

# Cooking Companion

Contextual Inquiry, Task Analysis, Design Sketches

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## Overview

Today there exist a multitude of applications for smartphones designed to aid the amateur chef. Most of these applications focus on finding and managing recipes, or providing general cooking advice. Personalizing these applications to one’s needs is rarely possible, and they provide little help in the kitchen beyond displaying a recipe. Cooking Companion goes beyond existing recipe applications by providing improved meal planning, a hands free interactive recipe display interface, and automatic recipe adjustments based on the user’s pantry, and equipment. It uses the preferences and dietary requirements of the expected diners to aid in recipe selection, and automatically generates organized shopping lists. Cooking Companion allows users to navigate through recipes and track their progress using hands free gestures, or voice commands. It effortlessly makes ingredient substitutions, and alters recipes for the equipment present in the user’s kitchen. Cooking Companion transforms a smartphone from a cumbersome recipe display device into a valuable kitchen aid.

## Contextual Inquiry Participants

### Layla Cole

Layla is a biologist who lives on a yacht in Seattle along with her fiancé. She has significant experience with healthy and vegetarian cooking; having been trained by her mother who wrote a book on the subject. She was chosen as a participant because she has recently been compiling a collection of recipes on her iPad using an app called “The Recipe Box”. I observed her preparing corn chowder in the galley of her yacht, which is a small but effective space. I was primarily interested in how she interacted with the iPad while cooking, although I did ask about her cooking decisions as well.

### Lisa Olmstead

Lisa is a Registered Nurse, but spent many of her years as a stay-at-home mom. She cooks dinner most days of the week, and has a family dinner for 12 people almost every Sunday. She was chosen because of her experience in the kitchen. I observed her in her kitchen preparing a turkey with stuffing. Before starting, I explained that I would like to know as much as possible about the reasoning behind her decisions. She was very good about keeping a running dialog, which minimized the number of questions that I had to ask.

### Tessa Olmstead

Tessa is a recent graduate of the Bioengineering department at the UW. She is a part time research assistant and also a dance instructor. She bakes frequently, but was trying a new recipe for a Dutch apple pie when I observed her in her kitchen. I thought that it would be good to observe someone preparing a new recipe from an online source. Tessa did a good job of explaining her actions as long as I asked questions to get her thinking about her reasoning.

### Naresh C

Naresh is a Software Engineer by profession. He lives with his wife in Bellevue. He likes to cook and his preference is to cook fresh every night. He enjoys playing the Fifa Soccer game on his Xbox and is often playing on his Xbox while cooking. He uses an existing recipe application on his Windows Phone. In general, he doesn't prefer totally new recipes but likes to experiment within bounds of somewhat known recipes. He is very efficient while cooking and does things in parallel to minimize cooking time.

## Contextual Inquiry Results

In the contextual inquiry sessions, participants were asked to prepare food from a recipe. Some of the participants chose recipes that they had prepared before, while others chose new recipes. Participants also used different media to find the recipes and to display them while they were cooking. There were several recurring themes that occurred throughout most of the contextual inquiry sessions: Participants customized recipes, followed them in a different order than written, and continually had to walk between the recipe and the food prep area.

All of the participants that were observed customized the recipe in some way. There were several reasons for customization, including personal taste, prior experience, ease of cooking, and differences in cooking appliances. Lisa ignored the recipe and added extra onions to the turkey stuffing by eye because she likes lots of onions. She also added extra sage to the stuffing, and basted the turkey with butter and salt although the recipe did not call for it. Tessa double the recipe for pie crust because she has found it easier in the past to roll out the pie crust when there is more dough. The extra crust can be trimmed and baked as a tasty snack. She put the pie in the oven for less time than called for because her oven tends to overcook food. Layla was not satisfied with the consistency of the corn chowder after following the recipe, so she added flour to make it thicker.

Participants followed the order outlined in the recipe for important steps, but tended to add ingredients out of order. Tessa looked at the recipe to identify the spices required, and then went to the cabinet to collect them. After setting them down on the counter next to the filling, she added them in the order that she picked them up rather than the order that the recipe called for them. She picked up a jar and then walked to the laptop to check the quantity to add. Lisa only used the stuffing recipe as a guideline for making the stuffing because she has done it many times before. She added most of the ingredients and then checked the recipe to make sure she did not miss anything. Layla had done some of the chopping of vegetables before I arrived, but waited to begin actually cooking them until I was there.

It did not matter what media the participants used to display the recipe while they were cooking; they all walked continually between the recipe and the food preparation area. For those using computing devices to display the recipe, there was an additional step of cleaning hands before using the touchpad or touchscreen. Tessa started with her laptop on the counter next to where she was cooking, but had to move it to the kitchen table to prevent it from getting covered in flour. This caused an even more pronounced pattern of walking back and forth. Layla was cooking in a relatively small area so she did not have to walk very far, but still went back regularly to check the recipe and mark off completed steps.

There were a few other occurrences that were interesting, but not common to all participants. Layla tried to use Siri to start a three minute timer on her phone. Siri started a 33 minute timer instead, illustrating the difficulty with using voice commands successfully.

When Tessa was asked why she chose the particular pie recipe that she used, her first response was that she chose a recipe that looked good and had a lot of stars. There were many recipes that fulfilled this requirement, but the deciding factor was the number of steps in the recipe. Tessa prefers recipes that call for adding the ingredients all at once because it is easier than following a long sequence of steps.

Naresh symbolizes a typical working professional, always out-of-time. He likes to eat fresh and prefers cooking every evening. But at the same time, he tries to do things in parallel and change the order of steps as much as possible to minimize the cooking time, so that he can get back to his favorite Xbox game. Naresh reads through the entire recipe and does a mental analysis of making it most efficient in terms of cooking time. Whenever he is missing an ingredient, he doesn't hesitate to call his mom for an expert advice for a suitable alternative. Watching Naresh cook, it felt that he would not hesitate to deviate a little from the exact recipe. For example, he used cardamom instead of fennel. The other noticeable point was his need for maximizing screen real-estate. He keeps his phone on landscape mode so that more of the recipe is visible at one time. Naresh mentioned that his biggest issue today is to plan ahead. He would like to choose some recipes while spending a leisurely weekend afternoon and get those ingredients added to his grocery shopping (typically done Sunday evenings). Today, there is no

such plan-ahead. While at it, he also thought calendar integration would made life so much easier. He would know which days he's supposed to cook or have guest list in there.

## Task Analysis Questions

### 1) Who is going to use the system?

The system will be used primarily by young and middle aged adults who cook regularly and have a smartphone. It will appeal to those who are adventuresome in their cooking and like to try new recipes, and who are enthusiastic about using mobile computing to stay organized.

### 2) What tasks do they now perform?

The target audience most likely obtains recipes from a variety of sources including recipe sites, mobile recipe applications, cook books, and cooking magazines. They decide upon a recipe based on personal preference, preferences of friends and family, online reviews, and perceived difficulty of the recipe. When cooking, they use printed recipes, or display recipes on a tablet or laptop computer located near their kitchen. If they use a tablet or computer for cooking, they only use it to display the recipe, time cooking steps, and occasionally search the internet for answers to cooking questions. The tablet or computer does not have personalized cooking settings and offers little help while cooking.

### 3) What tasks are desired?

Users would like to be able perform the following tasks:

- Use the application to find recipes based on personal tastes, dietary requirements, ratings, and time since a similar dish was prepared
- Enter personal preferences and dietary requirements into the device
- Enter preferences of friends and family, or be able to acquire this data using social networking.
- Display a recipe with an indication of the steps that have already been completed
- Determine substitute ingredients when a required ingredient is not available
- Interact with the device from a distance using voice commands to inquire about measurements and move between steps
- Start a kitchen timer using voice commands
- Enter information about kitchen appliances, and have recipes automatically adjusted for appliances, for example by modifying cooking times.

### 4) How are the tasks learned?

When the application is first run, it starts in "tutorial" mode. In this mode, it walks users step by step through the available tasks. After users have exercised all of the functionality of the application in tutorial mode, tutorial mode is disabled to allow faster navigation. A help menu is available to provide assistance later. If users choose not to use the advanced features of Cooking

Companion, it will function much like other recipe applications and will be familiar to many users.

**5) Where are the tasks performed?**

Recipes are prepared in user's home kitchens. Personalization/customization is all done on the user's smartphone. Users can search for recipes anywhere as long as they have data access to their smartphones.

**6) What is the relationship between customer & data?**

Cooking Companion as a company does not take ownership or responsibility for user's data. Users create profiles and recipe libraries that are stored on their local devices. They can import recipes from cooking sites, books, and magazines. Users can augment profiles for friends and family by importing data from social media sites. Users can export their profiles and recipe libraries to transfer them to other devices.

**7) What other tools does the customer have?**

The customer has cookbooks, other recipe applications, and the internet to find recipes and answer cooking questions. They can also call or email friends and family to get answers to questions. Most users have kitchen timers and thermometers to determine when food is done.

**8) How do customers communicate with each other?**

Cooking Companion integrates with social media to download public information about friends. It does not provide a mechanism for posting information or for directly connecting with other users. Users will communicate using traditional mechanisms including phone, email, text message, social media, etc.

**9) How often are the tasks performed?**

Most users will cook several times a week, but will frequently cook from memory and therefore will not need to use Cooking Companion for every meal. It is estimated that customers will use Cooking Companion at least once a week. However, customer usage may vary depending on their cooking preferences and how often users explore new recipes.

**10) What are the time constraints on the tasks?**

Cooking Companion does not impose any time constraints on tasks. There are no time constraints for meal planning. While cooking, users should follow recommended cooking times for best results.

**11) What happens when things go wrong?**

Cooking Companion offers some help for problems by providing substitutions for ingredients that are not available. It also helps users stay on track by alerting users on missed cooking steps and initiating oven timers. There is little that can be done to recover from severe errors like overcooking, but fortunately the worst case generally only requires users to start over.

## Task Descriptions

### Existing Tasks

One of the most common tasks that existing cooking applications are used for is searching for a recipe. Existing cooking applications provide access to a vast collection of recipes, and it is common to search these recipes by category, keyword, or both. Cooking Companion improves the search experience by allowing users to filter recipes based on the preferences in their personal profile. This focuses the results to include only recipes that the user is likely to find appealing, have the equipment to cook, and that they have not prepared recently.

Another common task is using a cooking application to display a recipe while preparing it. Most existing cooking applications simply display a list of ingredients followed by instructions for combining and cooking them. The recipe frequently does not fit on one screen, so the user has to scroll while cooking. Cooking Companion provides hands free gestures to navigate the recipe without having to touch the device and potentially smear the display. It also provides voice commands to navigate the recipe, and to query measurements and cooking directions. A user can ask a question like “How much milk”, and Cooking Companion will say “One and a half cups”.

Users sometimes need to adjust a recipe to change the quantity, substitute different ingredients, or adjust cooking times for non-standard appliances. Unlike most cooking applications, Cooking Companion makes these adjustments very simple. Cooking Companion even performs some of these adjustments automatically; for example changing cook time for higher elevation.

Many users plan meals ahead of time, and create shopping lists based on the required ingredients. Cooking Companion provides a calendar display that allows users to plan multiple meals ahead of time. It can generate shopping lists for planned meals, organized by the section of the grocery store where the ingredients are likely to be found.

### Three Example Tasks

#### Easy – Find and use a recipe.

Search for a recipe online using your smartphone to cook for your family (spouse and two small children). Your spouse likes pasta dishes so keep that in mind while searching for the dinner recipe. Verify that you have all the necessary ingredients and adjust the recipe serving to 4 people. Follow the recipe step by step from your phone while cooking.

Moderate – Find and use a recipe. Cook the recipe out of order and use substitution on ingredients.

Find a banana cake recipe online using your smartphone, and perform some of the recipe steps in a different order. Keep the ingredients list handy on your device. When asked for ingredients which you might not have in your kitchen, please substitute them with a closest match in your kitchen pantry. (For example, replace baking powder with baking soda and lemon juice).

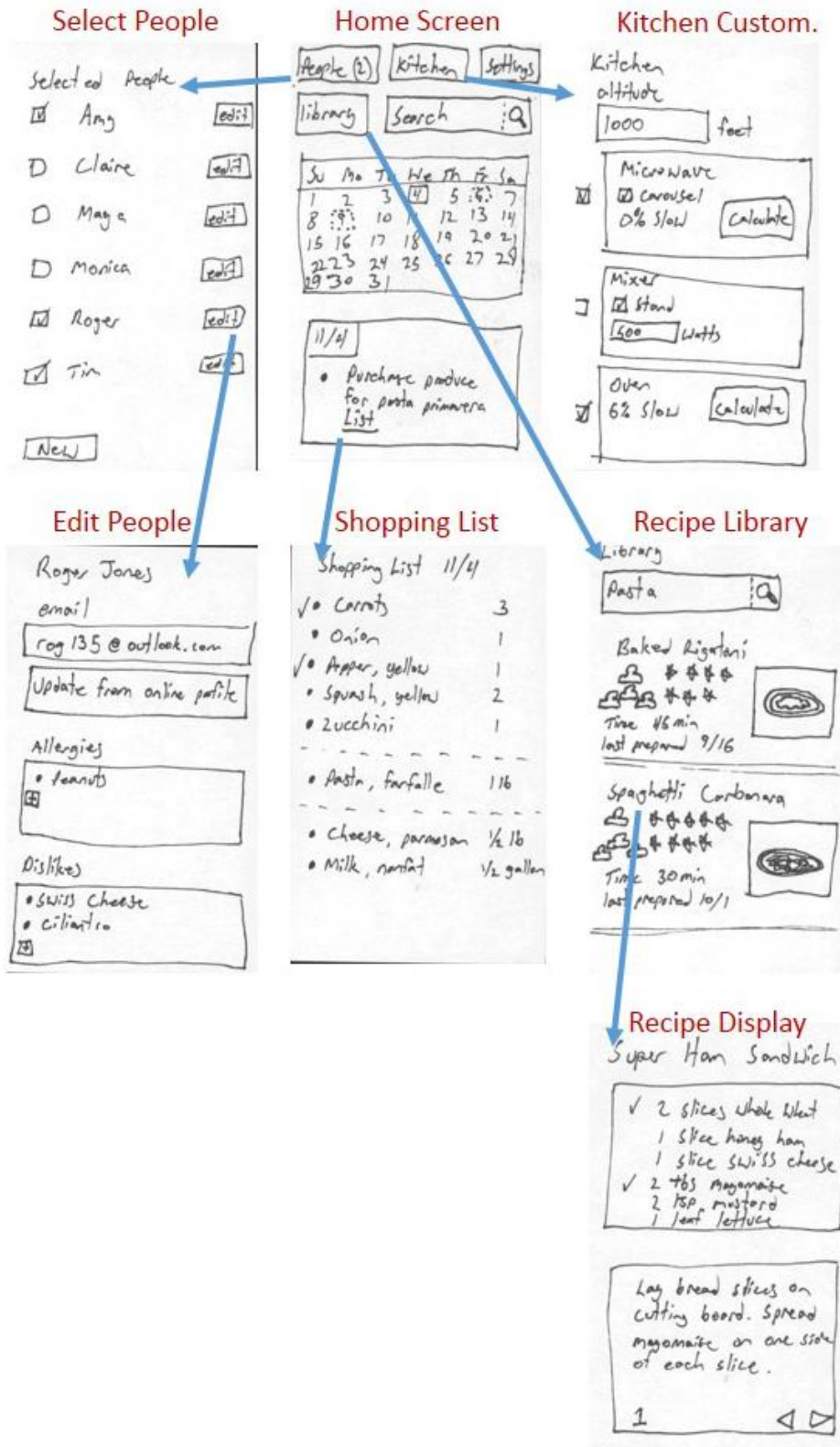
Difficult – Find and use a few recipes. Plan ahead and purchase ingredients for the week. Customize recipe for family and friends.

Pick out a few dinner recipes a week out ahead of time to plan using your smartphone. Also, pick out a Chinese dish recipe from a magazine and upload it to your phone recipe library. You will be having dinner with family friends on Thursday, so search your friend's profile page on a social app. You notice your friend is allergic to shrimp so adjust the recipe accordingly. Keep track of the total ingredients required for the week and purchase them all with a single stop shop at the grocery store. Be sure to search online for food discounts and bargain prices using coupons and discounts to save on food expenses.



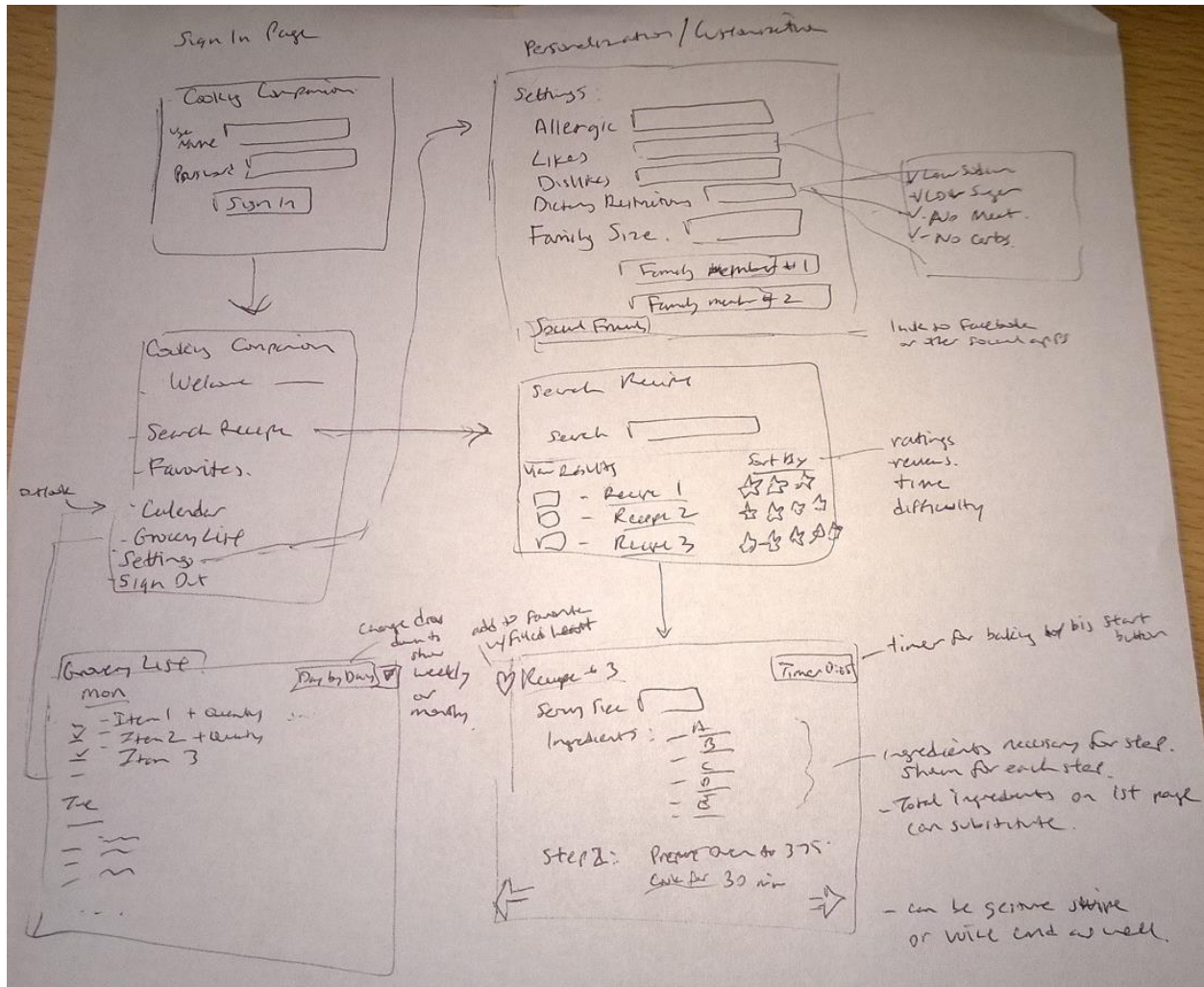
# Initial Storyboard Sketches

## Sketch 1



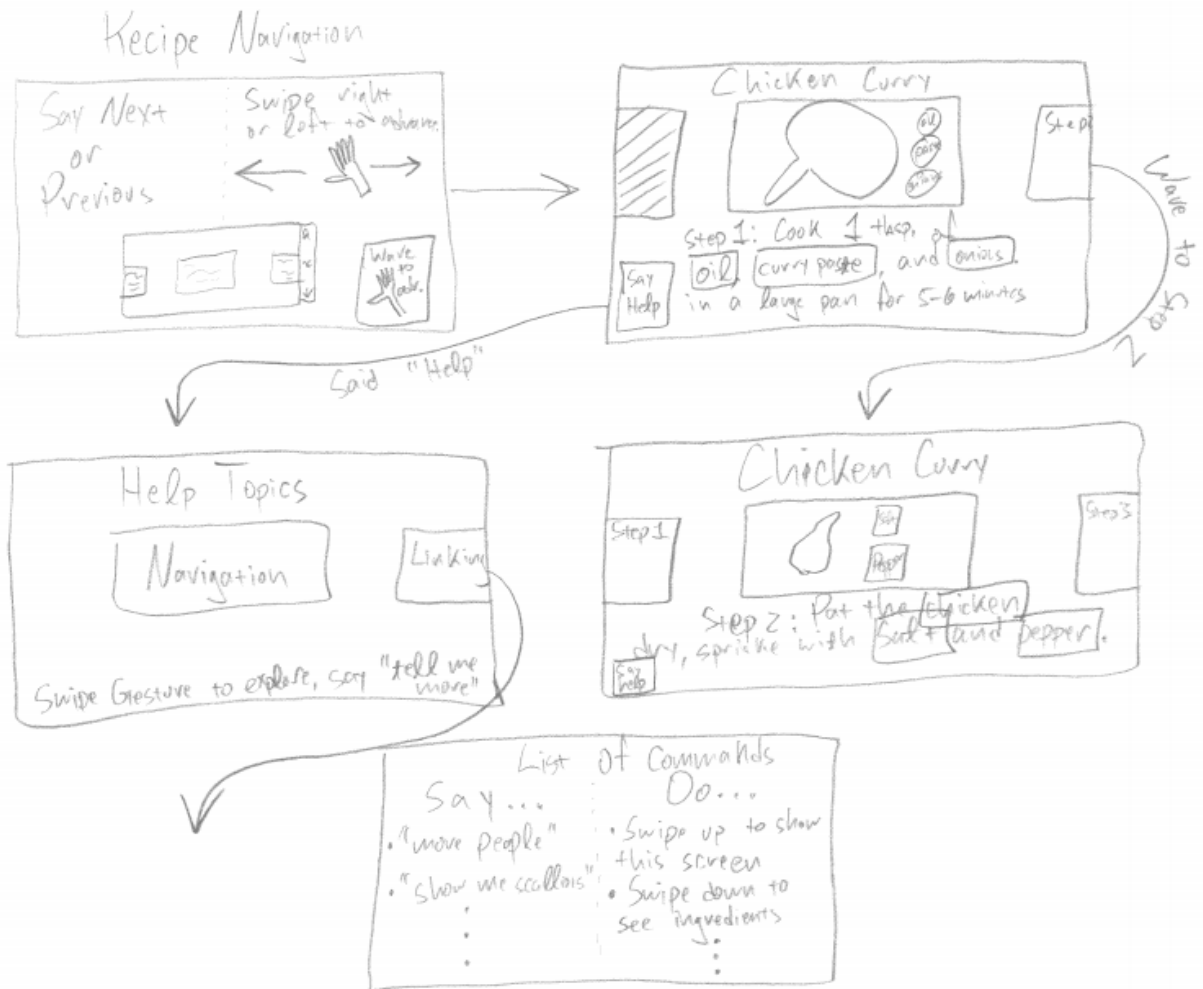
**Quick Summary Storyboard:** When the user opens the app shown in sketch 1, they are taken to the home screen. From there, they can see a calendar with meals and cooking related events. At the bottom of the screen is a summary of events for the selected day. Users can select a different day by touching it on the calendar. The buttons at the top of the home screen take the user to the screens shown by the arrows. Users can go back to the home screen by using the “back” button on their phone. From the recipe library, users can view a recipe by touching the recipe name. The recipe display always shows the ingredients at the top and indicates which ingredients have already been added. Instructions are shown one step at a time at the bottom of the screen. Users navigate between steps by touching the arrows. From the recipe screen, users must use the “back” button on their phone twice to return to the home screen. In this design, no title bar or on screen navigation bar were provided in the interest of saving screen space for content.

## Sketch 2



**Quick Summary Storyboard:** User begins with home sign in page. Upon log-in, they are directed to the navigation page where they can choose to search for recipes, look at favorites, calendar view, grocery list, settings, etc. Clicking on settings takes them to a page where they can customize their personal settings such as dietary restrictions, family size, and contacts for friends. Searching for Recipes takes users to a different page where after a list of results will show upon searched item, with links for more details as well as filters for sorting by ratings, reviews, cook duration, and difficulty. The grocery list page displays a checklist of ingredients to purchase with a view for day /week / month view. The recipe page shows all ingredients with step by step listing and ingredients required for step in between. It also has a timer for steps involving baking time with oven or microwave.

### Sketch 3



**Quick Summary Storyboard:** When the user enters the recipe to cook, a navigation page will display allowing user to enable hand gestures and voice for navigation. Clicking on the Help button or saying "Help" will also show the list of commands that Cooking Companion supports, such as swiping down to show ingredients for the required cooking step. Now navigation is simply done by waving without having to worry about cleaning up the screen display or washing hands each time in order to see the next step. Also, the user can change the ingredients simply by clicking on the item such as "salt" or "oil" and seeing a list of substitution ingredients that it allows.

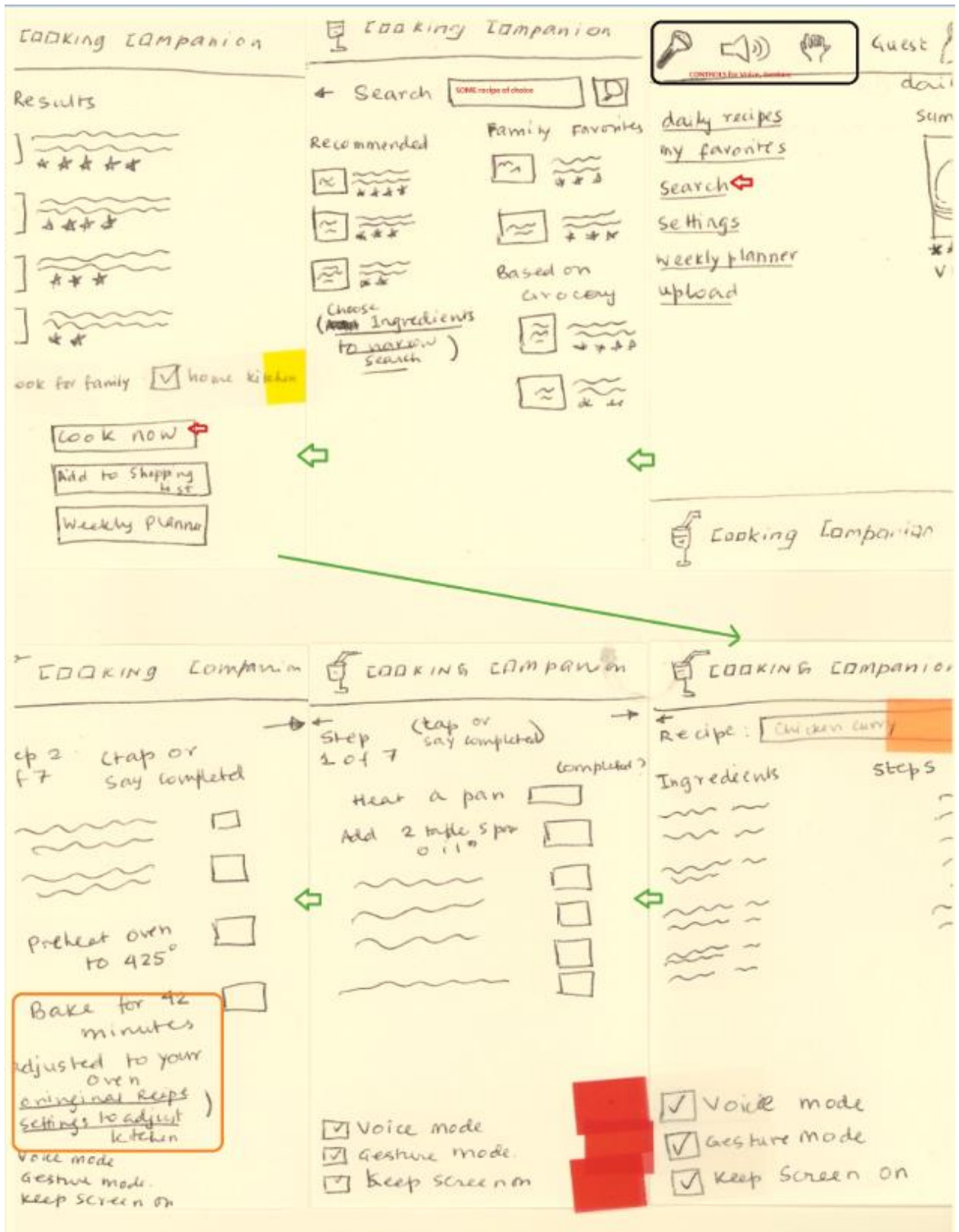
Sketch 4

The sketch shows three pages of a mobile app sign-up process for 'Cooking Companion'.

- Page 2 of Sign-up:** Features a header with a fork icon and the text 'Cooking Companion'. Below is a sign-in prompt: 'Sign in to your Cooking Companion Account'. There are input fields for 'user name' and 'password', followed by a note '(don't have an Account?)' and links for 'sign up now' and 'continue as guest'. An 'ENTER' button is at the bottom. A 'privacy notice' and copyright notice are at the very bottom.
- Page 1 of Sign-up:** Features a header with a fork icon and 'Cooking Companion'. It lists navigation options: 'daily recipes', 'my favorites', 'Search', 'Settings', 'weekly planner', and 'upload'. On the right, there's a 'Guest' profile icon, a 'dailyR' label, and a 'Summo' button with a circular icon and 'View' text.
- Page 3 of Sign-up:** Features a header with a fork icon and 'Cooking Companion'. It has a 'New Account' section with a 'Basic Info' sub-section containing fields for 'username\*', 'password\* (7-13 char)', 'First Name\*', 'Last Name', 'Age (yrs)', and 'Favorite Cuisine'. Below this is a 'Family Members' section with three rows of 'First Name' and 'Age' fields. At the bottom are 'Next' and 'Cancel' buttons, a 'privacy notice', and a copyright notice.

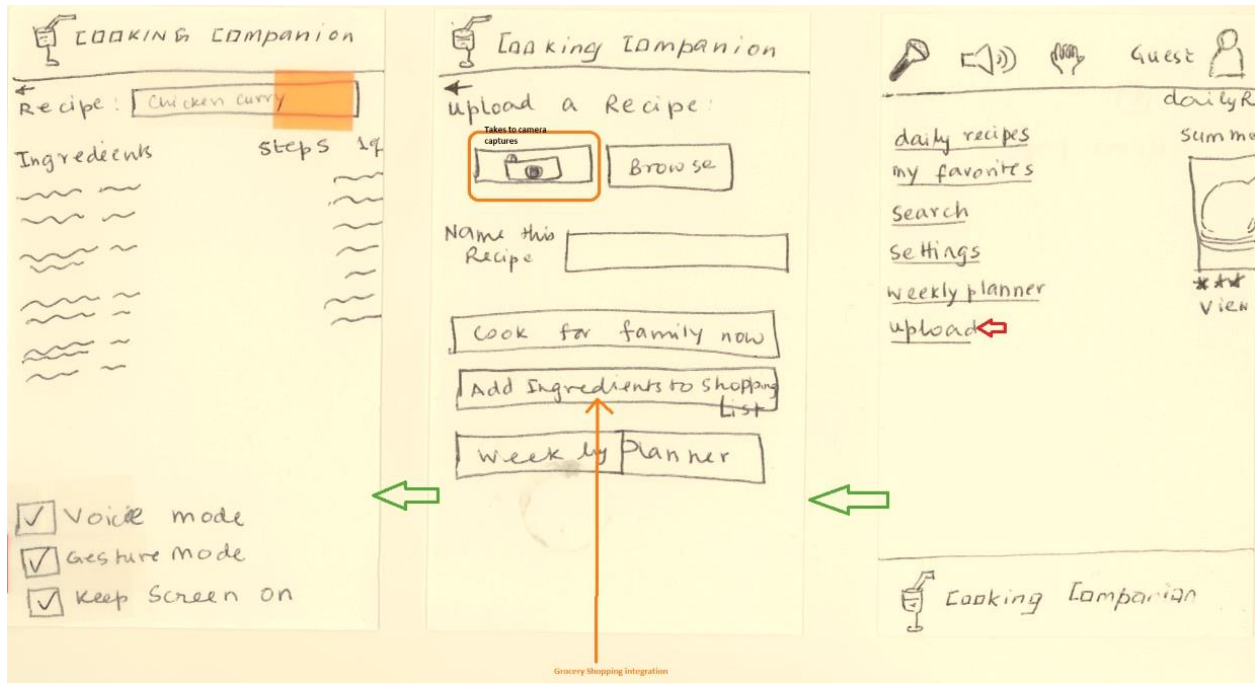
Page 2 also includes a note: 'Sign-Up Experience: User can continue as "Guest" or sign-up for an account (first experience) or see sign-in.' Page 3 includes a note: 'Sign-Up Experience: Asks for basic info and then about your family, likes preferences, gestures, voice, zooms off etc.'

**Quick Summary Storyboard:** One of the most important aspects of Cooking Companion is to “personalize” it and make it perfect for one’s family. The landing page (top-right screen on the picture above) shows a clean landing page. Note that it shows “Guest” as the current user. The user could easily tap on that and sign-in to the app using a user name / password. One of the possibilities is to tie this username / password with the Microsoft Account (MSA) or an Apple-ID that the phone is already aware of. The 3 screens below show a typical sign-up experience. Note that only username, password and First name are essential components but it is encouraging users to personalize. For example, once the user enters Family Details, cooking preferences as well as kitchen details, various aspects of cooking companion lit up. Let’s talk about a few examples. One of the most common tasks after searching for recipe is to cook it. Based on personalization, cooking companion is easily able to reduce the portion size based on family-size, adjust cooking time based on appliances as well as suggest cooking alternatives based on preferences. These delighters along the way to task completion help elevate Cooking Companion to become a true kitchen help from a mere recipe-search tool.



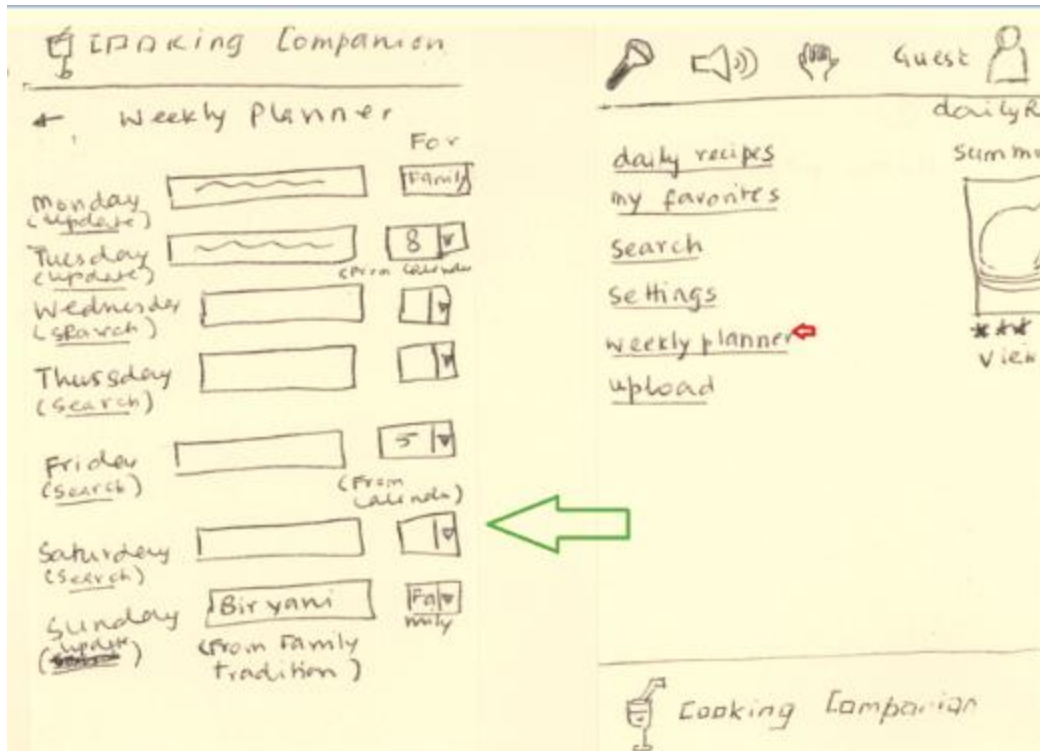
**Quick Summary Storyboard:** This picture shows how the Bake time was adjusted based on the oven. Also, search results are customized based on family favorites, grocery list, "Cook Now" automatically

adjusts the recipe for family size. Checkboxes next to steps help identify which steps are done (given one of the contextual inquiry result was that participants prefer to cook out of order). The picture also shows how to turn on different interaction model (like gesture, voice etc.)



**Quick Summary Storyboard:** This design above shows how a task around “click a picture to cook” could be enabled. From the home page, user would click on Upload and then take a picture on camera. This would allow taking a picture of a dish or a recipe from a magazine, OCR it to get to cooking.





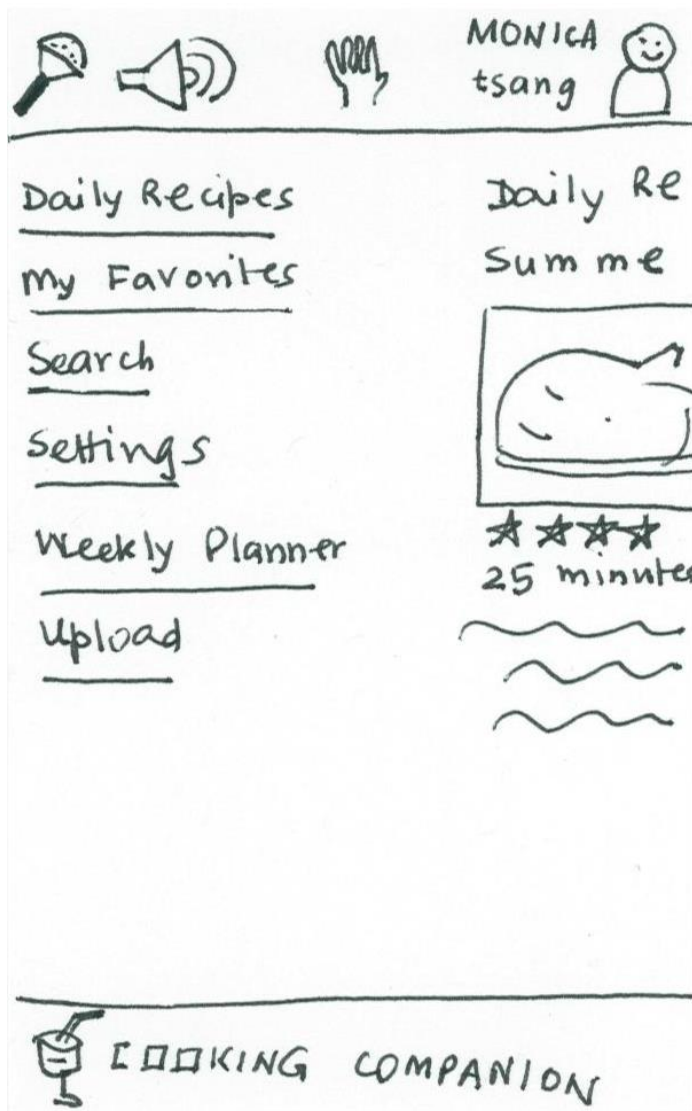
**Quick Summary Storyboard:** This is another example of how weekly planning could be done. It shows basic calendar integration and automatically updates the “Cooking For” column to be 5 for Friday.

## Best Design

At first, the four different sketches / models looked very different from each other. However, as we dissected into these sketches, we found that there are quite a few similarities on our view of the ideal model. Eventually no one sketch / design seemed to be perfect for all our tasks and we chose a combination of different sketches as our final design. The components to our best design choices are explained in the next few sections below.

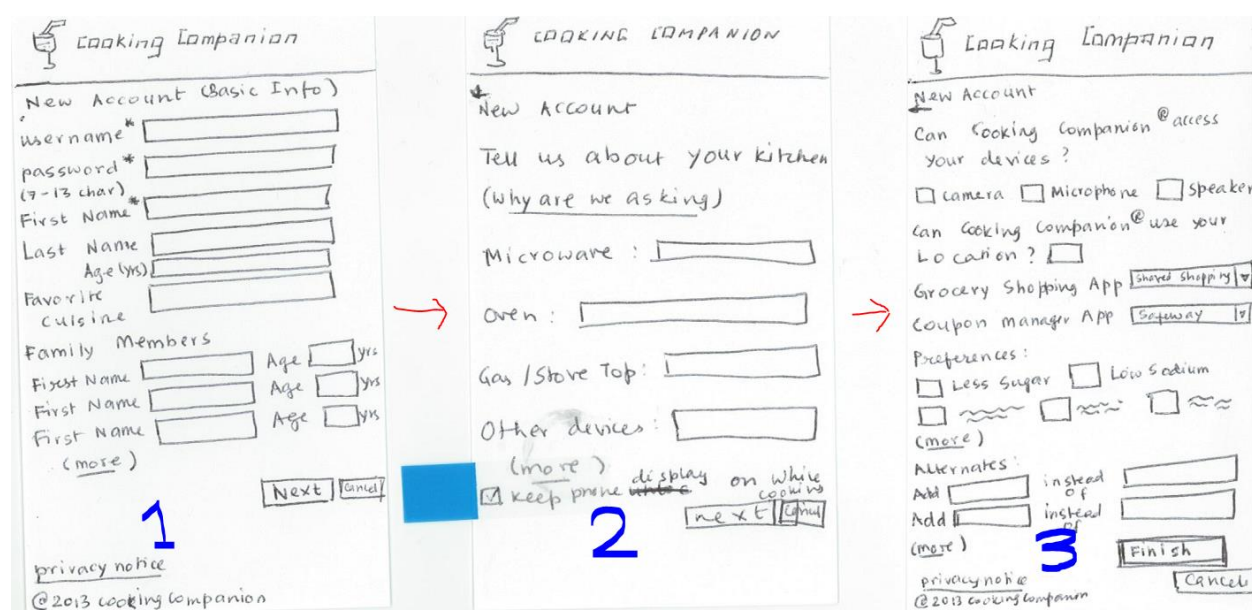
### CLUTTER-FREE LANDING PAGE

One of the key requirements for the landing page was to be clean and consistent with the rest of the application. We liked the home page design of sketch 4 for this purpose.



This landing screen is able to articulate clearly that the user who is using the application is “Monica Tsang”. At the top, we show what we call the Top-Bar – that has quick access to most essential interaction controls – microphone, speaker and gesture-mode. Tapping on the interaction controls toggles these modes on / off. The screen shows the entry points to the 6 most-basic activities. These are (a) Choose a daily recipe (suggested by cooking companion or pre-configured during weekly plan-ahead, (b) Looking at my favorites, (c) Searching for a recipe, (d) Updating Settings, (e) Planning ahead and (f) Uploading a recipe from camera or another application. Clicking on these links launched separate flows.

## PERSONALIZE



One of the most important aspects of Cooking Companion is to be personalized to be perfect for one’s needs. Towards this we carefully selected and chose the sign-up experience – mostly based on the sketch 4. When the user launches the app for the first time, she would be requested to create an account (though she could continue to use the application as Guest). The 3 pages above show the Sign-up experience. We evaluated options around (a) what should be mandatory fields (b) Should users see all three pages before they finish setting up, versus having a Finish button on every page, (c) How to address privacy concerns, and (d) should there be social aspects of the account setup.

**Mandatory Fields:** When users provide more information about their cooking environment and family, various aspects of Cooking Companion lit up. However, there are conservative users who are not very comfortable sharing all that information. Towards that, we decided on having the only 3 basic mandatory fields – Username / Password & First Name. Even if the user did not enter any other information, this basic data allows us to surface a good “Settings” experience later on where users

(being more comfortable with the application after using it for a while) could provide additional information.

**Finish on All Pages:** Heuristic Evaluation – User-in-control might suggest that we allow users to finish the account setup on each screen. However, most modern sign-up experience prefers users to visit all the screens at least once to know what’s out there. To mitigate concerns around Users-in-control, it allows a Cancel hook at every page and also makes fields non-mandatory. We followed that model in our design here.

**Privacy Concerns:** Privacy concerns are real. We surface a Privacy Notice link on every screen during setup. During initial brainstorming, we had ideas around asking users to update medical conditions (e.g., users with hypertension could be suggested low-sodium ingredients or recipes for diabetic users would be auto-adjusted to use less sugar or other alternatives). However, due to privacy concerns, we dropped this and instead presented these as cooking preferences for users to choose.

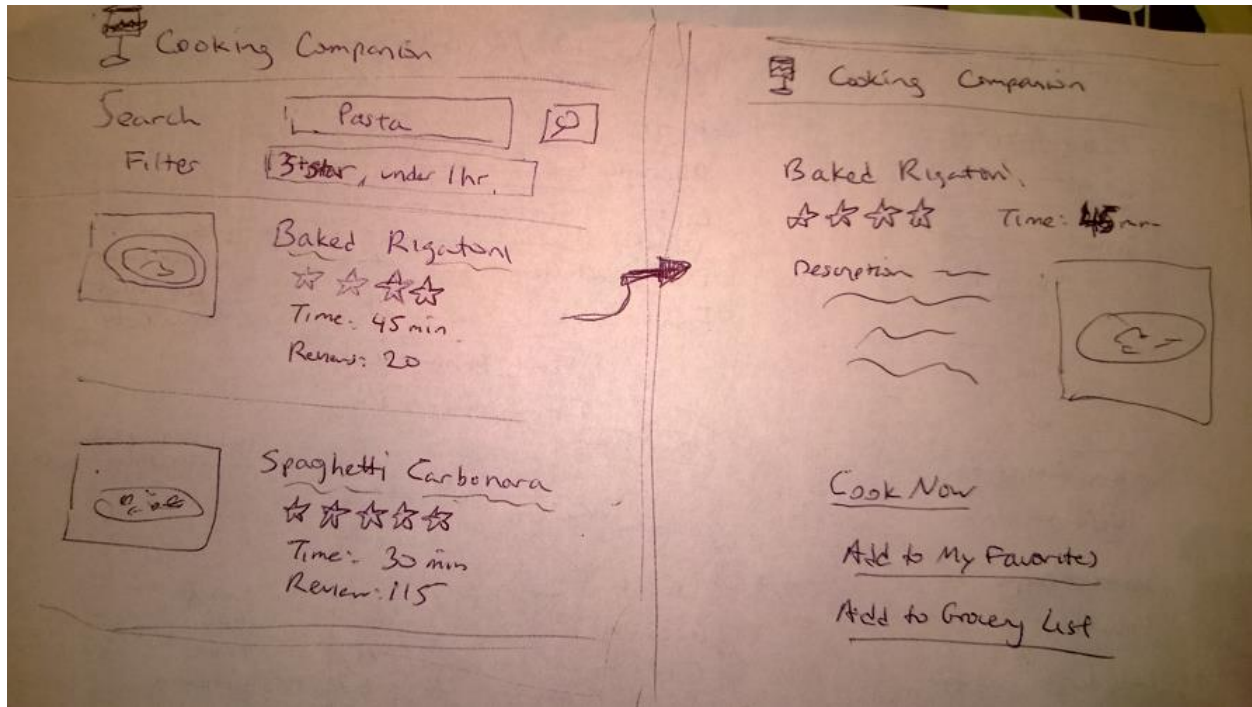
**Social Aspects:** During our initial designs, we also had thoughts around building social aspects in our design. One could share her cooking preferences socially. To talk about a specific scenario, Amy invites her colleague Tom over for dinner and using Cooking Companion, she not only found a nice recipe, she found the perfect one for the evening, based upon her and Tom’s preferences and recommendations. However, there are definite privacy concerns around this area, so we decided to drop this aspect in our scoping exercise.

## CONSISTENT LOOK-AND-FEEL

We also chose a logo for the cooking companion app (glass with a straw) that is then used consistently elsewhere in the system.

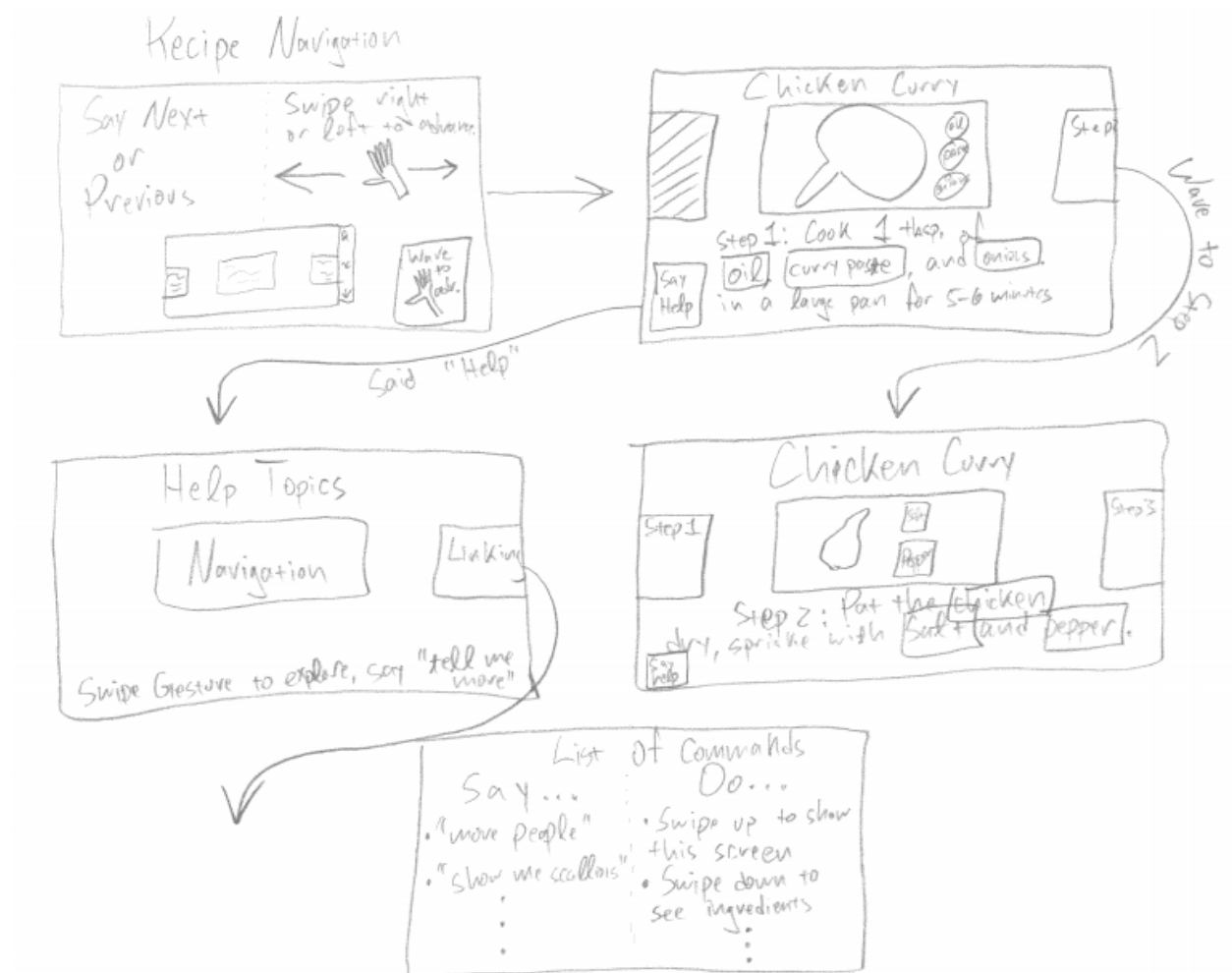


## SEARCH EXPERIENCE



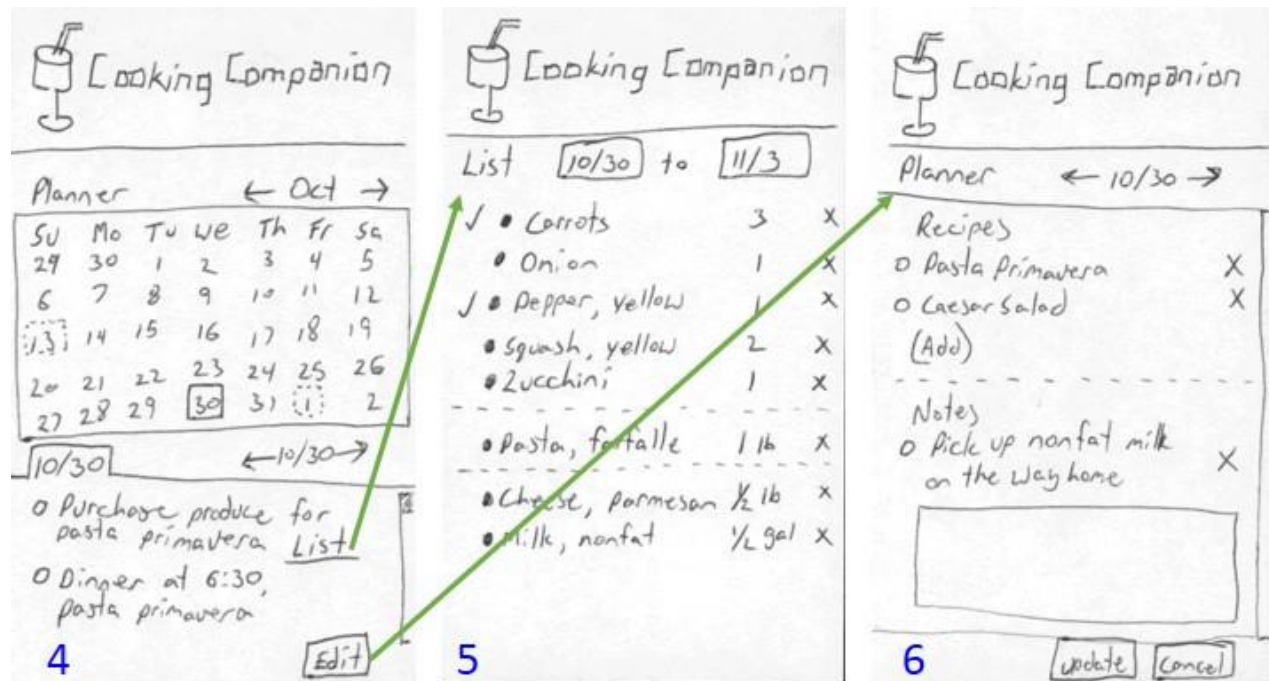
This design interface for the Search Experience was quite similar across sketch #1, #2 and #3, so we decided to combine all three into our final Search component. The user can enter in the textbox their search criteria, and can further refine their search based upon filters (cooking duration, star ratings, # of reviews, family preferences). Upon entering in their results, a list of recipes with illustrations is shown in the results view, with information on all the filters described. User can click on the recipe to get a detailed summary of the recipe, and find out more information related to it. For example, they can click on the Reviews to see what others have to say about the recipe. They can also choose to cook this recipe now, add it to their "My Favorites" recipe library, or add the ingredients to the grocery list for shopping later.

## VOICE & GESTURE NAVIGATION



We took Sketch #3 as it had the most detail for the actual recipe cooking navigation component. This feature enables the user to be able to interact with Cooking Companion without having to actually touch the phone display screen with messy hands, and also helps users follow along the cooking steps without having to walk back and forth to get the recipe information. The display is in landscape mode for better real estate usage. In the beginning of the start cooking site, a helpful tip is shown where the user is reminded that they can use hand gestures or voice to control the navigation. For example, simply swipe using a hand waving gesture, or say "Next" or "Previous" to move forward or backward to the next page. On each of the recipe steps, there is also a help button which brings up help topics and commands for the user in case he/she forgets. While following the individual steps of the recipe, the user can modify the ingredients and substitute it with an alternative ingredient. For example, while making Chicken Curry recipe in the sketch above, by touching on "onion", a popup list of alternative ingredients will be displayed. The user selects "green pepper" and Cooking Companion continues where it left off, while adjusting the recipe for the right amount of green pepper instead of onions to be used for the recipe.

## PLANNING



We determined that the most effective method of planning meals was to use a calendar display. This makes it easy to visualize important dates, and provides rapid navigation between events on different days. When a user touches the “planner” link from the landing page, they are taken to the planner calendar display (4).

The planner display shows a calendar of cooking events. The selected day has a solid box around it, and days that have cooking related events have a dotted box around them. The month can be changed using the arrow keys on either side of the month abbreviation above the calendar. The bottom half of the display shows events for the selected day. Users can choose a different day by touching it on the calendar, or by using the arrow keys on either side of the date below the calendar. Users can add or remove events for the selected day by using the “Edit” button.

When users click the “Edit” button, they are taken to the planner edit screen (6). The top of the edit screen shows recipes to be prepared on the selected day. Recipes can be removed by touching the “X” on the right side. Users can add recipes by touching “Add” at the bottom of the recipes section. When they touch “Add”, users are taken to the recipe search screen. When they select a recipe, they return to the planner edit screen. When users add a recipe, ingredients for the recipe are automatically added to their shopping list for the selected day. The bottom part of the planner edit screen shows a list of user entered notes. Users can delete notes by touching the “X” on the right side. Users can add notes by typing in the empty text box at the bottom. When they touch anywhere outside of the text box, the text becomes a new message, and a new blank text box appears at the bottom of the screen. Touching “Update” saves changes and returns to the planner calendar screen, while touching “Cancel” discards changes and returns to the planner calendar screen.

When a recipe is added to a day on the calendar, a note automatically appears reminding the user of the groceries that need to be purchased. The note has a link to a shopping list. When the user touches the link, they are taken to the shopping list page (5). The shopping list by default shows grocery items for the next 5 days, but this range can be changed by editing the dates at the top of the screen. Items in the list are organized by type (Produce, pasta, dairy, etc.) for easier shopping. Items can be checked off by touching them, or removed by touching the “X” on the right.



# Scenarios

## Three Example Scenarios

### Easy Scenario – Find and use a recipe

Monica lives with her husband and 2 kids (ages 3 and 7). She is cooking dinner for her husband's birthday. Her husband likes Pasta dishes. Monica does a quick search of her recipe library in Cooking Companion and selects a baked rigatoni recipe. She goes to the recipe ingredients list and verifies that she has all of the ingredients in her kitchen. Though the original recipe was meant for 8 people, Monica easily adjusts the recipe down to 4 with the help of Cooking Companion Monica and sees that the ingredients are also scaled down as well. Using her phone, she follows the recipe step by step. She uses gestures to move from one step to the next without having to touch the screen. She completes the recipe and the results are fantastic!

### Easy Walkthrough

When Monica first launched the cooking companion application on her smartphone, she signed up for an account. That allowed her to specify her family size, her cooking preferences as well as her kitchen appliances. Cooking companion got to know that she has 4 people (including 2 kids in the family), that she has an older oven that takes a little longer to bake and that she prefers Percorina Romano cheese to regular parmesan.

On the evening of her husband's birthday, when Monica searched and found the baked rigatoni recipe, Cooking Companion automatically adjusted it down for 4 people to start with. At the step of combining the eggs and cheese, the recipe was automatically adjusted to suggest romano cheese instead of parmesan. Also, while the original recipe is set for 40 minutes in the oven, Cooking Companion adjusted the bake time in the recipe to 46 minutes to accommodate for her oven. Along the way, Monica was able to follow the recipe with voice (e.g.: asking for next steps) as well with gestures (e.g.: waving to go next or back).

### Moderate Scenario – Use advanced cooking features – Find and use a recipe. Cook the recipe out of order and use substitution on ingredients.

Joe is a grad student and does not have the budget for a well-stocked pantry. He is taking a dessert to a pot-luck at a friend's house, and he uses Cooking Companion to find a banana cake recipe that everyone will appreciate. He begins cooking it immediately. Joe is an efficient cook, and does not like to keep walking back to his phone to check the ingredient list. Instead, he tells Cooking Companion to read the recipe step to him. Joe performs some recipe steps in a different order than the recipe lists them, and Cooking Companion is able to accommodate this based upon Joe's voice command by telling the phone to move on to the next step. When Joe gets to a point in the recipe that calls for baking powder, and he realizes that he only has baking soda, Joe alters the recipe and Cooking Companion suggests baking soda with lemon juice instead. Joe is pleased to see that he is able to continue on with his recipe steps even with the substitution mishap during cooking.

### Moderate Walkthrough

Joe logs in to his Cooking Companion and goes to the search screen and types “Simple Cake Recipes”. There are hundreds of results, and with limited time before the potluck party starts later in the day, he filters his search to recipes that can be done under an hour, with 5 star ratings and lots of positive reviews with only a handful of fruits such as strawberries and bananas. The Banana Cake Recipe caught his eye and he quickly glances at the description and the number of ingredients. When Joe is happy with his decision, he clicks on Cook Now and it takes him to the Recipe Navigation page to begin cooking. Joe toggles on the voice and gestures icon so that he doesn’t have to walk back and forth to his phone to get the recipe and sets the device up right.

As Joe goes through the recipe steps out of order, he tells Cooking Companion to read the recipe steps to see where he is at. When Cooking Companion replies with a step that Joe had already accomplished, he quickly interrupts the app by saying “Next” and in doing so, it skips forward to the next step while marking the previous step complete. When Joe gets to the step where he needs to add baking powder (which he has none), he adjusts the ingredients by tapping on the baking powder ingredient and seeing what other alternative ingredients he could use. Joe sees that baking soda with lemon juice is a good substitute, and so he taps on the ingredient and continues on where he left off. Upon getting to the step where Joe sticks his cake batter into the oven, Joe yells “Start Timer”, and Cooking Companion then starts a countdown timer of 45 minutes where it will alarm and alert Joe when it reaches 0.

### Difficult Scenario – Planning and integration – Find and use a few recipes. Plan ahead and purchase ingredients for the week. Customize recipe for family and friends.

Robin works as a Software Engineer and lives with her fiancée. Given that she typically has a busy schedule throughout the week, she prefers to plan her dinner plans for the week well ahead of time. She picks up a few recipes suggested by Cooking Companion, and also takes a picture of a Chinese dish from a magazine that she is reading using her smartphone. The picture is imported into Cooking Companion and this new information is now updated into her recipe library. Cooking Companion sends an alert through its calendar reminding her that Josh and his wife would be over for dinner Thursday. Robin has recently resolved to cook healthier meals, and decides to adjust her recipes to reduce sodium. She updates her profile, and her recipes are automatically adjusted. Based on her choices for the dinner all week, Cooking Companion is able to plan her grocery list. As Robin heads out grocery shopping Sunday evening, she checks Cooking Companion grocery list for the week, and checks them off as she purchases them. She is confident that she got all ingredients covered for the week.

### Difficult Walkthrough

While at her friend's house, Robin logs into Cooking Companion and touches the "Upload" link. This takes her to the recipe display screen, where the text fields are editable. She snaps a photo of the Chinese dish from the recipe she is reading, and types the name of the recipe at the top of the screen. She then touches the "back" button on her phone to return to the landing page, and the recipe is saved. When she gets home, she logs into Cooking Companion again and touches the "Weekly Planner" link. This takes her to the planner screen (4). She touches the date on the calendar for next Monday to select the date. She then touches the "Edit" button at the bottom of the screen, which takes her to the planner edit screen (6). The "Recipes" section is empty. She touches "add" which takes her to the recipe search screen. She enters "pasta" in the search box, which shows a list of pasta recipes. She taps

"Baked Rigatoni", which selects the recipe and takes her back to the planner edit screen (6). "Baked Rigatoni" is now listed as a recipe for Monday. She clicks "Update" which saves changes and takes her back to the planner screen (4). She then touches the date on the calendar for Thursday. She touches the "Edit" button to go to the planner edit screen. On the planner edit screen, she touches the empty text box in the "notes" section and types "Josh and Katie coming over for dinner". She clicks "update". The note is saved in her Cooking Companion calendar, and is pushed to her fiancée's calendar as well. Robin uses the back button on her phone to return to the landing page. She chooses "settings" and pushes "next" twice to get to settings page 3. She checks the "Low sodium" box, and clicks "Finish". She is returned to the landing page and her recipes are updated. When Robin gets to the grocery store, show opens Cooking Companion and selects "Weekly Planner". This takes her to the planner screen (4), where there is a reminder about shopping for groceries. She touches the "List" link in the reminder and is taken to the shopping list page (5). As she puts items in her cart, she touches them on the list and they are checked off.