

Conversion

Immersion

by Dawn Grow

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Introduction

Calculator App Overview

Goal:

Design the interface for a specialized calculator app that works on a touchscreen smart phone.

Identify a profession or activity that would benefit from a specialized calculator app.

Next, identify the functions your calculator must provide. Then design an appropriate interface using the principles of interaction and user testing. Keep your calculator app simple. It should be more like a basic four function calculator than like a complex graphing calculator. The final project will include a presentation of your app design and a comprehensive process book. This assignment explores observation, conventions, and feedback—three important concepts in interaction design.

Steps

Design for smart phone screen size

Design both portrait and landscape versions

Design 5 to 10 screens to demonstrate functionality

Create wireframes to structure the interface

Refine your three scenarios based on user testing observations and concept development

Conduct usability test 02 using paper prototypes

Refine wireframes after conducting user tests

Conduct usability test 03 using paper prototypes and/or digital prototypes

Play with form and features (explore aesthetic and user options — rough digital comps)

Refine interaction and form

Review the project using the list of interface musts. Make adjustments to project (or list) as needed

Create a user interface for smart phone

Conduct usability test 04 using digital prototypes

Refine user interface after conducting user tests

Conduct usability test 05 using digital prototypes

Keep the presentation to a five minute time limit

Highlight goals established for the calculator app

Discuss how user tests affect the final app design

Present the final calculator app

Exploration: History

The first known tools used to aid arithmetic calculations were bones, pebbles and counting boards, and the Abacus, known to have been used by Sumerians and Egyptians before 2000 BC. Development of computing tools arrived near the beginning of the 17th century: Geometric-military compass by Galileo, Logarithms and Napier Bones by Napier, slide rule by Edmund Gunter.



In 1642, the Renaissance saw the invention of the mechanical calculator by Wilhelm Schickard

and several decades later Blaise Pascal. Pascal's Calculator could add and subtract two numbers, multiply and divide by repetition. Schickard's machine, constructed several decades earlier, used a clever set of mechanised multiplication tables to ease the process of multiplication and division with the adding machine as a means of completing this operation. Gottfried Leibniz spent forty years designing a four-operation mechanical calculator, inventing in the process his leibniz wheel, but who couldn't design a fully operational machine.

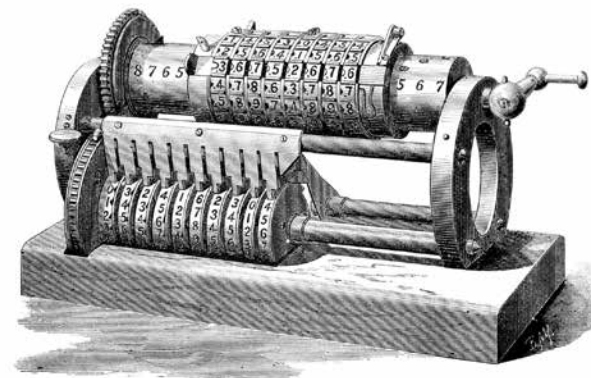


The Grant mechanical calculating machine 1877 is displayed on the right.

The 18th century saw the arrival of some interesting improvements, the Arithmometer, invented in 1820 as a four-operation mechanical calculator, was released to production in 1851 as an adding machine and became the first commercially successful unit.

It wasn't until 1902 that the familiar push-button user interface was developed, with the introduction of the Dalton Adding Machine, developed by James L. Dalton in the United States.

Today we have advanced to the use of an app on our modern smart phones.



Special thanks to Wikipedia for the research information.

Exploration: Research



Searching through the smart phone for calculator apps yielded the following miscellaneous styles of calculator apps.

WordList

- Percent
- Script
- Graphing
- Conversion
- Tip
- Pregnancy
- Fertility
- Mortgage
- Fraction
- Weather
- Fitness
- Anime stats
- Payroll
- Food
- Currency
- Photo
- Quick loan
- Stocks
- Taxes
- Nutrition
- Relationship
- Scientific

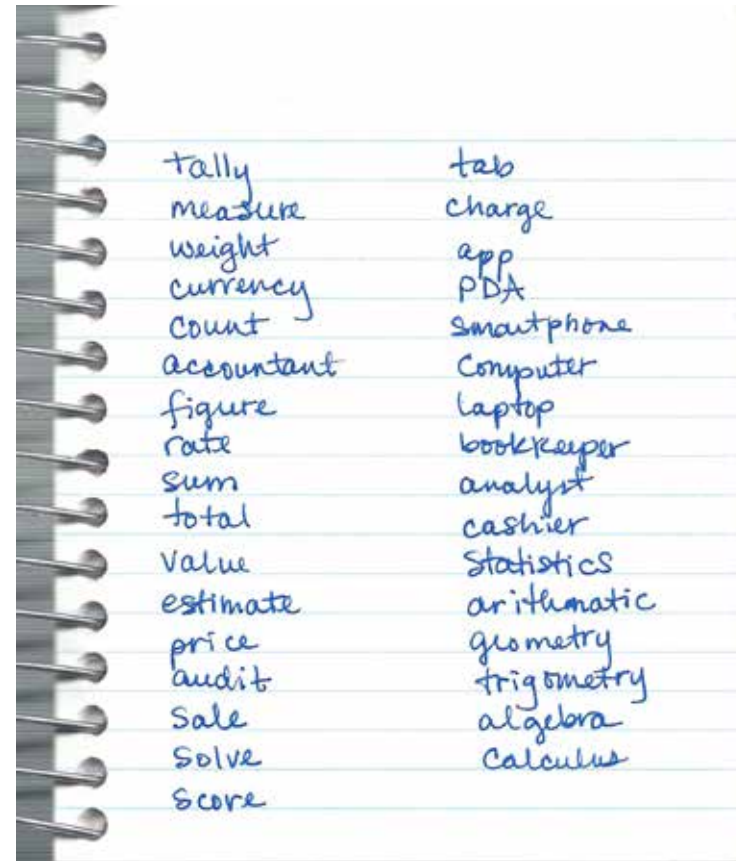
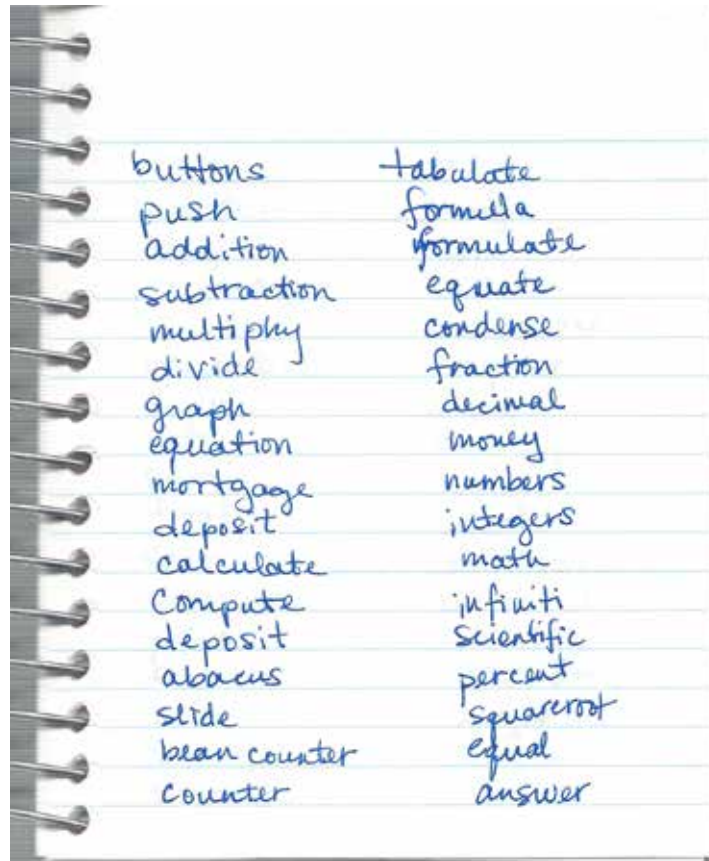


Exploration: Smartphones Do

Smartphones Replace:

- 50 pounds of books (via Kindle, iBooks)
- Kindle e-reader
- Daily newspaper
- Pocket digital camera (via built-in camera)
- Holga film camera (via Instagram, ToyCamera app)
- Pocket foreign language dictionaries
- Scanner (via Genius Scan)
- Bank ATMs (via USAA's app, which allows deposits via snapshot)
- GPS device
- Road maps / printouts from Mapquest and Google Maps
- Reporter's notebook (I find tapping out notes isn't any slower than writing them)
- Voice recorder
- Handwritten grocery lists (via DropBox-syncing Plaintext)
- Nintendo DS
- iPod
- Radio
- (via NPR app / Hype Machine / iTunes / Spotify / Pandora)
- Paper comics (via Comixology)
- Set-top box remote (via the Roku app)
- Paper receipt file (via EZ receipts)

Word Lists



Persona 1

The app would be useful for people of all literate ages.

This app would be useful for a person who were traveling and needed help with currency ...

Name: Julia Smith

Age: 35

Lives: Chicago, Illinois

Occupation: Sales Executive



Julia is a working mother who travels a lot for work. She has a demanding job and it makes her tired especially with jetlag.

She doesn't have the patience or time to deal with converting her currency or figuring out what temperature it is in the current country.

She wants an app for her phone that allows her to compute the correct amount of money for her taxi ride, dinners out and temperature in other countries.

Persona 2

for measuring distances ...

Name: Rob Brown

Age: 37

Lives: Denver, Colorado

Occupation: Insurance
Salesman



Rob has a job he enjoys and a great love of the outdoors. Rob uses every chance he gets to travel and see places normal people don't see. He also likes to search with his friends on maps and go geocaching.

He has a hard time judging distance and speed in the other countries with their version being in kilometers.

Rob needs an app for his smartphone that will convert the kilometers to miles or miles to kilometers so he has an idea where he is or how fast he is going.

Persona 3

or had a cookbook from another country with different measurements.

Name: Dean Baker

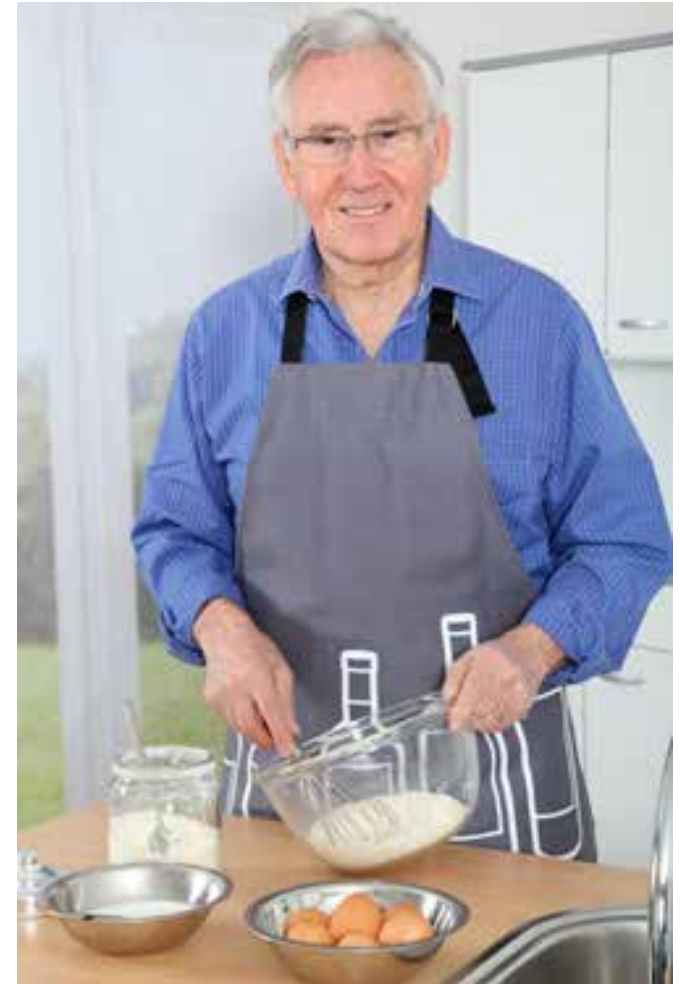
Age: 62

Lives: San Francisco, California

Occupation: Retired

As a new retiree, Dean and his wife, Joan, like to cook and experiment with new recipes.

Dean recently bought a new European book of recipes that has all the recipe measurements in liters and milliliters. He needs an app for his smartphone that will show the measurements in a measurement he has in his kitchen.



Similar App Pages

App Requirements

Currency

- United States
- Canada
- Mexico

Temperature

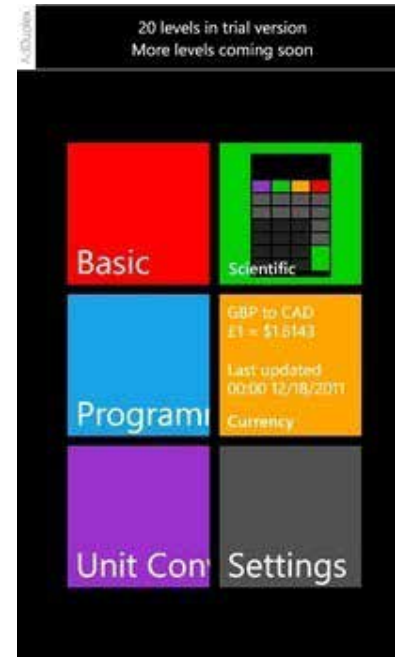
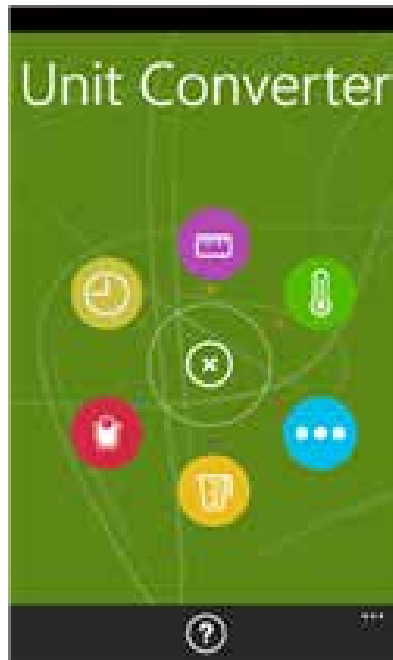
- Celsius
- Fahrenheit

Distance

- Meters
- Inch
- Feet
- Mile

Measurements

- Cup
- Quart
- Milliliters
- Liters



To be successful app:

- Simple, uncluttered
- Easy to use
- Easy to understand
- Legible



Brainstorming

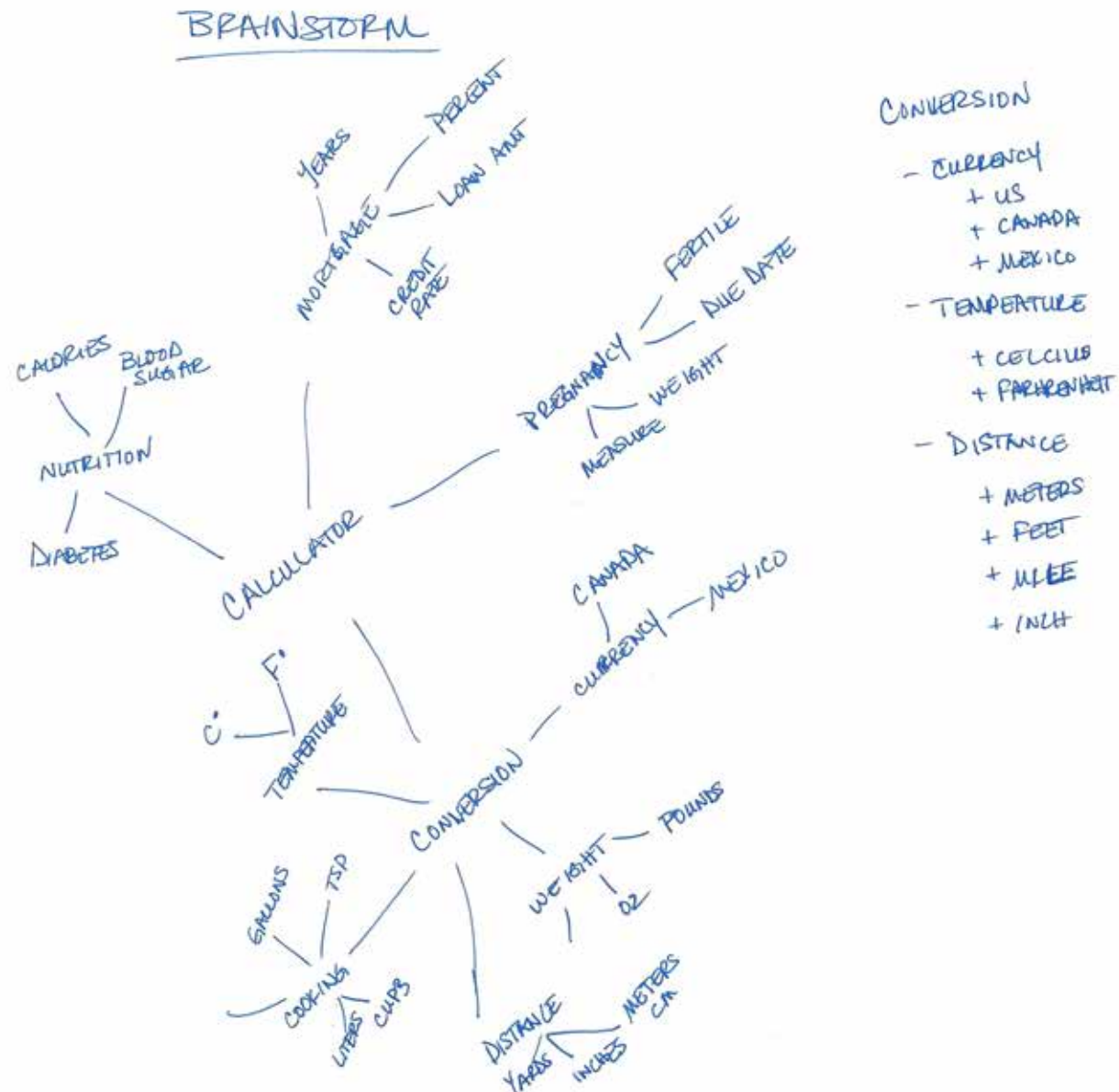
Goal:

Design the interface for a specialized calculator app that works on a touchscreen smart phone.

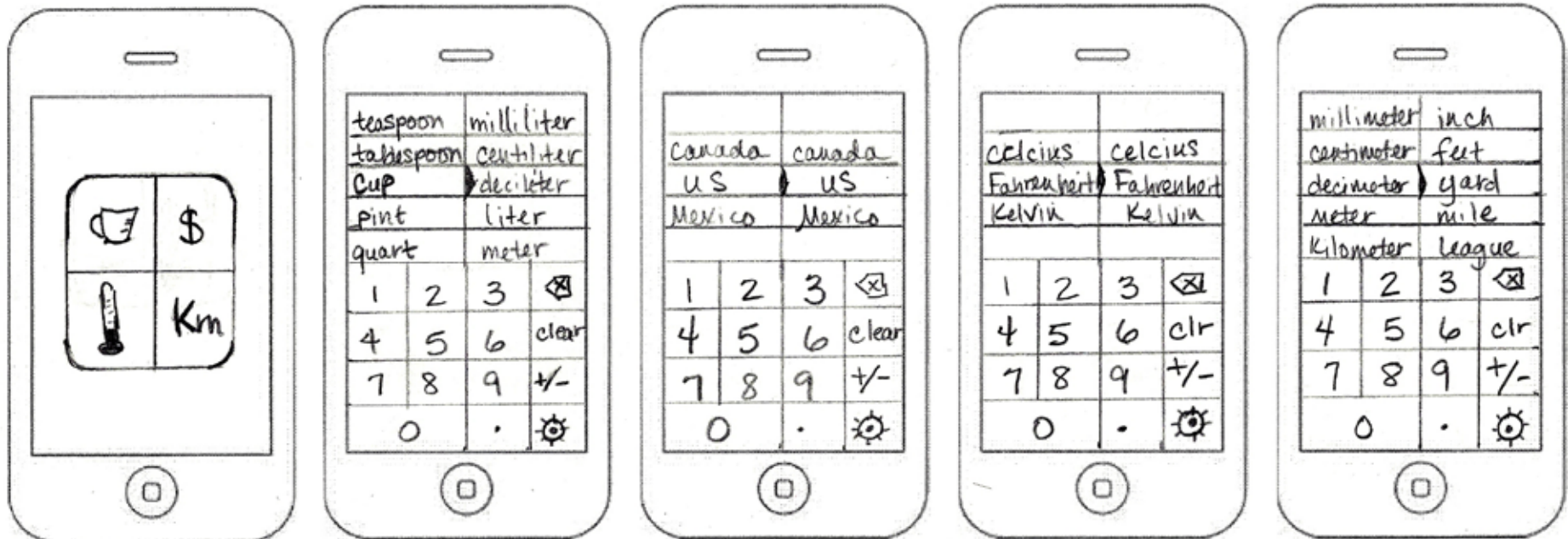
After brainstorming the topic, it was decided that this app would be for conversion. This app will convert currency, temperature, distance and volume.

The app must be:

- Simple, uncluttered
- Easy to use
- Easy to understand
- Legible



Sketches: Portrait

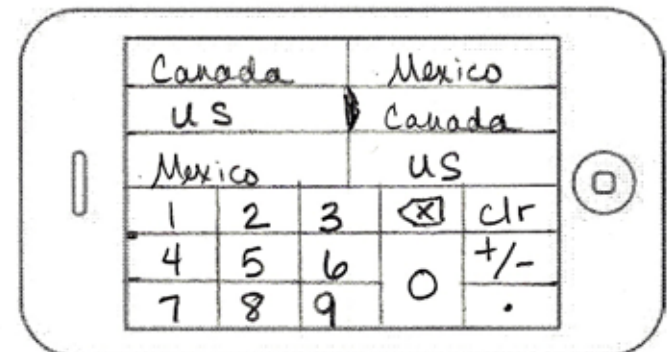
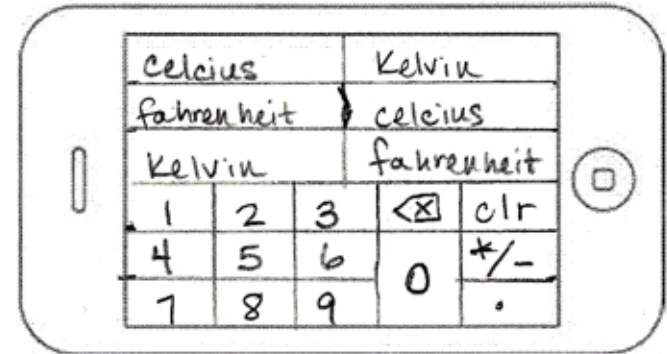
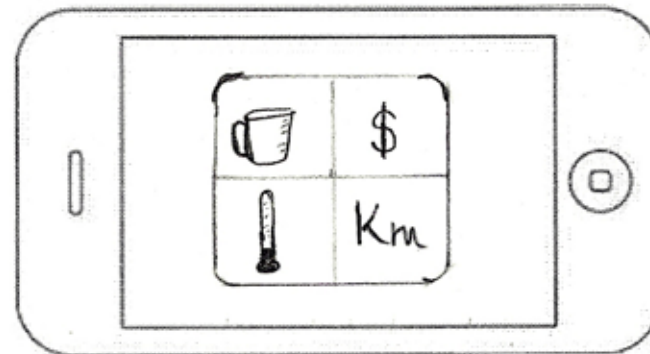
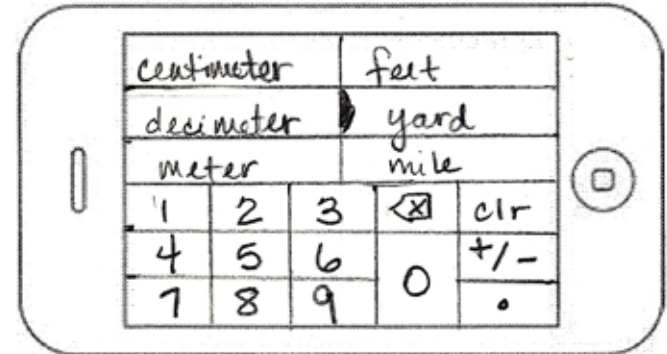
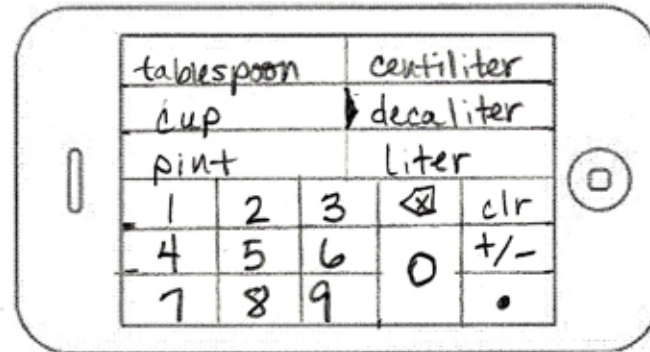


This shows some possible ideas sketched of an iPhone and the way the app could look upon the screen in a portrait view.

The main thought of these would be a calculator number pad on the bottom with the units to be converted on the top. The user could scroll through the left units list to find the desired unit to convert and the right list of the unit they want to convert to.

Sketches: Landscape

This shows more possible ideas sketched of an iphone and the way the app could look upon the screen in a landscape view.



Scenarios

SCENARIO 1

Julia has been traveling all morning and just arrived at the airport in Mexico. She is tired and doesn't want to figure out how to convert money in her head. She gets a taxi to her hotel and needs to pay the man. She gets out her smartphone and brings up her app to calculate the amount of money she needs to pay him. She opens up the app, clicks on the button with the \$, scroll through the countries to find the right ones and type in the money amount. Within a few flicks of her finger she has the correct amount along with a generous tip for his promptness and assistance.

SCENARIO 2

Rob is on a trip that his friends recently took. They gave him directions to an awesome restaurant they highly recommend. He looks at the directions and sees they are given in miles but the car he is driving only clocks the distance in kilometers. He remembers that he has the app on his smartphone that converts the distance. Bringing up the app, he clicks the 'km' button, scrolls through for the miles, finds the corresponding kilometers and types in the miles written down. He notes the correct distance and is able to follow all the instructions correctly. He sends his friends a thank you letter for the suggestion since the food was really good true native cuisine.

SCENARIO 3

Dean and his wife were given a new recipe book for Christmas. It is full of history of the leaders of the world and includes some of their favorite recipes. They are excited to start trying a few of them. They note that most of them are in metrics. Dean gets out his smartphone and finds an app that will be able to help them. After downloading the app, they are able to open the app, click on the measuring cup and convert the measurements so they can try out the new dishes. As they are waiting for it to cook and while they are eating, they read some of the stories that go along with these yummy dishes. What a great date night!

Usability Test 01

SCENARIO 1

1. Open the app
2. Click on the money (\$) button
3. Scroll to the country you are need money converted for
4. Type in the amount of money you need converted to
5. Scroll to the country you have money for
6. Your input will show up on the left column near the country, your answer will show up on the right column near the country
7. Finish your transaction

SCENARIO 2

1. Open the app
2. Click on the measure (km) button
3. Scroll to the measurement you have
4. Type in the number of measurement you need converted
5. Scroll to the measurement you need
6. Your input will show up on the left column near the measure, your answer will show up on the right column near the measure
7. You now know how far you need to travel

SCENARIO 3

1. Open the app
2. Click on the measure cup (cup symbol) button
3. Scroll to the measurement amount type you have
4. Type in the amount you need converted
5. Scroll to the measurement amount type you need
6. Your input will show up on the left column near the amount, your answer will show up on the right column near the measure
7. You now have the needed amount
8. Repeat steps 3 through 6 until you have all the ingredients for the recipe

Usability Questionnaire

Questions

- Was the main page easy to understand?
- Did you understand that the left and right columns rolled to other options?
- Did you get to your selection easily?
- Did you understand where the numbers you typed went to?
- Did you see your results?
- Did you have any problems with the app?
- What changes would you make if you could?

Usability Results

Test subject for Julia

name: Kiara

age: 19

Questions

- Was the main page easy to understand? Yes
- Did you understand that the left and right columns scrolled to other options? Yes
- Did you get to your selection easily? Yes
- Did you understand where the numbers you typed went to? Yes
- Did you see your results? Yes
- Did you have any problems with the app? No
- What changes would you make if you could? Nothing, it was wonderful

Test subject for Rob

name: Evan

age: 20

Questions

- Was the main page easy to understand? Yes
- Did you understand that the left and right columns scrolled to other options? Yes
- Did you get to your selection easily? No, it's paper
- Did you understand where the numbers you typed went to? Yes
- Did you see your results? I think so
- Did you have any problems with the app? No
- What changes would you make if you could? Using a real phone

Test subject for Dean

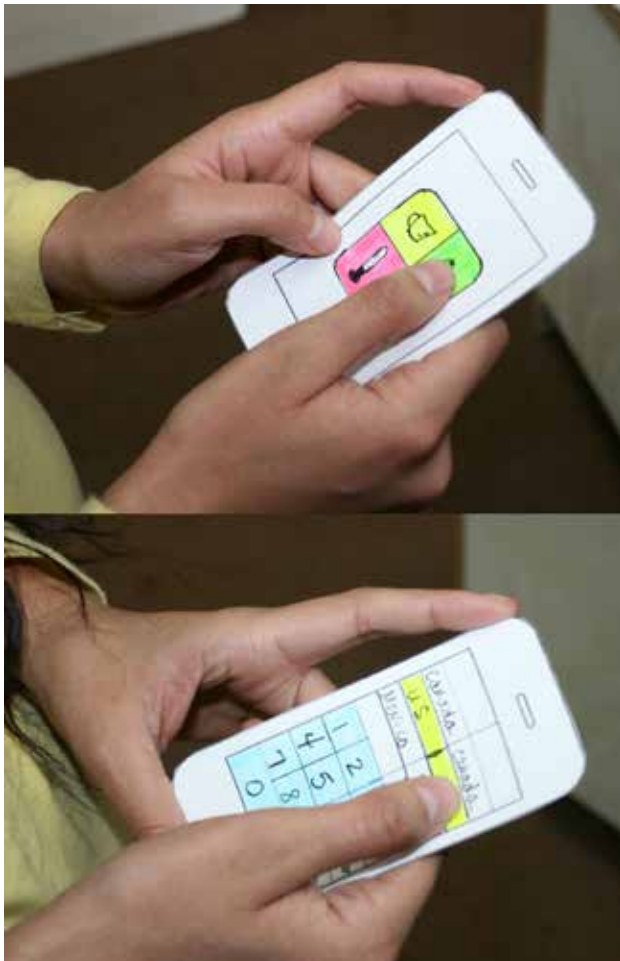
name: Neil

age: 50

Questions

- Was the main page easy to understand? Yes
- Did you understand that the left and right columns scrolled to other options? It made it easy
- Did you get to your selection easily? Very quickly
- Did you understand where the numbers you typed went to? Indeed
- Did you see your results? No, it's paper
- Did you have any problems with the app? None whatsoever
- What changes would you make if you could? No changes

Usability Results



Subject Results

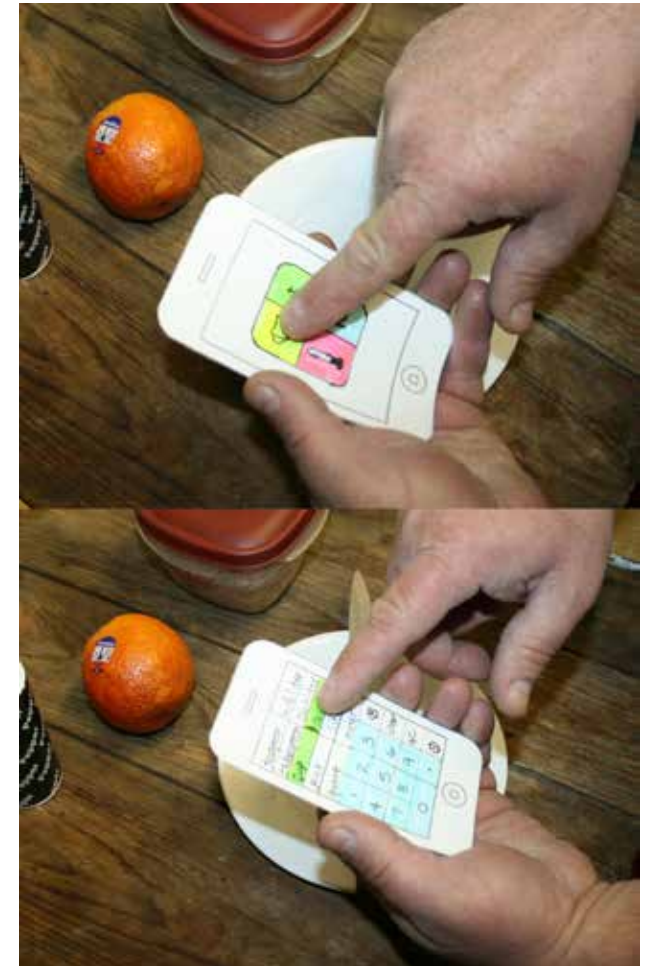
The test subjects did well and understood the app and how to work it for the most part. One subject, Evan, was slightly confused when asked to scroll and appeared to be trying to scroll the whole page, numbers and all. His problem could be the due to the horizontal/landscape version he was using.



The current appearance made the features short

Possible solution

The current appearance made the features short



and wide. The solution might be to move the scroll columns off to the left and move the number pad off to the right. This will leave the sizing about the same size as the vertical/portrait version, just with narrower columns.

Wireframes

Create wireframes to structure your interface. These have the 4 basic conversion units in fig-1, a scrolling choice section with a number keypad under it as seen in fig-2 or the landscape version with an input area with a selection area directly under it and the keypad on the side in fig-3.

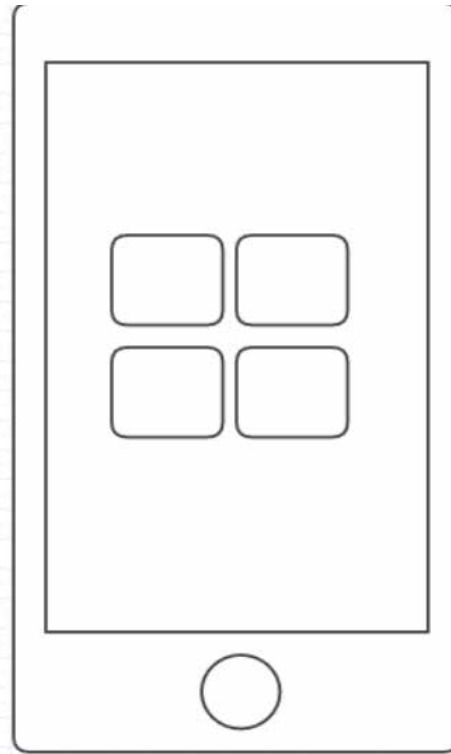


fig-1

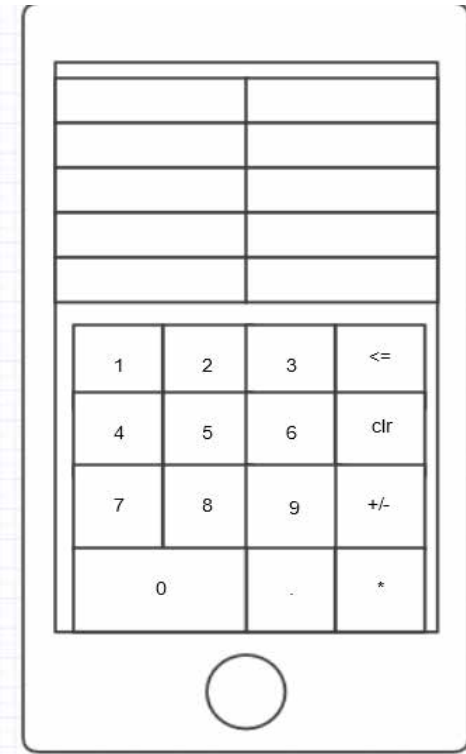


fig-2

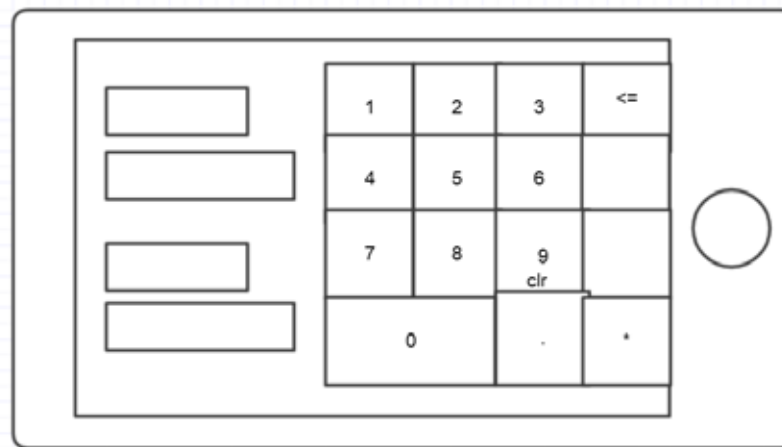


fig-3

Usability Test 02

SCENARIO 1

Julia is traveling and needs to figure out the conversion of money for the country she is in. She has to pay the cabbie \$20. How much is that in US currency?

SCENARIO 2

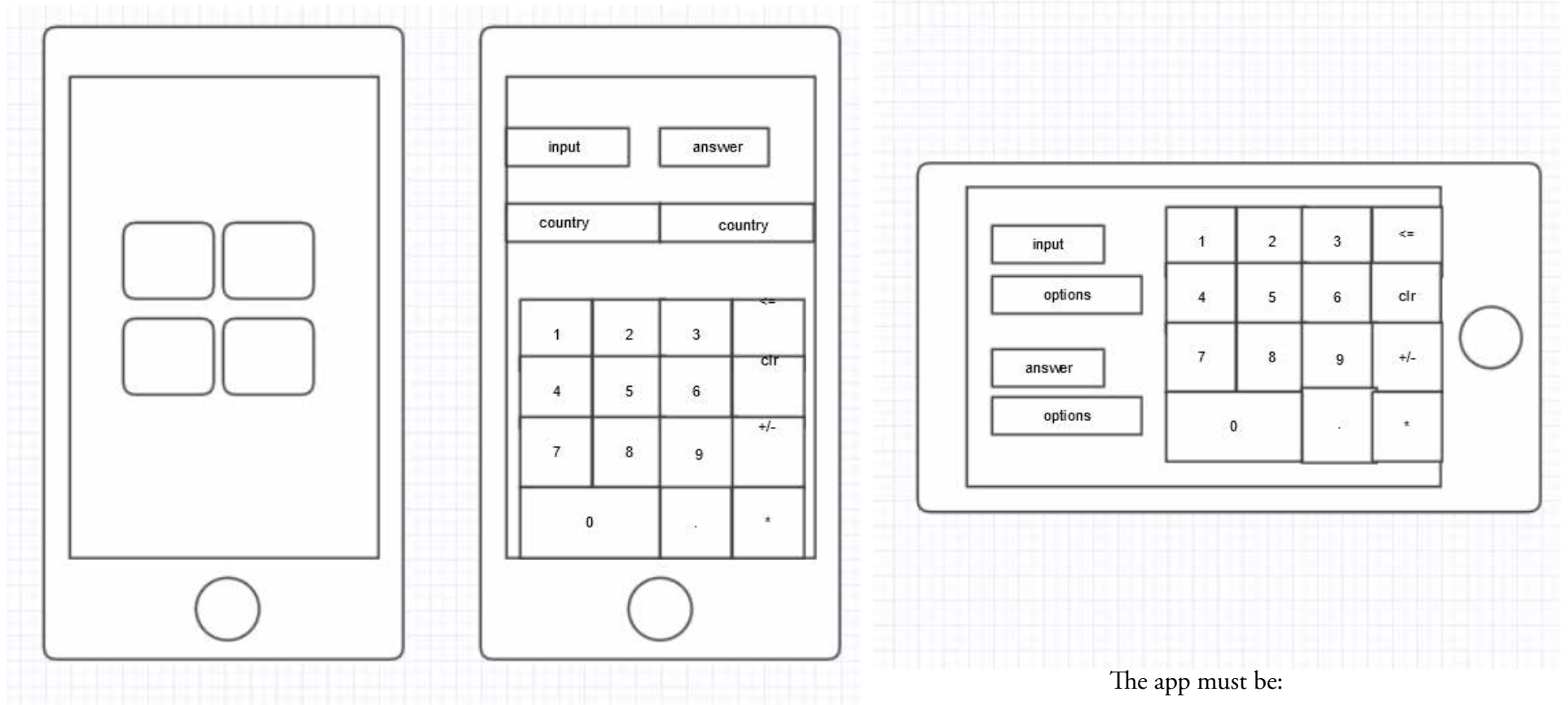
Rob is trying to follow directions and needs to convert miles to kilometers. His directions say 9 miles. How many kilometers does he need to go?

SCENARIO 3

Dean is cooking a recipe from another country which uses metrics. He needs to convert the measurements so he can make it. His first ingredient is 1 liter of milk. How many quarts is that?

Conduct usability test 02 using paper prototypes

Refine Wireframes



Refined wireframes after conducting user tests.

The app must be:

- Simple, uncluttered
- Easy to use
- Easy to understand
- Legible

Wireframes/Prototype



This is the start of the digital prototype.

The keypad was not working well with the input section.

Usability Test 03



They need to be refined again. The keypad was found to be unusable. Some of the input areas allowed for the letter/number keypad to pop up from the bottom of the screen making the keypad superfluous anyway.

Usability Test 04



Some of the comments:

“Why can’t I touch this? It won’t let me convert. There are no instructions. It won’t give me an answer.”

“I don’t know what to do. It needs more instructions. Other than the instructions, it is self-explanatory.”

“I couldn’t find the ‘done’ button. It would be fine if I could figure it out.”

Usability Test 05



I am still tweaking some of the features and getting others to work properly but the prototype shown here can be found at

<https://www.justinmind.com/usernote/tests/13811681/13813005/13813088/index.html>

Refining the backgrounds: Portrait



background:
http://fc05.deviantart.net/fs70/f/2012/047/b/4/mac_os_x_mountain_lion_wallpaper_for_iphone_ipod_by_flinkan-d4px6hs.png



background:
<http://i.ytimg.com/vi/xjWKevyRhGc/maxresdefault.jpg>



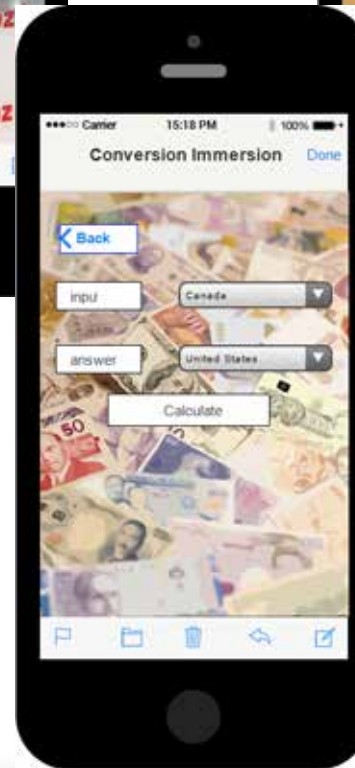
background:
<http://imgkid.com/hot-thermometer.shtml>

I decided that an icon on the main page would be a better “start”.

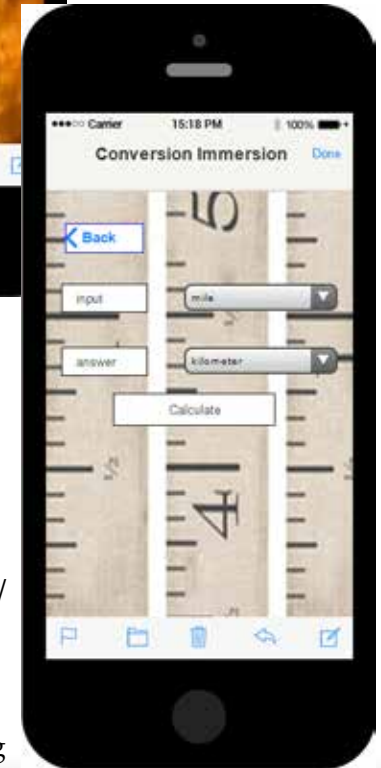
The empty space at the bottom of each screen was good for connecting the photo with the topic. It also did not cover up anything important when the popup keyboard opened.



background:
<http://cdn.thenextweb.com/socialmedia/files/2011/09/money-bonzaii-pop-art-wallpaper.jpg>



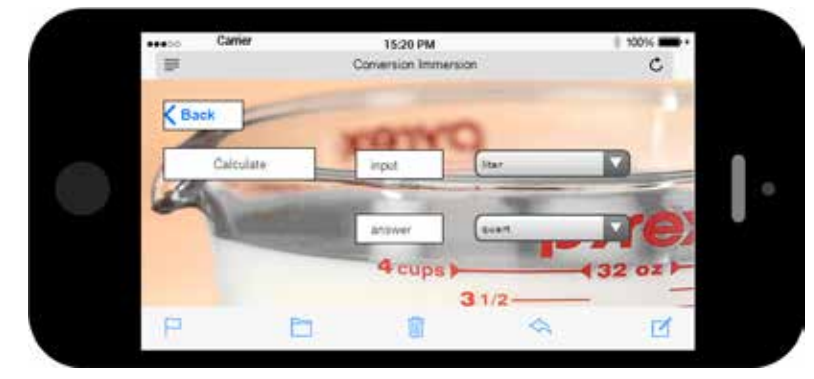
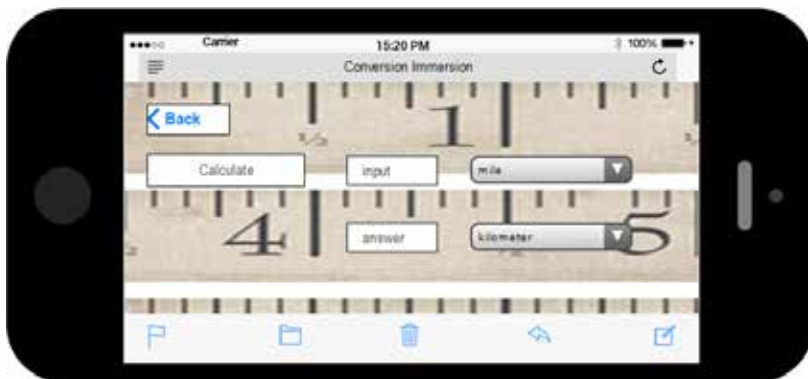
background:
http://s3.amazonaws.com/spoonflower/public/design_thumbnails/0317/1978/rMeasuring_Tape_Upholstery_Revised_shop_thumb.png



Refining the backgrounds: Landscape

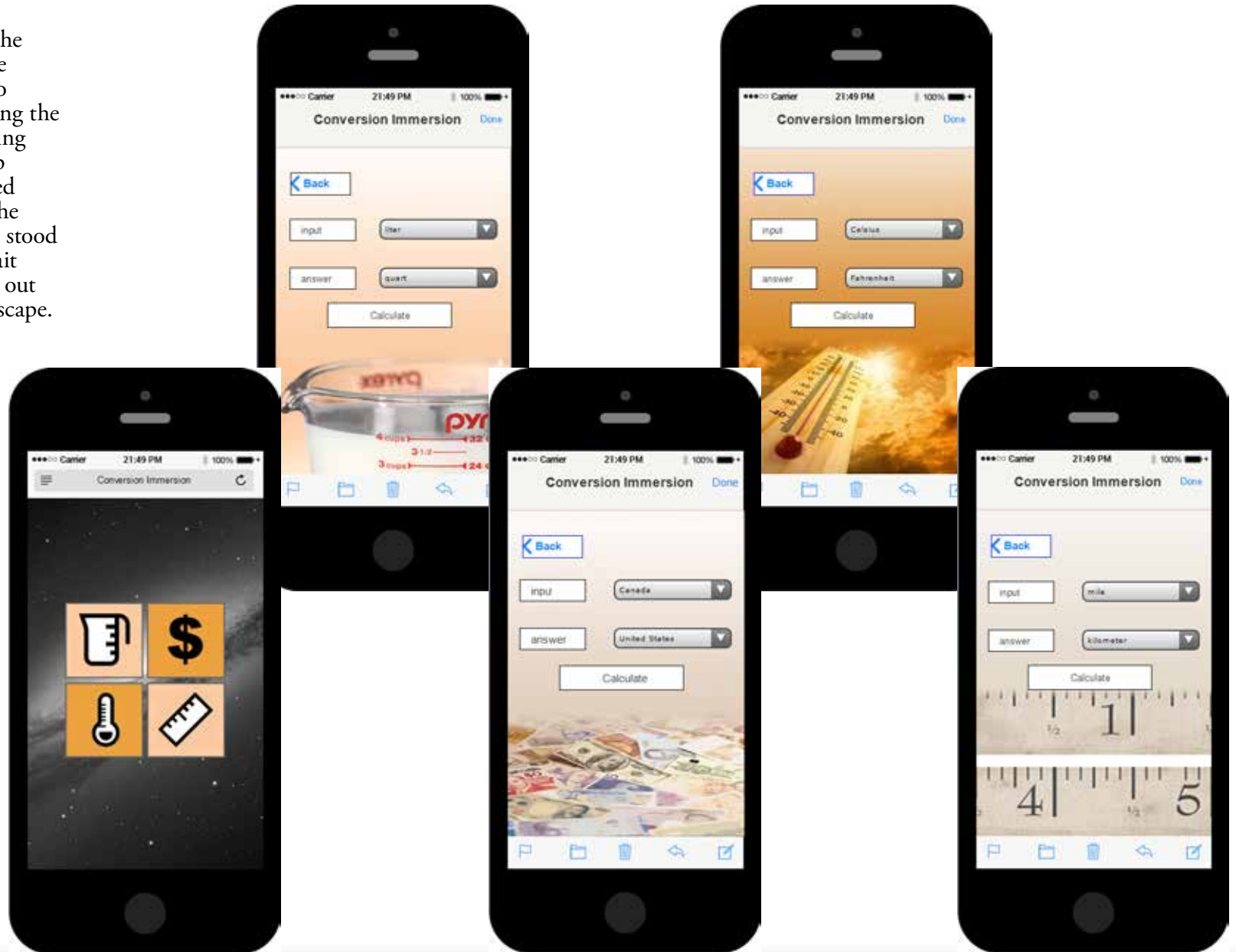


Test 05 brought more changes. The prototype software was harder to compute the value. It was decided to add a “calculate” button. After making sure the entire app functioned properly, the final step involved adding color and a background. Each background represents the topic it was made for.



Final App Pages: Portrait

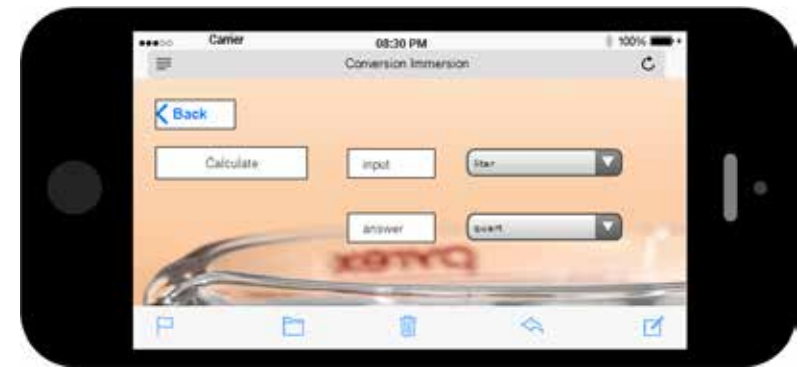
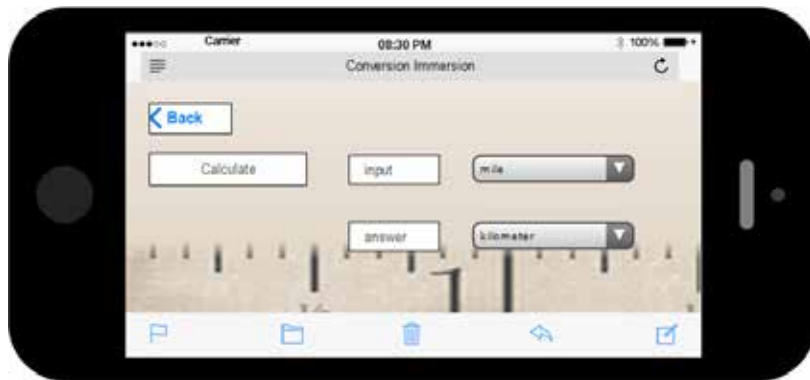
It was decided that the pictures added to the background were too distracting. By scaling the photo back and adding a gradient on the top of the photo, it muted the background so the buttons and features stood out better. The portrait backgrounds turned out better than the landscape.



Final App Pages: Landscape



There was found a glitch in the software. It has random words pop up in the prototype that would not be in the final app. I could not find a way to totally remove them.



Presentation

As a recap...

The goals that I had for my app ...
The app must be:

- Simple, uncluttered
- Easy to use
- Easy to understand
- Legible



Result Summary

The user tests were very useful. I had many changes to my app. I changed it in the following order:

- a scrolling lists with a keypad
- adjusting the landscape view
- changing the scrolling to a drop-down list
- removed the keypad in favor of the pop-up keyboard
- added a 'calculate' button
- added backgrounds

<https://www.justinmind.com/usernote/tests/13811681/13881029/13881031/index.html>

Video Presentation

My video presentation can be found at ...
<http://screencast.com/t/sXkDqHLXff>

The app could be simulated at the following link in portrait format.

Draft Feedback

These were feedback from January 16, 2015

Dawn, I think this looks like a good start! I have since seen what you have added and fixed and I think you have done a great job improving it. I wish I had some suggestions but I think it looks pretty good.

Preslee

Hey Dawn!

I'm so glad you were able to come up with a concept. I really like that you look at all different forms of conversion for the app. I think this will help give you the ideas you need to execute the required (3) functions and also have fun doing it. What does the screen look like when a different country? I like the ideas but the interface sketches are a little hard to go through. Are you going to have an area that the user can see what they are typing?

Jacky

Dawn,

I think you have a great concept! I think your app is helpful for a wide audience. I think you have great variety in your scenarios.

The only thing I saw that would be a suggestion would be to fix exploration...on your table of contents page it is spelled without the "l." But aside from that, it looks great!!

Kendra

Good job dawn. You have a good start here. I think you process book is nice and you are set up for a great project.

Becky

Great start Dawn! This was a lot to tackle in a short amount of time and I know that I am not done quite yet either. I agree with Bro Iman that the Italics seems out of place along with the gray background on some of the pages. I really like your font and alignments!

Sarah

Dawn,

Really great work here. I really like your three different scenarios, and also the direction you are taking with your app. I would recommend that you run a spell check as Kendra suggests to make sure everything is spelled right. Visually I feel like your process book is weak in a few things—just some adjustments. Your italic blue letterspaced headers do not feel professional looking. When you use italics and letterspacing it really feels odd, and may be harder to read. I would suggest to not letterspace the headers. I think this will make them easier to read. Second the gray background dulls the overall feel of the page. I would suggest losing it and just have white. Keep it simple and clean—it will be easier to read. Let me know if you have any questions.

Kyle