CSEP510, Spring 2012
Midpoint Project Report

Restaurant 2.0

Team:

Krists Auders
Marc Beitchman
Danny Draper
Dirk Groeneveld

Problem Overview and Solution:

Although restaurants currently make use of software systems and services for some common tasks, there are many areas of operating a restaurant where software has not been considered to improve the dining experience and efficiency of restaurant operations. The goal of the Restaurant 2.0 project is to explore and discover ways that current developments in ubiquitous computing can improve restaurants. The following report explains the findings of the project and explains the design process for the initial design of the system interface.

Contextual Inquiry Participants:

When initially considering which type of group we wanted to focus on for our contextual inquiry, it was clear we needed a strong focus. We decided to focus on the conventional "gastropub" style restaurant. This usually means a restaurant which has a strong focus on food as well as drinks, and generally a slightly more relaxed atmosphere. One such place is the Brave Horse Tavern, a well-known Tom Douglas restaurant in the South Lake Union neighborhood. It has an impressive Beer and Cocktails menu, along with a simple-yet-impressive food menu that is also a highlight of the restaurant/bar. This is where we decided to conduct our contextual inquiry, as it was very close to our ideal target.

Our first participants were "Sarah" and "John." They were a local Seattle couple who were visiting the restaurant for a casual weekday dinner. John had been to the restaurant before, but his wife Sarah had not. We observed them through the beginning stages of their restaurant experience. This meant we observed them upon entrance into the restaurant, while they looked for a table (it was seat-yourself), through finding a table and deciding what to order, and finally placing the order. Our role of apprentice was simply following them, asking them questions about their actions and process, and generally acting as a member of their party. We didn't observe through the whole meal, as it was clear they wanted some personal time together.

Our second participants were “Craig” and “Jake.” Craig is an engineer for Boeing in Tukwilla, and Jake is an insurance agent working in Bellevue. Each lived in the cities in which they worked. Jake was treating Craig to beers and appetizers for helping him move earlier in the day. Jake had been to the restaurant before, but Craig had not. They were both smartphone owners, but neither of them used their phones during the course of the meal. Our observation of Craig and Jake began after they had found a table, but before they ordered, and lasted through the meal and paying of the bill.

Our third participants were “Linda” and “Robert.” They were at the Brave Horse to celebrate their fourth anniversary. They both lived in the Seattle area. While they were out for their anniversary, they didn’t like to make it a “big deal” and liked to keep it casual. They were both iPhone owners, and they both used their phones throughout the meal. We observed this couple in the later stages of their dining, after finishing their meal, but before they paid the bill and left the restaurant.

We also had several smaller observations and interactions with other patrons at the restaurant, which yielded valuable results, but these three subjects were our primary subjects in the inquiry**.**

Contextual Inquiry Results:

The primary tasks and themes of our participants, at the highest level, were remarkably (although not unexpectedly) similar. The Brave Horse is a food and drink establishment. The participant’s tasks were simple – Find a seat, decide what to order, order it, eat it, maybe order another drink, pay the bill, and leave. Most people familiar with dining out will recognize this task flow. However, the particulars of each participant revealed different takes on each task. The varying nature of the needs of customers depended on several factors, including their experience at the restaurant in the past, their food and drink preferences, their overall pickiness, and several other factors.

Our first participants, Sarah and John, were out for a casual dinner together. They were a good example of how previous visits affect the way customers order. John had been to the Brave Horse before, so he did not even look at the food menu. He knew the exact burger he wanted. He did peruse the beer menu, looking for (and deciding on) an IPA, which he hadn’t tried yet. Sarah, on the other hand, had never been there before, so she was taking in the entire menu at once. She ultimately asked the bartender for a recommendation for a “fruity drink”, and actually received two different samples then picked the best one. After perusing the food menu, she ended up choosing the same burger her husband was getting, relying on his knowledge and preference.

The second group, Craig and Jake, were out as a “thank you” to Craig. Jake had been there before (and was how they ended up there in the first place), and yet again we saw previous experience dictating current selections. Craig deferred entirely to

Jake's recommendations for appetizers (although partially this was because Jake was paying). Craig perused the beer list the entire time until the waitress approached to take their order (he did not decide before hand). Jake decided his beer selection based on the recommended beers section, saying that it was likely the best way to find well-regarded local and seasonal beers. The waitress informed Craig that his first choice was actually no longer available, and she recommended a different beer, which he accepted. After the waitress left, he expressed frustration that the beer was unavailable. He said that he wished he would have known, so he could have considered a different beer ahead of time. We later discussed the notion of user ratings of particular beers, which was well received. They said that while server's recommendations were sometimes helpful, they remained dubious of their overall effectiveness. They liked the idea of more general recommendations, as well as recommendations from the head chef or other notables. They only ordered one round of drinks, so they got their check, paid via credit card, and promptly left.

Linda and Robert, the participants in our third group, were there celebrating their fourth anniversary. Neither of them had been to the restaurant before, but they were there from knowing it was a Tom Douglas restaurant. They both ended up ordering based on server recommendations, because they were unsure of what they wanted and were "indecisive." Yet again, we found that those there for the first time differed to a more knowledgeable source. They were also receptive to the idea of other diner recommendations, but they came down on the other side of the fence from Craig and Jake, saying that they would actually trust waiter recommendations first. Between finishing the meal and getting the bill, they were both using their iPhones. They remarked that then would have been a good time to rate and review their meal, as they didn't have much to do anyways. They didn't like the idea of entering text for the meal, but they thought a star rating would suffice.

Looking at the cumulative results of our participants, it's clear that both a customer's previous experience, as well as servers themselves played a big part in the dining process. Something we realized was that the server's interaction with the customers is essential. Any attempts to remove the customer-server interaction would likely hurt the overall experience. In fact, in several additional cases, we say many customers waiting idly for their waiter to stop by to either place another order or signal they want the check. In one case, we actually observed a woman forced to physically grab an aloof server as they walked by in order to place another order.

The people we observed relied on both people they knew, as well as people they didn't, in order to have best dining experience possible. It's clear that they want more information and a faster response time, not a complete reworking of the dining experience. They like talking to servers, they like receiving recommendations. We believe we can augment what already exists to make the experience even easier and more successful.

Answers to Task Analysis Questions

1) Who is going to use the system?

Diners in casual restaurants will use the system.

2) What tasks do they now perform?

The current tasks diners perform are deciding what to order from the menu, ordering, requesting special service and paying for their order.

3) What tasks are desired?

Diners usually like efficient service. They want to find food to order and order it in a reasonable amount of time. Diners want to be checked on frequently in case they have special needs. Finally, diners would like to receive their bill and have it picked up in a timely manner so they do not have to wait too long after finishing their meal.

4) How are the tasks learned?

Tasks are learned through personal interaction, past experience and personal research such as reading reviews. The dining experience is different based on whether the diner has been to the restaurant previously. This was observed multiple times during the contextual analysis. Generally, people who had been to the restaurant before already knew what they wanted without looking closely at the menu. We observed that first-time diners generally had a harder time making ordering decisions.

5) Where are the tasks performed?

The tasks are performed in a restaurant at a table or bar.

6) What is the relationship between customer and data?

The customer is presented the set of items that are available to eat (also what is not currently available).

7) What other tools does the customer have?

The customer may seek more information about the restaurant or specific menu items through personal interaction or finding written reviews on the web.

8) How do customers communicate with each other?

Customers are usually seated at separate tables and usually only communicate with people at their table. In certain cases, such as bars or communal tables, customers

are more likely to interact with other customers that they do not know personally.

9) How often are the tasks performed?

The ordering task happens multiple times per visit. Payment usually occurs once per visit.

10) What are the constraints on the tasks?

The constraints are that service must happen in a reasonable time for ordering, payment and other service.

11) What happens when things go wrong?

Customers have a poor experience and do not return to a restaurant and do not recommend the restaurant. This results in a loss of repeat business for the restaurant, which is a major issue.

Three Supported Tasks

To write proper tasks, we must first consider the main features and functions of our interface:

Easily find menu items of all types
Remember favorite menu items
View detailed information and customer ratings of menu items
Request to talk to a real person (waiter) for many reasons
Rate menu items
Pay the bill, either by splitting it or paying the whole thing

The tasks must utilize as many of these features as possible, so we start with a simple task to test the main menu interface.

1) You arrive at your favorite pub, you know exactly what you want, and you want to get it fast. Order the Royale with Cheese and a Quentin's Dark Ale. You also want a dessert you had here last time; you can't remember its name but remember that it has always been the highest rated dessert.

That should give us a fair idea of how usable the main interface is for someone who knows what he or she wants. Next, we must test the payment and rating flow. This can be more complex, so it will be the moderate task.

2) You have just finished your meal with two of your friends and you're ready to pay the bill. You wish to split the bill between all three of you, so go ahead and pay for your part first. You loved the Royale with Cheese, so give that a 5 star rating before you pay. Your beer and dessert were good too, so give those 4 star ratings.

We should now have a good understanding of how usable the main functions of the interface are. To further test some more complex ways a user could use the features available, we have a complex task.

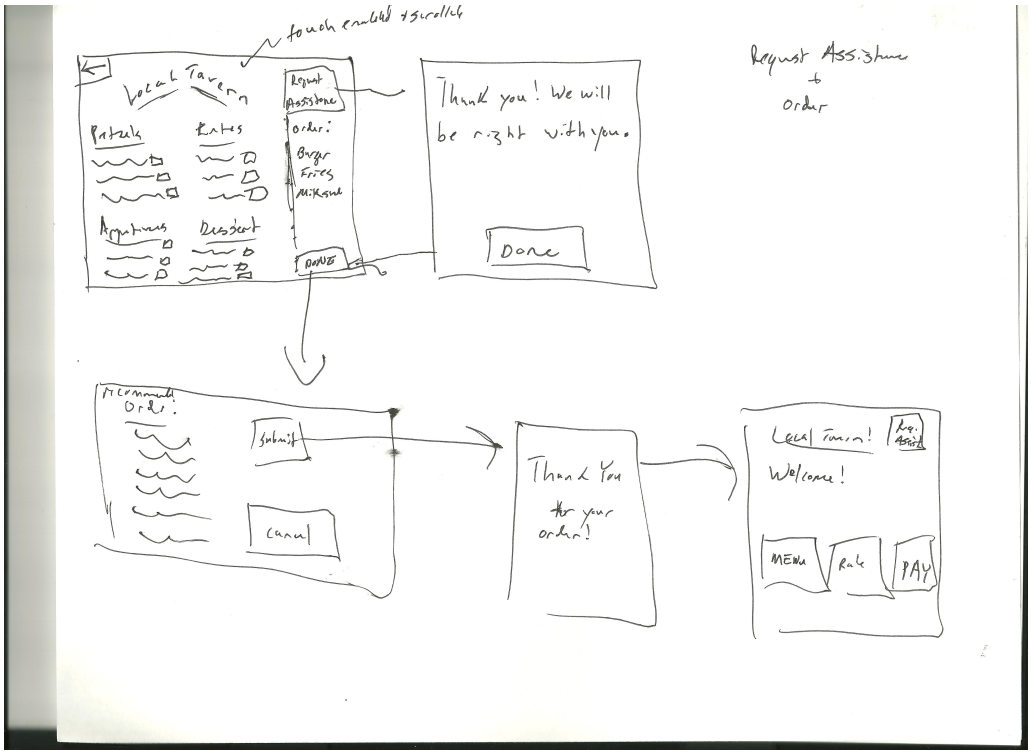
3) You have just arrived at a new pub, and you'd like to order a main entree, a drink and a dessert. However, you are vegetarian. Find and remember at least three vegetarian options for your main entree, then choose the one with the highest rating. For your drink, find any dark and local beer. For dessert, order the one with the least calories since you're watching your weight, and make sure it is a vegetarian dish.

Initial Storyboards:

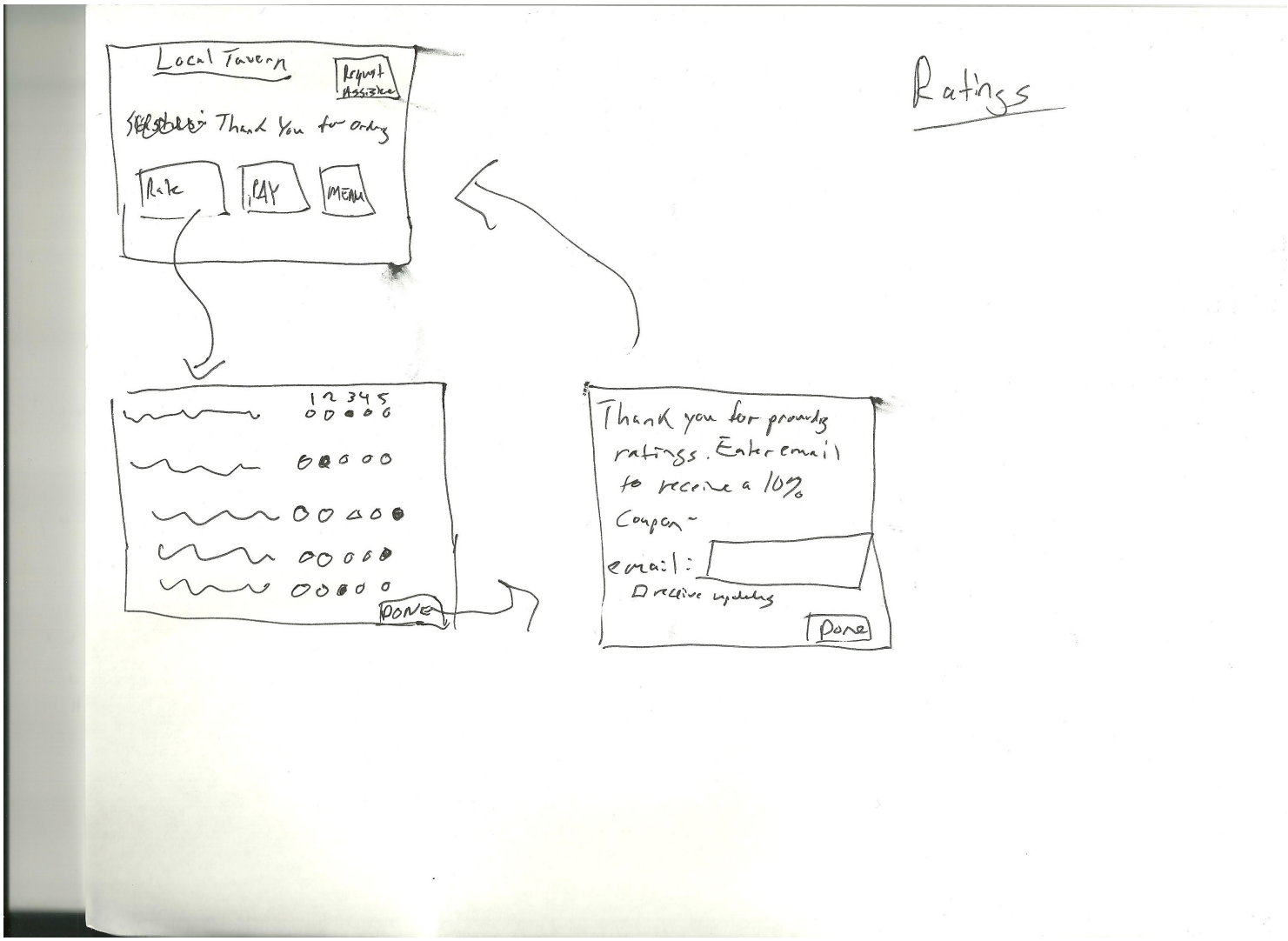
This section shows storyboards from the initial stage to the final concept. The group presented individual ideas by drawing on white boards. Each member of the group had different ideas and had focused on different parts of the tasks. The final interface design is a combination of our ideas and not derived from one single early idea.

These storyboards represent early ideas for the interface.

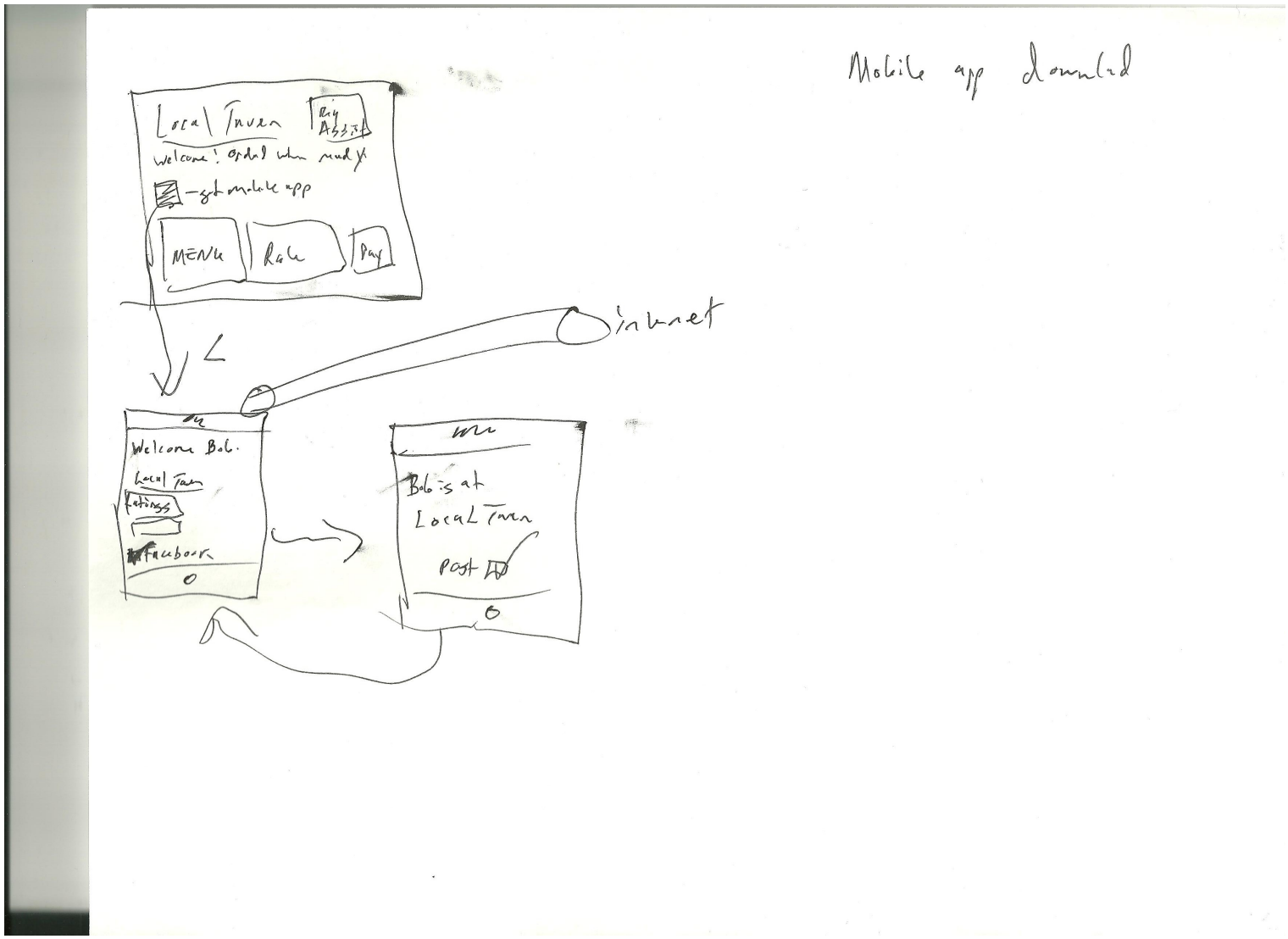
The following storyboard shows an interface design for viewing a menu and ordering. The screen on the on left shows the menu with the request assist button that is on every page. Easily being able to request assistance is an important feature that we expose on most pages.



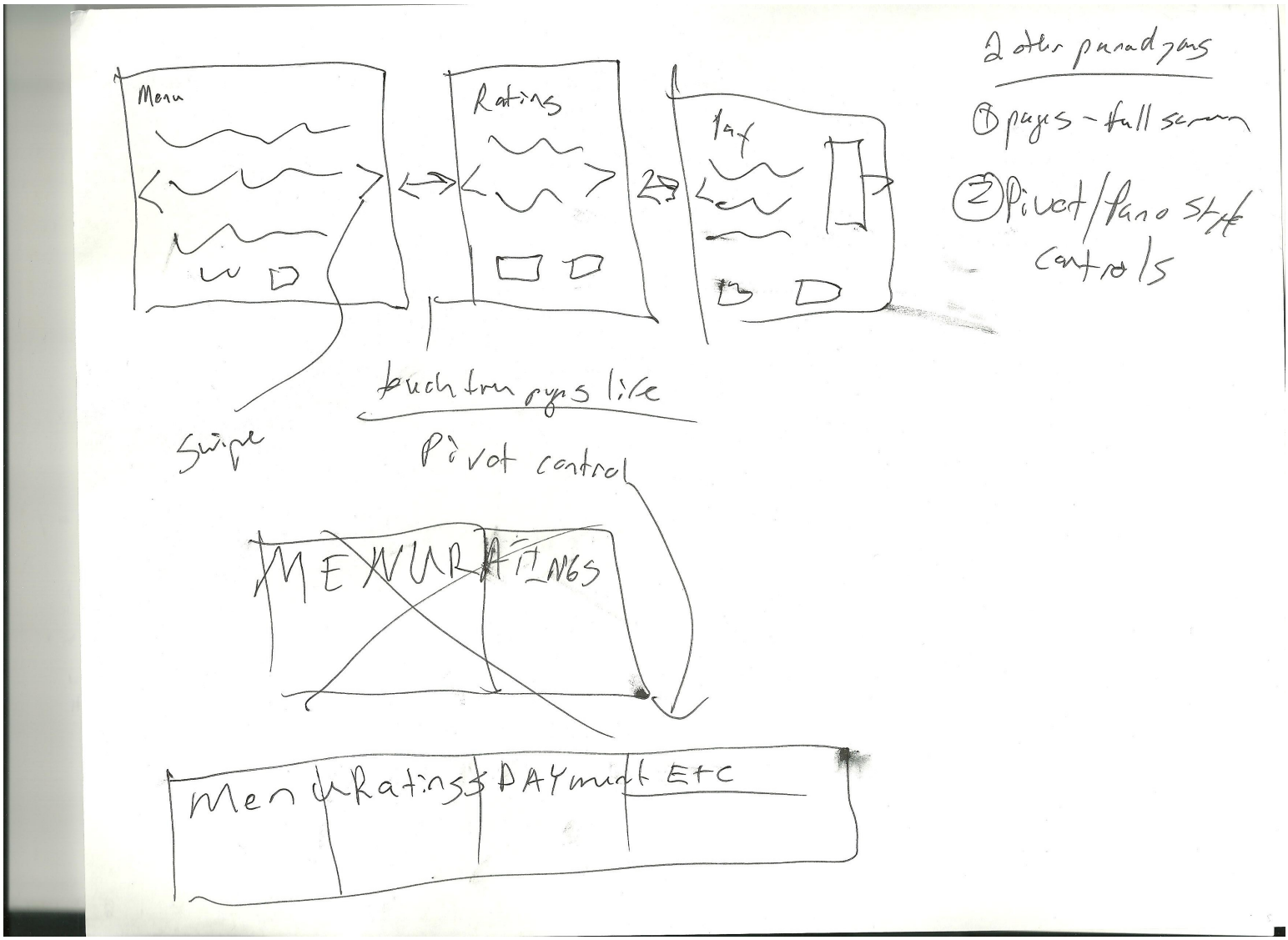
The following interface shows an initial workflow for rating items.



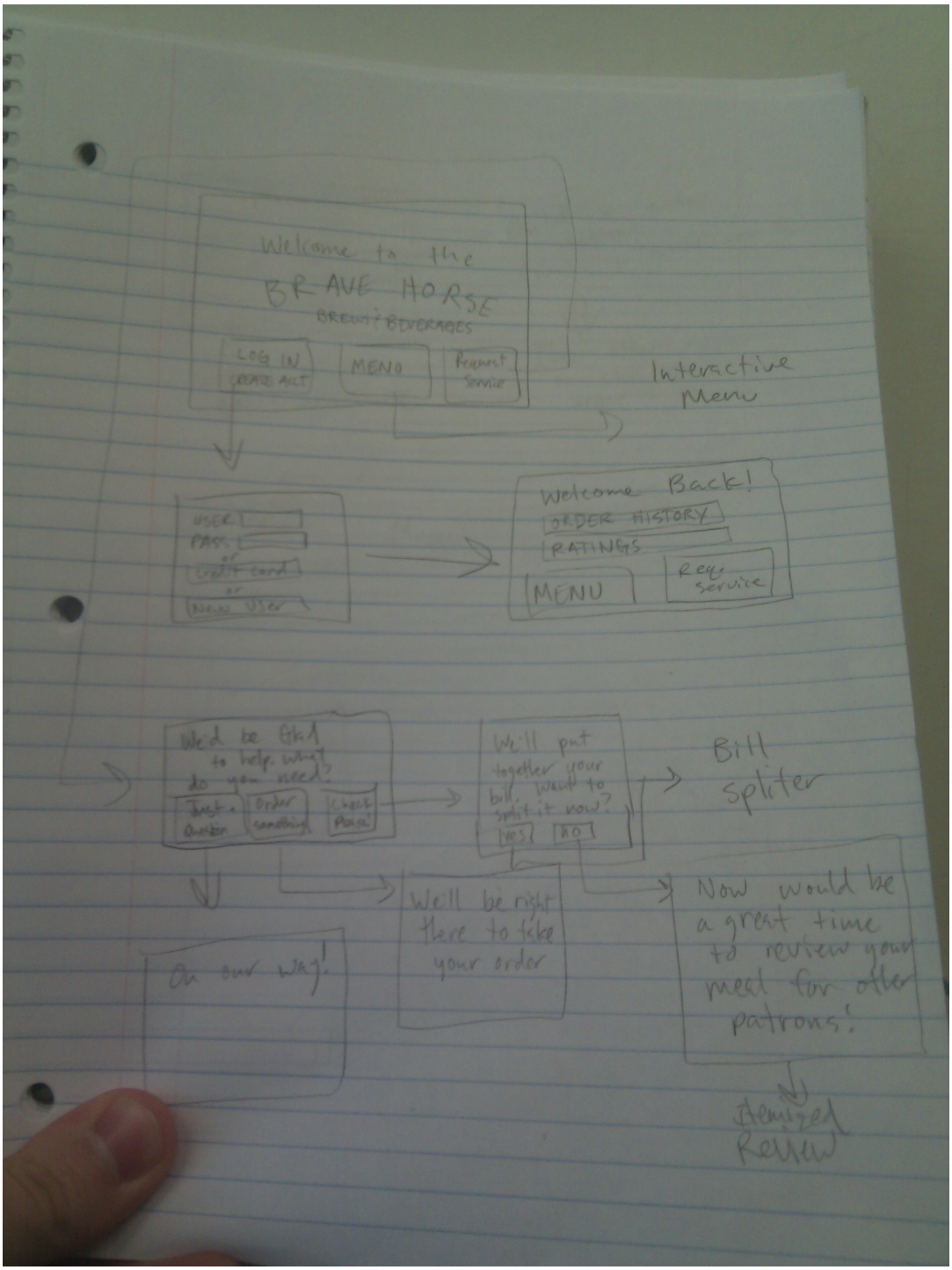
The storyboard below shows a scenario of downloading a companion app for a smart phone from the main interface that is on the table at the restaurant.



The next storyboard shows possible page and navigation designs for the interface.

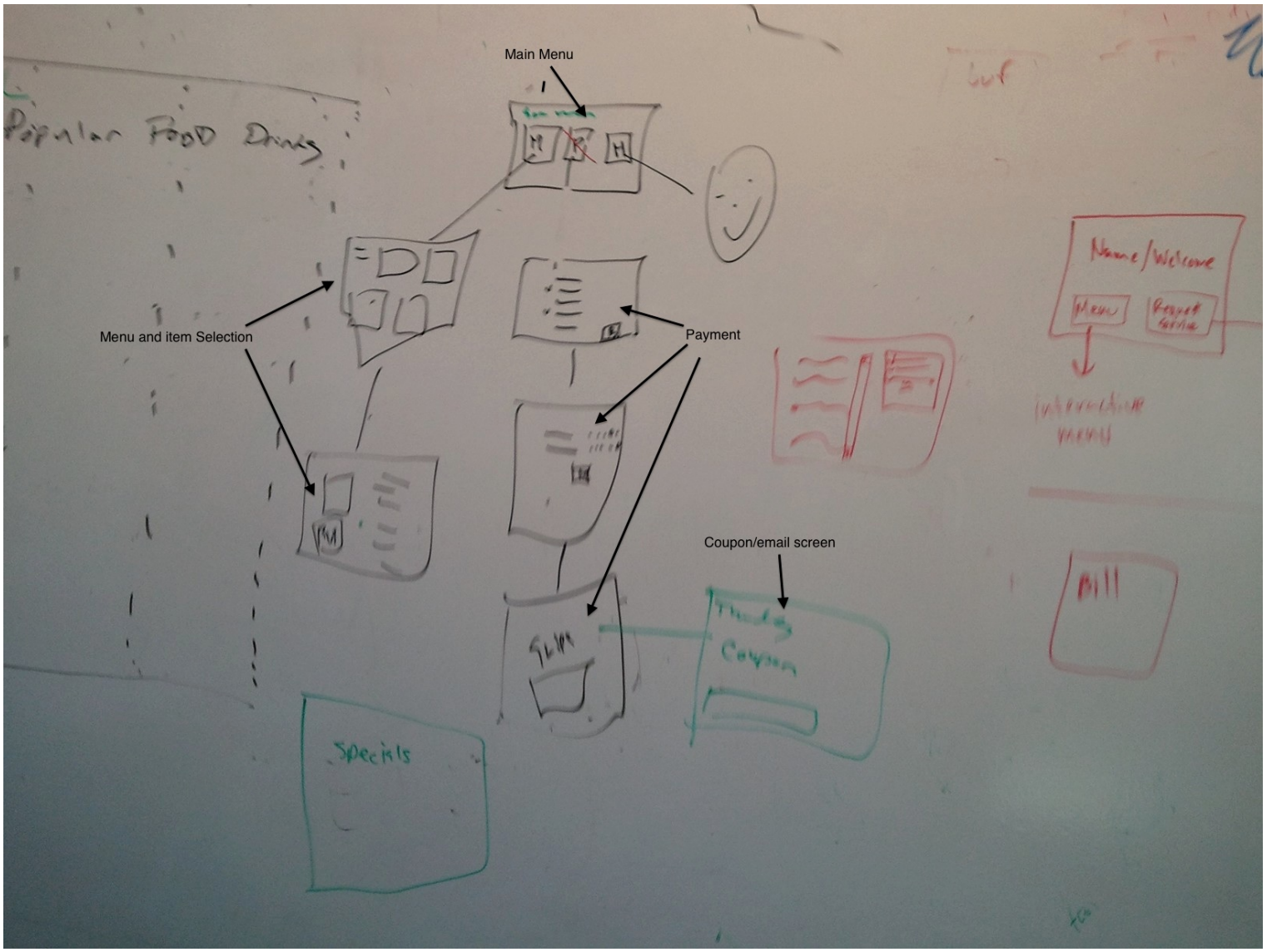


This storyboard depicts a system that is based on a consistent home page, and then three main areas of navigation -- User Accounts, The Menu, and Requesting Service. The main design goals of this storyboard are that it is easy to use (simple flow, large buttons, user shouldn't get lost), and that it should integrate well with the "classic" restaurant experience (you can't just ignore the old model, people want this still).

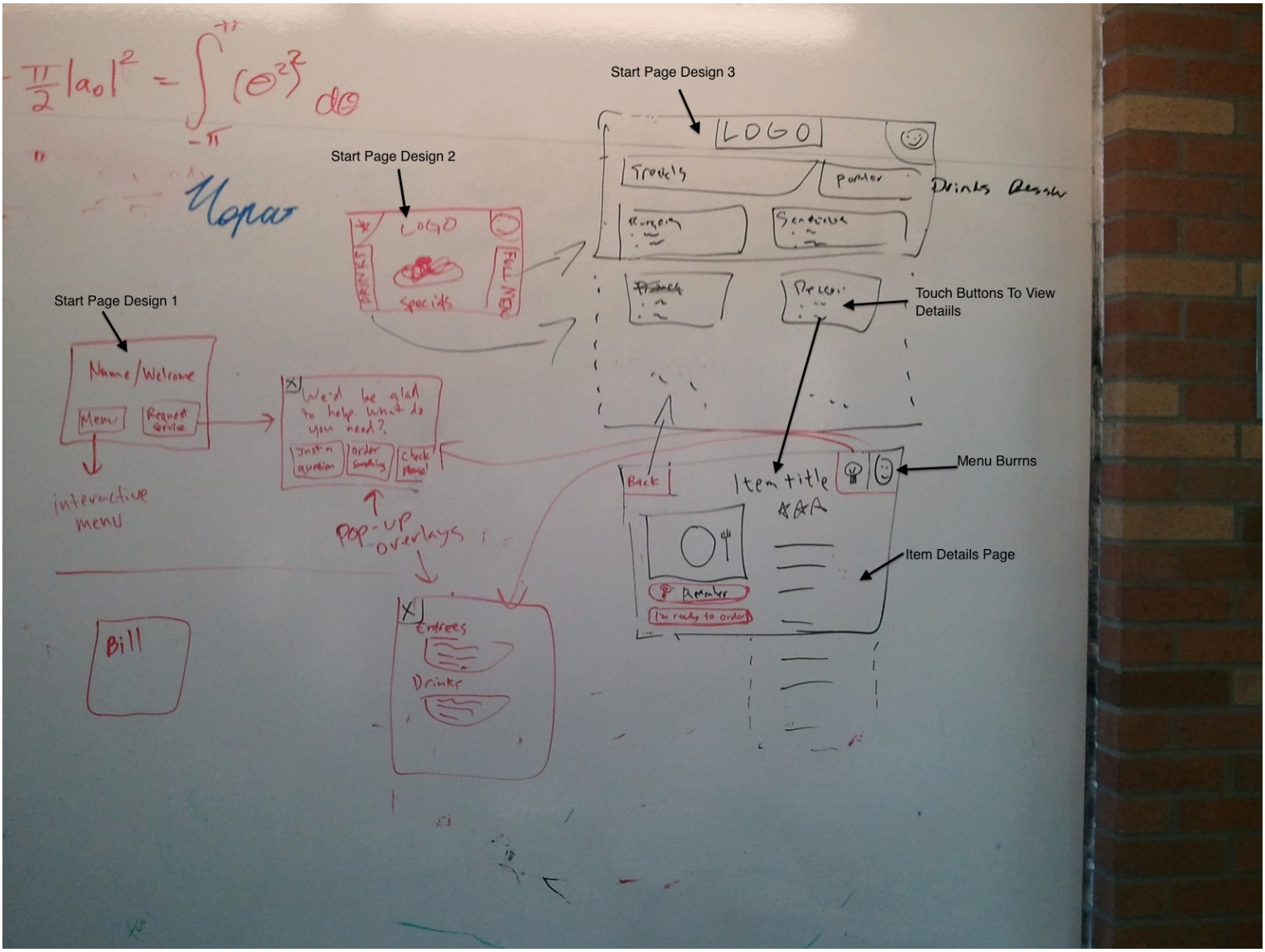


The following storyboards are from a later design session and show a clearly where the ideas for the final interface come from.

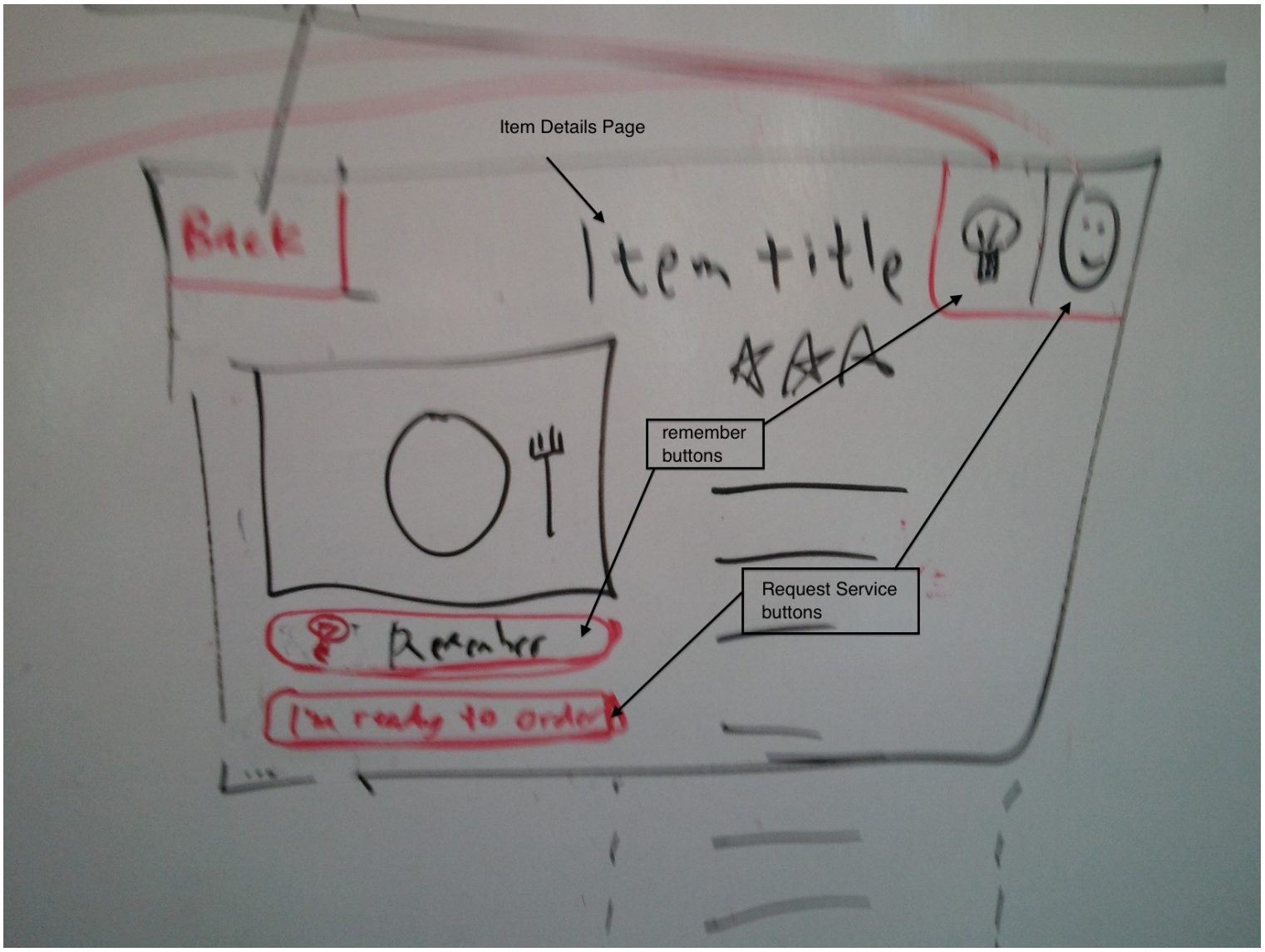
The following storyboard shows an application design. This shows a main menu with buttons for the menu and ordering and screens for payment. It also shows the screen that allows the diner to enter their email after payment.



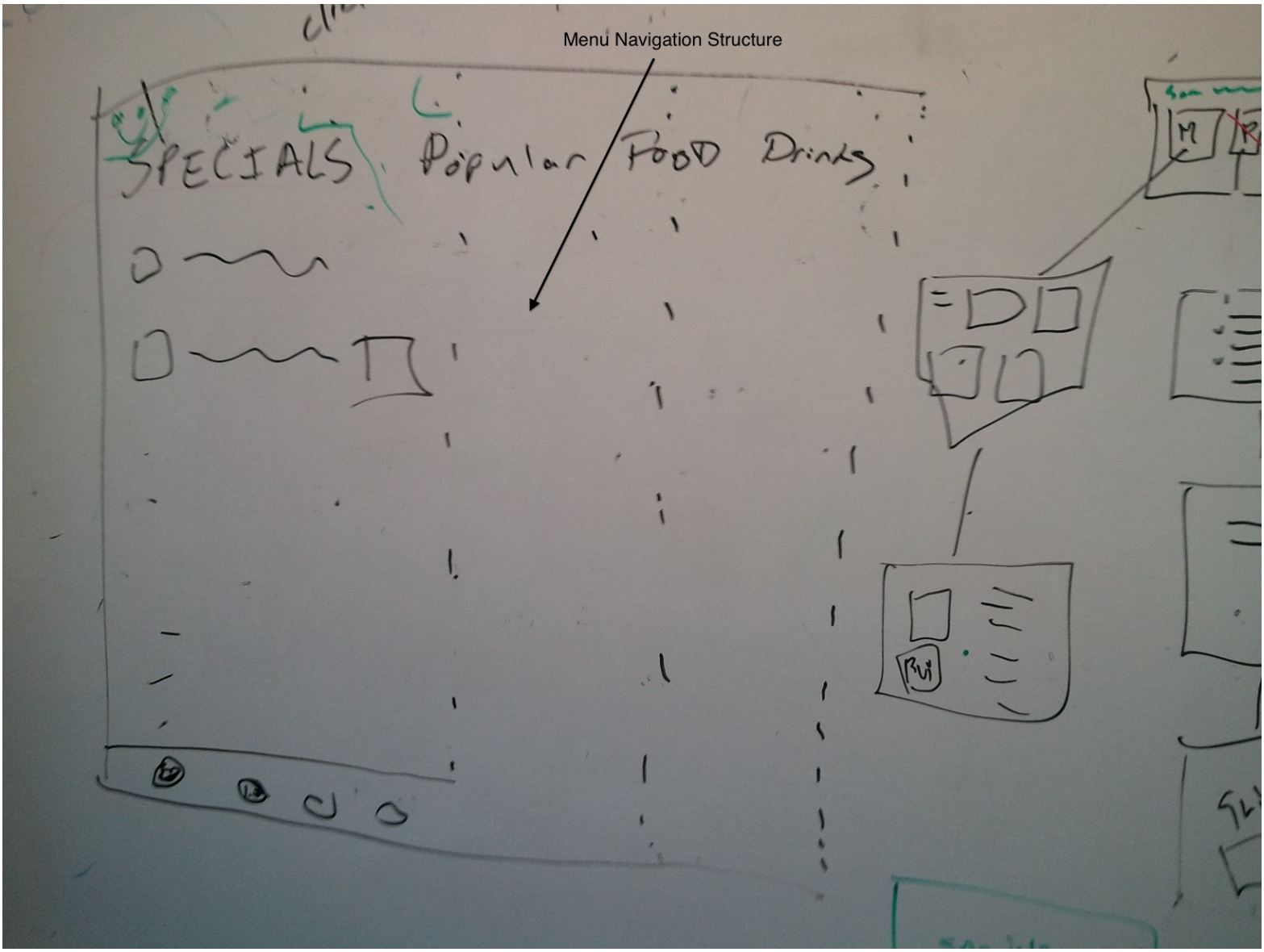
The following storyboard shows three start page designs. We focused on design 3, which shows the menu initially to the diner. The design 3 start page show the request assistance button the top right. This storyboard also shows the item details page.



This storyboard shows a close-up view of the menu item details page.



The storyboard below shows a drawing of the panorama control that is used on Windows Phone. This inspired our menu screen.



Selected Interface Design:

Design Choice:

The design we chose was not simply one of the three, but a combination of them. Not only were our designs themselves different, but we also found that we had put the focus of the app slightly differently. For example, some of us really focused on payments, while others focused more on the menu itself. We also all had glaring oversights in our designs that became apparent when we started comparing notes. For example, when you sit down at a restaurant each of you gets a menu and makes a selection separately. Giving a party of four only one tablet would slow down their ordering process considerably, and is thus not workable. Not all of us realized this when we came up with the initial designs. As a result, no single idea was workable, and we had to merge them to come up with something reasonable.

Functionality Summary:

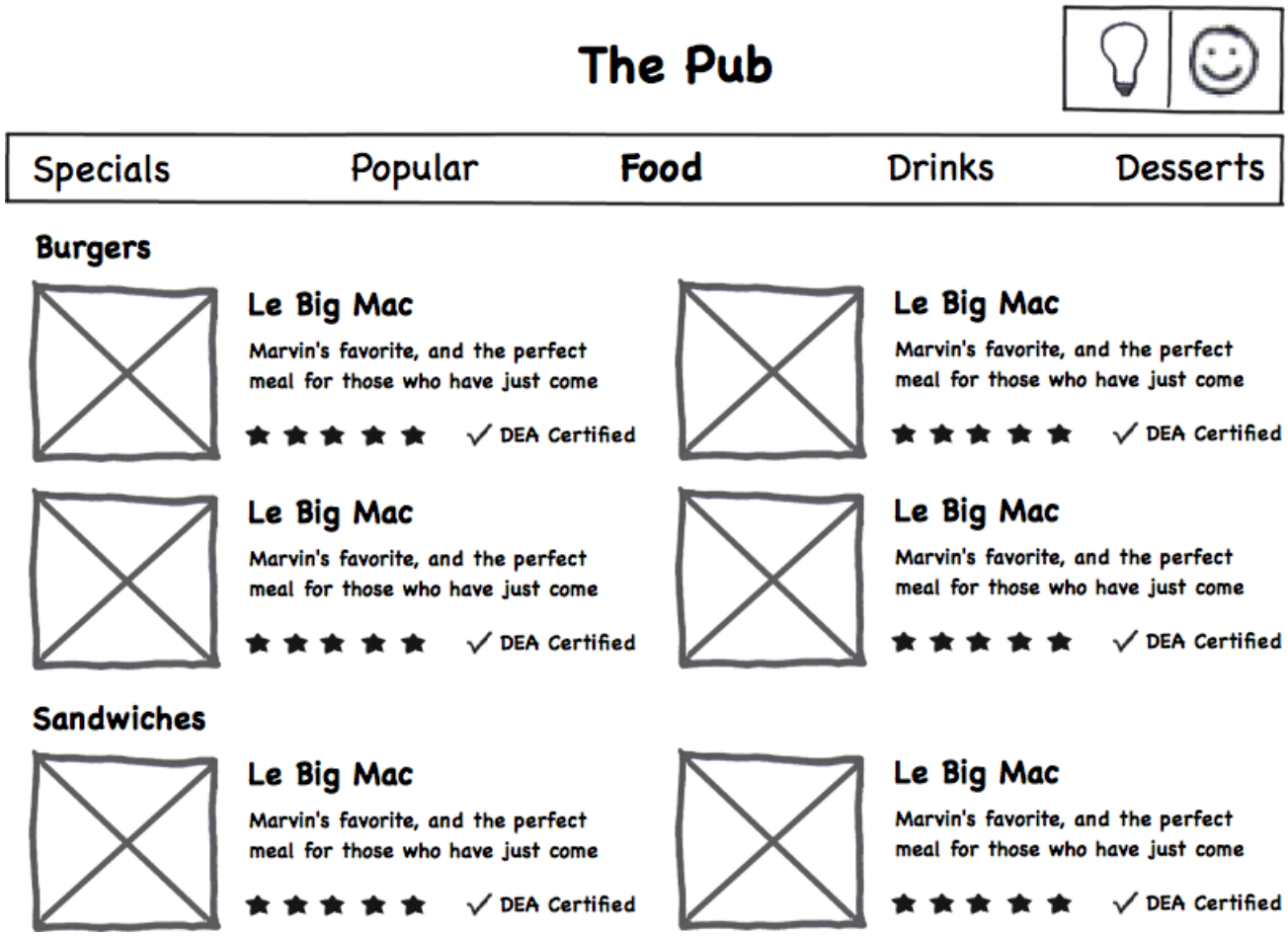
We focused the design on two areas of the restaurant experience: Selecting your food from a menu, and paying.

When you enter a Restaurant 2.0, everyone in your party is given a tablet that functions as the menu. The tablet presents you with a number of options, just like an old-fashioned menu. You can select, or "remember", items from the menu to put together an order. When you're ready, someone in your party presses the "call for waiter" button, and the waiter will take your orders as usual. When you have ordered, the waiter will take all but one of the tablets with him to give to other guests. The last tablet remains in case you want to order more items, or call for the waiter for other reasons.

When you're ready to pay, the waiter shows up with a tablet running a different app, one for payment. It shows your party's complete order. You pass this tablet around the table so everyone can pay their share. There are two modes for this. You can either each pay the same fraction of the total bill, or you can pick the items you want to pay for, pay for them, and give the tablet with the rest to the next person. The app lets you specify how much you want to tip, and offers you coupons for your next visit in exchange for an email address.

User Interface Description:

The Start Page



This is the generic first page of the menu. Along the top, you have the name of the pub, and then two buttons. The first button brings up the list of your remembered items. The second button calls a waiter. These buttons are present on every screen in the interface. To make the system non-scary and accessible to new users, we wanted to let users call a waiter at any time, much like self-checkout at a grocery store. We considered the idea of a "home screen", but decided against it, because there really is no reason for it. There is only one thing to do on this tablet, and that's choosing food and drink.

In the next row, you have the major categories of items on the menu. Tap one of them, and the rest of the interface changes to show you these options. This corresponds to the main headings in paper menus.

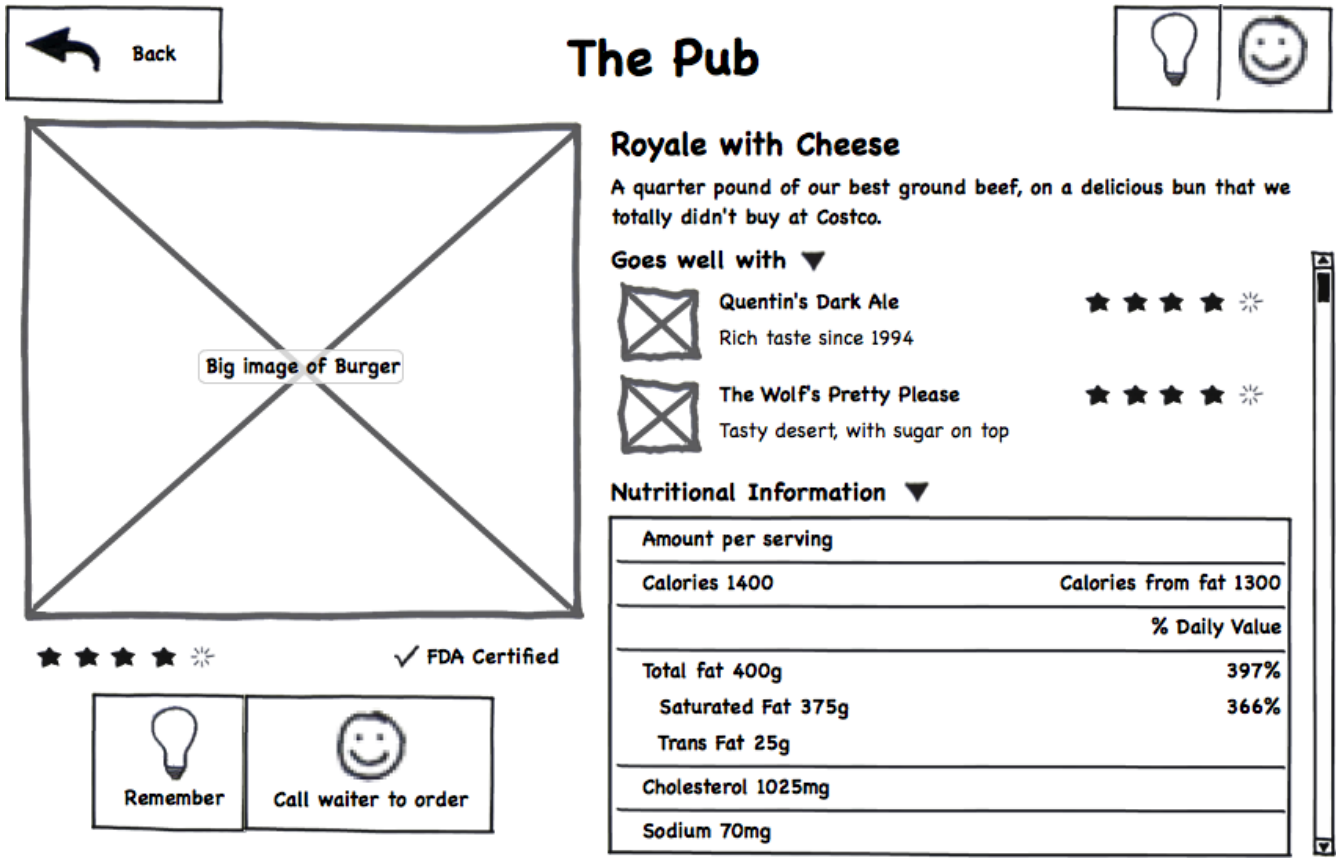
Most of those pages look like the one shown here: A number of items, with sub-headings in between. Tapping any of these items brings up the item's detail page. People are used to this paradigm, so we'll use it as well.

The Specials Page

The specials page is the only page that looks different from the other menu pages. It shows a big, delicious image of the items that are currently special. Swiping left and right cycles through them, and we might want to accentuate this by adding subtle arrows to the left and right side. Clicking the "See More" button brings up the special's detail page.

The purpose of the specials page is the same as they are in a regular menu: To raise diners' awareness of new items, promotions, or recommendations.

Item Detail Page



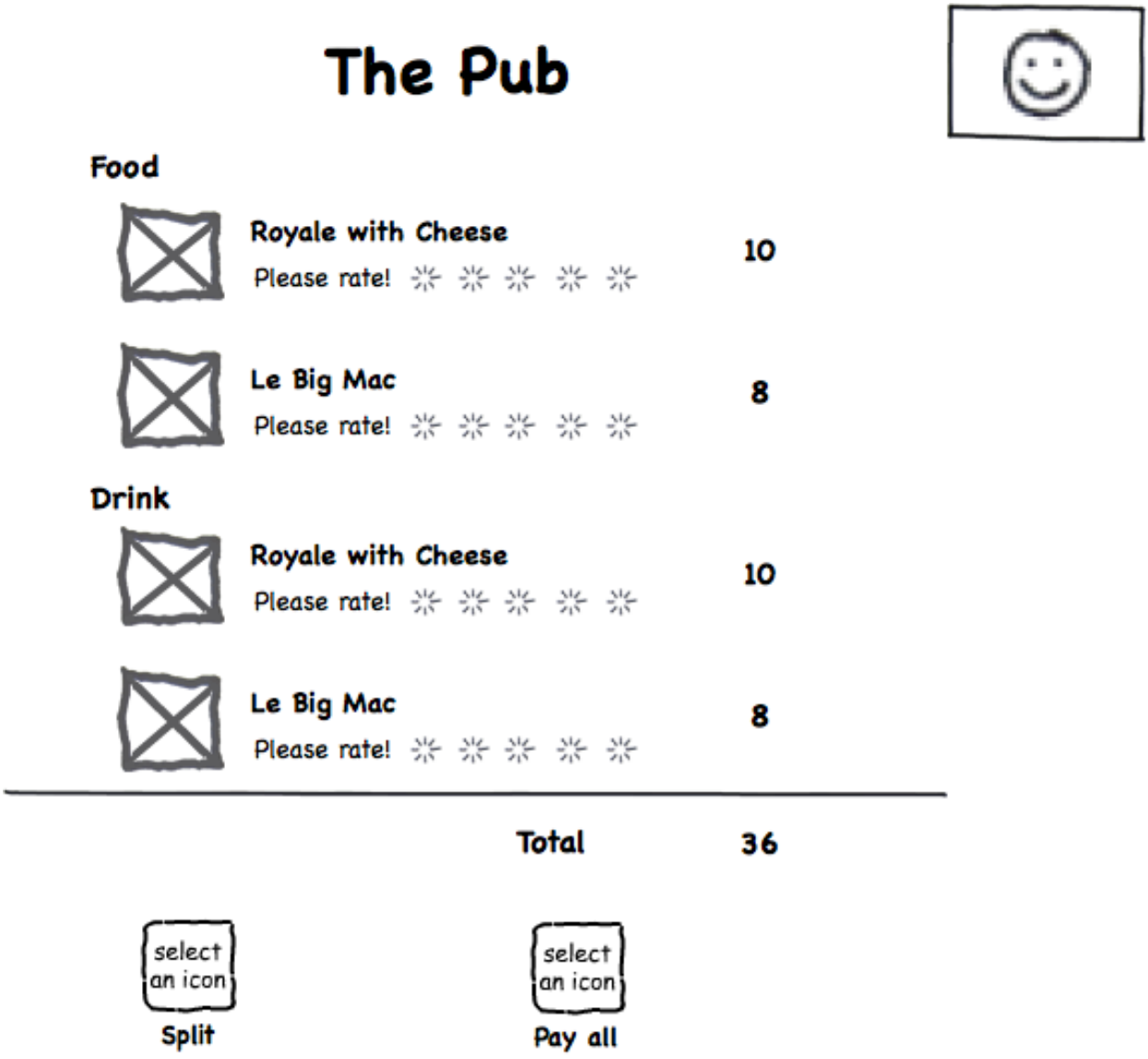
The detail page for an item contains a title, description, and large image of the item, together with some additional widgets. The widgets shown here are the “Goes well with” box and the “Nutritional Information” box. Other widgets are possible. There are also large buttons to call a waiter right away, and add this item to the list of remembered items. Finally, there is a back button to get back to the menu.
Calling the waiter is always important, so this screen has actually two buttons that accomplish this. The widget system allows us to show different information in different restaurants, or even different items. Two of the widgets shown here are aimed at the problem of choosing by recommendation: The review bars under the image, and the “Goes well with” box.

Remembered Items

When you tap the light bulb in the corner, you go to a screen that shows all your remembered items. Here, you can review and remove items, go back to their detail pages, or call a waiter to put in your order.

We have the review screen to make it easier for users to narrow down their choices, and so that they don't have to remember what they wanted from the time they choose to the time the waiter arrives.

Pay Screen

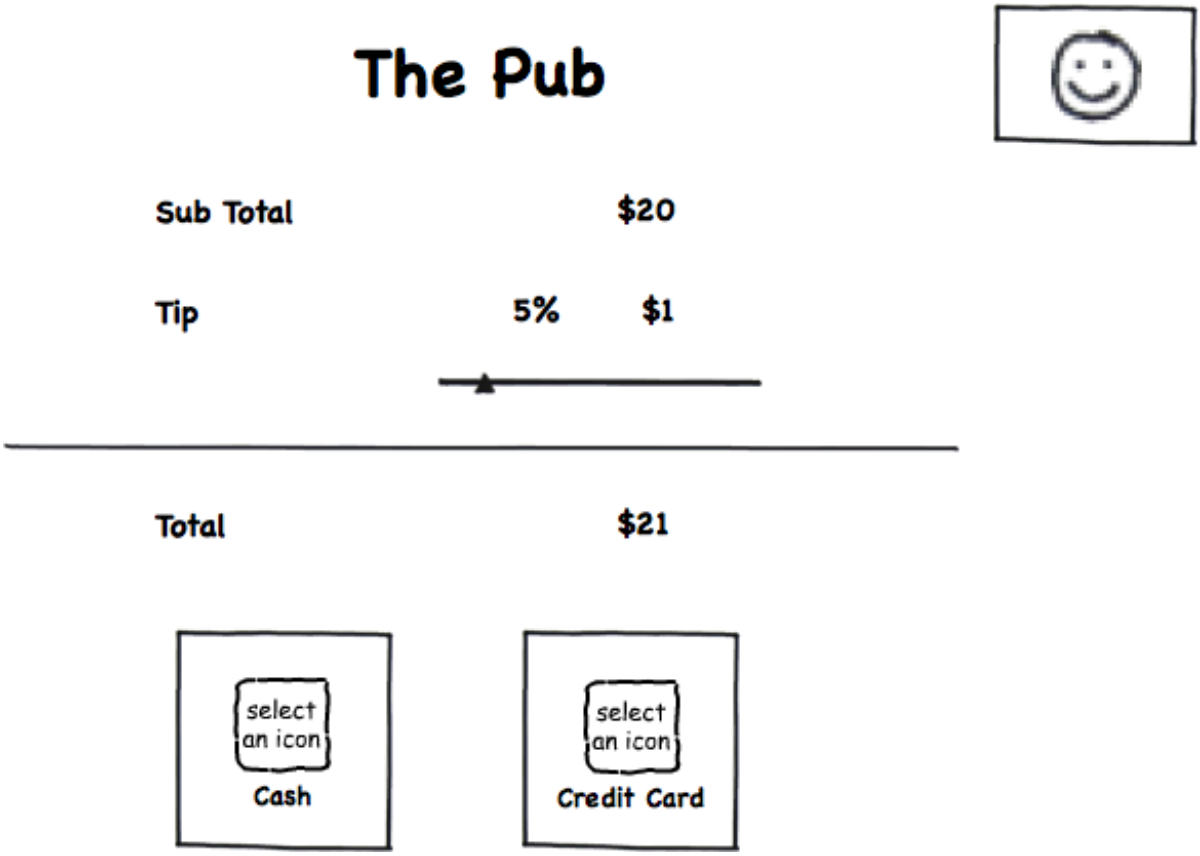


This screen is shown on the tablet that the waiter brings out when it's time to pay. It shows every item you ordered, together with a price and an opportunity to rate the item. You can either choose to pay the whole bill at once, or split it. If you choose to split the order, you have the choice between splitting it n ways, or selecting the items you want to pay for. If you choose the latter, and complete the payment process, the app will return to this screen with the items removed or grayed out that have already been paid for. As always, you can call a waiter by tapping the smiley face in the corner.

Splitting the bill evenly is a common option these days, when splitting a bill item-by-item is hard. For continuity, we want to continue offering this possibility. However

the interface makes splitting item-by-item so much simpler that it may become the predominant way of splitting a bill if this system gets some adoption.

Settling the Bill



After you have chosen what to pay for, you can enter a tip amount on a slider. The percentage and the amount are updated simultaneously as you slide the slider around. You can either pay with cash, or with a credit card reader that's part of the device.

Incentives

When you're done paying, you have the chance to enter your email address to receive a free coupon. The restaurant can use this address to notify the customer of upcoming events or other specials.

Three Scenarios:

Our current interface design should make tasks 1 and 2 fairly easy, because the interface is designed based mainly on those basic tasks. Thus tasks 1 and 2 should give us feedback on the quality and usability of the interface for those simple scenarios, whereas task 3 should provide us with more things to add to the design, to make such complex tasks easier.

1) To complete task 1, the user would first receive a tablet when sitting down. To find the Royale with Cheese, the user would either swipe to the food section or tap the food button, click on the Royale with Cheese, and then click the Remember button. On the same page, there is a recommended link to Quentin's Dark Ale, so the user should click the remember button next to it. Otherwise the user might hit the back button, flip to the drinks section, select the ale, and click the Remember button there. The user would then flip to the desserts section, and glance through the ratings to find the highest rated one. After tapping the Remember button here, the user would tap the Remembered Items button in the corner to bring up the list of all remembered items. To place the order, the user would then press the Talk to a Real Person button in order to request service and order from the waiter.

In some cases, task 1 can be simplified if the wanted menu item happens to be in the specials section, which shows up first. Since the interface is not designed to be an ordering system, but rather just an interactive menu, technically the user would not be required to even find the burger and ale if they know exactly what they want already. They could simply press the Talk to a Real Person button right away and place the order with the waiter. Usability testing will also quickly reveal whether the interface should have a search button, or if we should have ways to sort menu items by rating or by other characteristics.

2) To complete task 2, the user would simply start at the payment interface on a tablet brought by the waiter. This just lists the items ordered, with the option to easily rate items, along with the total and two payment options. The user would tap the Split Bill button, which will bring up checkboxes next to all the items in the list. The user would then tap each item he or she is paying for, and tap the Pay button. This will give the total amount, along with the option to change the tip, so the user would move the slider to select a standard 15% tip and then tap the Pay With Credit Card button, then slide their card through the integrated card reader.

3) To complete task 3, the user would either look at the specials, flip to the popular section, or to the food section. Here the user might have to tap specific items that might be vegetarian to check the details, and tap the Remember button on each vegetarian item found. The user might then tap the Remembered Items button in the corner to view the list of all remembered items, find the one with the highest rating, and then possibly tap the Delete buttons next to the other remembered items.

Finding a dark and local beer would follow a very similar flow, going to the drinks section and tapping on beers that might satisfy the criteria to check if they do. Finding the dessert might require even more tapping on items to check the calories, and remembering a few, to later review them and select one.

Task 3 will give us new ideas of how to add features like sorting, because finding certain types of items can be very difficult if you must read each description. This might end up the biggest area of improvements later on in our design process.