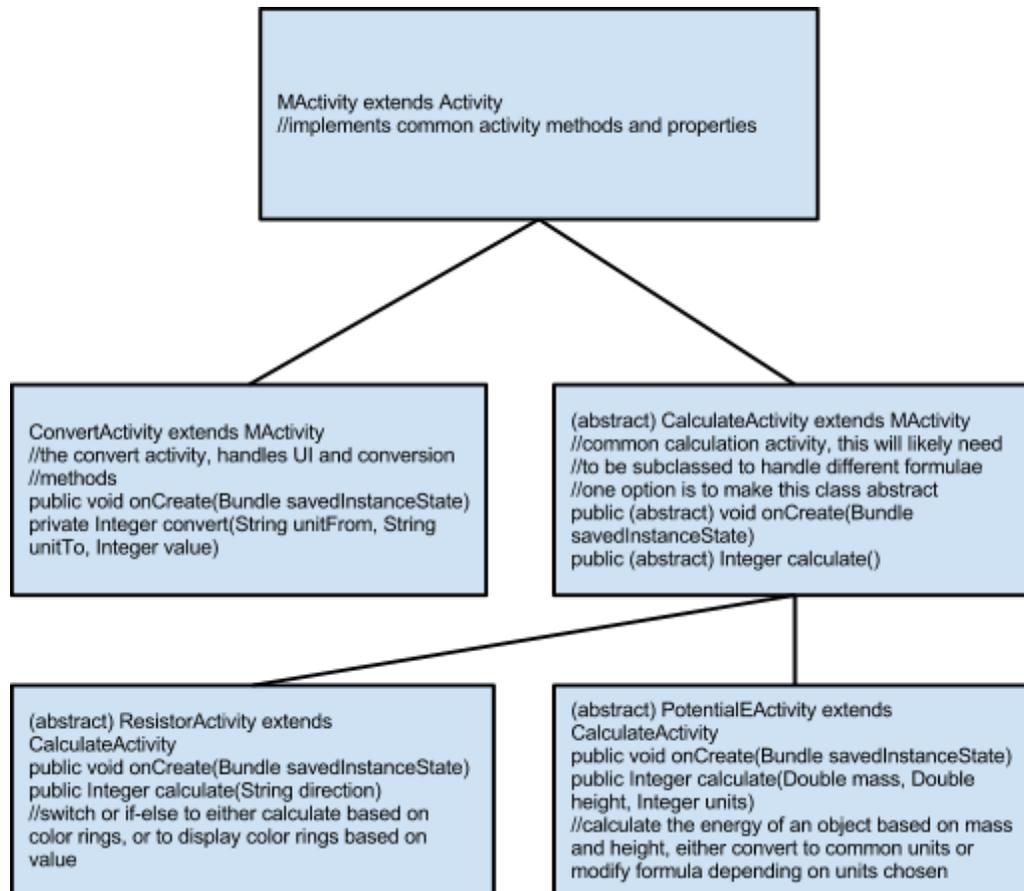
Build UI for needed screens - will need screens for each conversion type, as well as each formula, possibly a preferences page, and an entry screen.

Build base Application classes - MActivity, ConvertActivity, CalculateActivity

Subclass for specific pages

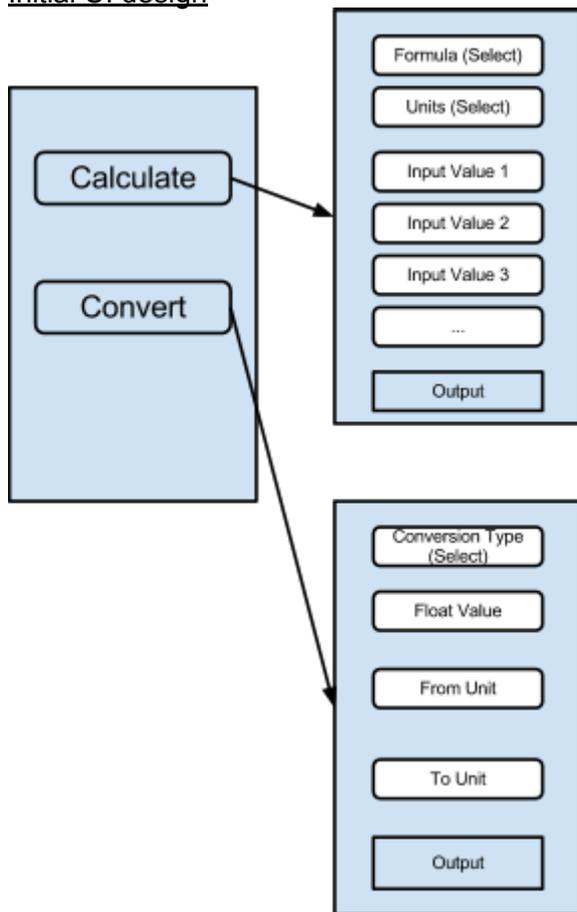
Test (hopefully using built in Android Test classes, otherwise by hand...

Initially planned classes



Depending on complexity ConvertActivity may become an abstract class like CalculateActivity, and will implement the convert method, and store a value for the xml view file required. The two CalculateActivity classes show two example classes that may be implemented in the application. Others may include Ohm's law, gravitational attraction, kinetic energy, conservation of momentum, mass-energy conversion.

Initial UI design



The initial design will also include a tab bar or drop-down menu in the header to allow for selecting of unit type (volume, mass, etc.) if in the conversion activity, or to select the formula to use if in the calculate activity. Depending on the formula additional functionality may be added to allow for greater interactivity. The design shown does not reflect color schemes, sizes, fonts, etc but is a simple wireframe to show needed UI elements.

Testing

Using the included test suites will allow me to test all unit conversions (both from and to) to try and track down any unknown bugs. A similar approach will allow me to test different values in formulae to find any mathematical flaws either due to programming error or system limitations. Testing of the device will be done using both the android emulator and a physical test device to ensure functionality.