King Saud University
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IT214: user experience
3rd Semester 1444 H

E-pantry

Phase # 4
Group # 6

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Introduction:

In most houses, a pantry is a small room near the kitchen that is often neglected, which results in forgetting to include its products in the shopping list and being unaware of what exactly is in it. Therefore, we believe that developing an app that helps you keep track of your pantry is beneficial.

We designed E- pantry for our targeted demographic that can benefit the most from using this app, which is 20 years and above. E- pantry is an application that is associated with the shelves of the pantry; each part of the shelf is assigned to a specific food product. Shelves have counters tracking the quantity of your products, and the app will alert you when they reach the assigned minimum limit and prepare your grocery shopping list. To save your time and avoid forgetting to write down any of your groceries.

Methodology:

Results:

- Interviews results:

We collected the findings from the interviews we conducted with our target demographic. Each response was analyzed before being summarized into key statements. The findings take into consideration all the interviewees' answers.

1- People place a lot of importance on going to the grocery store with a shopping list. They also care about how the list is organized, they prefer to start with canned goods before moving on to frozen ones, like to know the final cost in advance, and don't buy a lot of items with short expiration dates.
2- people face some common problems while grocery shopping such as forgetting to get some products, not knowing how much of a product to buy to satisfy one's consumption needs, not having a complete shopping list and buying a product when there is already plenty of it in the pantry which leads to having it in large quantities.
3- People usually don't clean their pantry regularly and this leads to not knowing the quantities of product they have, not noticing that some foods are about to run out, and forgetting about some products and not using them until they go bad.
4- People typically separate their products onto different shelves, such as large bags being stored on the lowest shelf and smaller products being stored on the top shelves. Moreover, frequently used items are kept on an easily accessible shelf, while less often used items are kept at the rear.
5- Some people don't organize their pantries, which results in chaos and makes it challenging to find the products they need.
6- People write their grocery lists in different ways; some write them over the course of many days, while others write them shortly before they go shopping, some individuals already have a thorough

grocery list that includes everything they need; they only need to check it before they go shopping, and other people choose to go directly to the store and look for the items they need without of writing any grocery lists at all.

7- People usually write a shopping list before they go grocery shopping, and they believe that doing so requires a lot of time and effort because they forget to write down missing items and don't remember them until they get home, checking the remaining quantities from different products takes a while, and family members have different requirements and consumption levels. However, making a list is useful for preventing forgetting and minimizing impulsive shopping. Nevertheless, some individuals believe it to be a simple process due to the minimal products they use, or their experience and the cooperation of their family members.

8- People are divided in half about being shocked by the total price of their grocery shopping, some of them are very shocked by the amount because they don't write a shopping list, the prices of the product seem reasonable when they are separated but when they are combined they are greater than expected, they purchase items that are not mentioned on the list, they buy items and not calculate their prices before they start shopping, or they purchase a different quantity or size of the product. The other half aren't shocked at all because they follow a specific list and calculate all the prices of the products that are added to the shopping cart, or they avoid buying products they didn't plan to buy.

9- People tend to determine the minimum amount of each product in their pantry based on the importance of the product, as a result, when an essential product starts to run low, they immediately restock it, but the secondary products are restocked once they are done. The exact limit number depends on the person, the expiration date, and the season.

10- Making a grocery list for a large family that includes everyone's preferences can be challenging due to the time and effort needed to ask everyone individually or to send them messages since regularly they won't reply until the shopping has been accomplished.

11- People are receptive to the idea of using technology to keep track of their pantry, get alerts when a product is running low, and make shopping lists.

12- Most people find it essential to know how much of each item is in their pantry because doing so helps them decide when to go shopping, saves money, and keeps them from forgetting to buy certain items or purchasing ones they don't really need.

13- Most people prefer practical shelves over ones that are aesthetically pleasing because they can withstand heavy products, will still look good after many years of use, and save money by not needing.

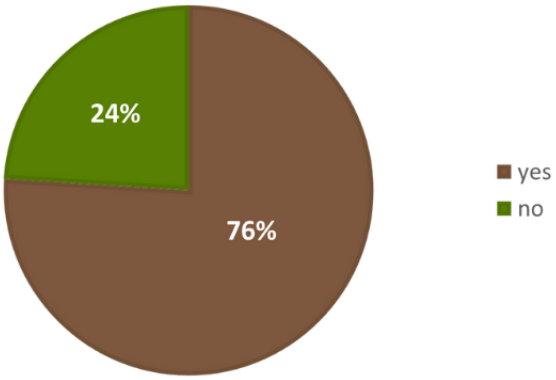
- Questionnaires results:

After receiving the responses to the questionnaire that we sent to our target audience, we conducted a percentage-based analysis to gain a better understanding of the needs and preferences of our target audience so that we could design a user experience that satisfies those needs, and the following results were drawn:

1- In graph one, most people (76%) find it time-consuming to write the shopping list for their pantry. Additionally, 48% of shoppers forget three or more items while they shop.
2- In graph 2, when people grocery shopping, 48% of them often forget to get three or more items. The distribution is as follows: 28% of people typically forget to buy 3-5 items, 8% often forget to buy 6-8 items, and 12% usually forget to buy 9and more items, while 52% of people frequently forget to buy from zero to two items.
3- In graph 3, 80% of people who took part in the survey said they write their pantry shopping list alone, and that may be why most people find it difficult, and 20% of people said they write their shopping lists with someone else.
4- According to the survey, in graph 4, 20% of people always find unused products during the seasonal cleaning that they were unaware of, while 28% think that it happens frequently, over half of them think that it happens sometimes, and on the other hand, 0% of people find it rare to happen. In conclusion, everyone forgets about some product in their pantry.
5- In graph 5, 100% of people use shelves in their pantry, and that's a good indicator.
6- In graph 6, the majority of people (92%) are willing to buy smart shelves, and the breakdown of that number is as follows: 32% of individuals are willing to buy one to three smart shelves, 44% are willing to buy four to six, 12% are willing to buy seven to nine, and 4% are willing to buy ten or more. while only 8% of people are not willing to buy any smart shelves at all.
7- In graph 7, 60% of people want to receive a notification when a product hits its limit and add it to their shopping list, while 28% believe that receiving a notification is sufficient, and 12% just want the product added to their shopping list without receiving any notification.
8- In graph 8, Most people (84%) believe that owning a smart shelf will enable them to save money, and the percentage specifies as follows: 36% of individuals believe that smart shelves may save them some money, while 48% believe it will save them money. Just 16% believe that owning a smart shelf will not save them any money.

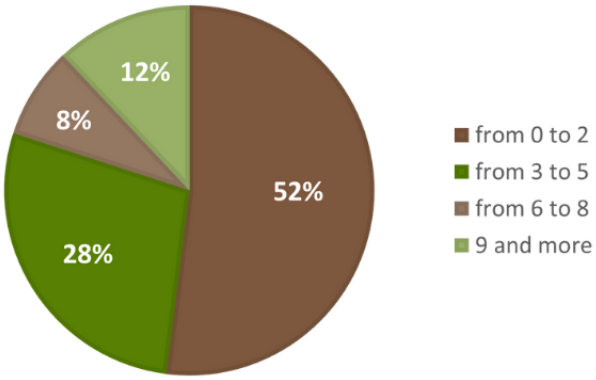
graph 1:

1-DOES IT TAKE A LOT OF TIME TO FIGURE OUT THE PRODUCTS THAT NEED A RESTOCK IN YOUR PANTRY?



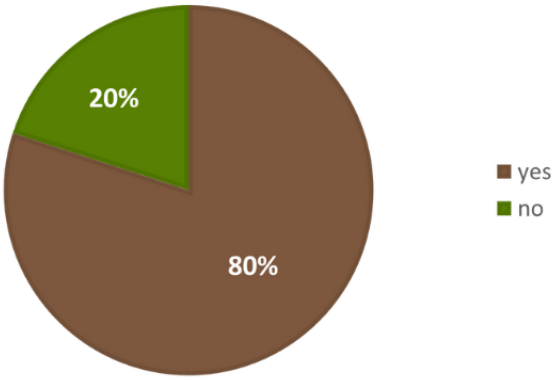
graph 2:

2-HOW MANY PRODUCTS DO YOU USUALLY FORGET TO BUY WHEN YOU SHOP FOR PANTRY'S GROCERIES?



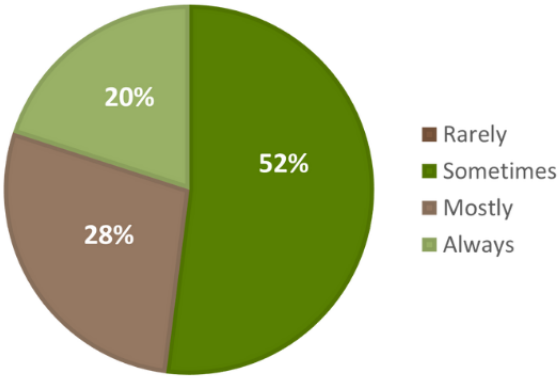
graph 3:

3-ARE YOU THE ONLY PERSON RESPONSIBLE FOR WRITING THE SHOPPING LIST IN YOUR HOME?



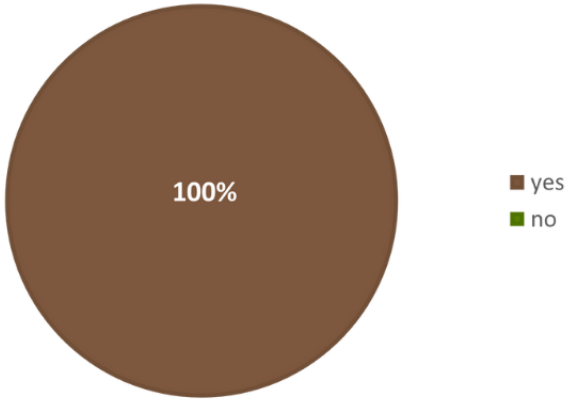
graph 4:

4- DO YOU FIND PRODUCTS THAT WERE NOT USED DURING YOUR PERIODIC ARRANGEMENT OF PANTRY?



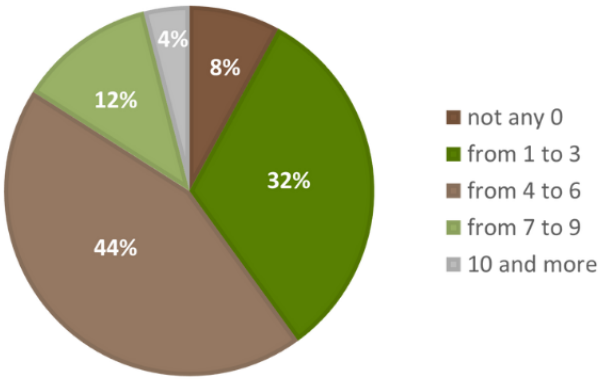
graph 5:

5-DO YOU USE SHELVES IN YOUR PANTRY?



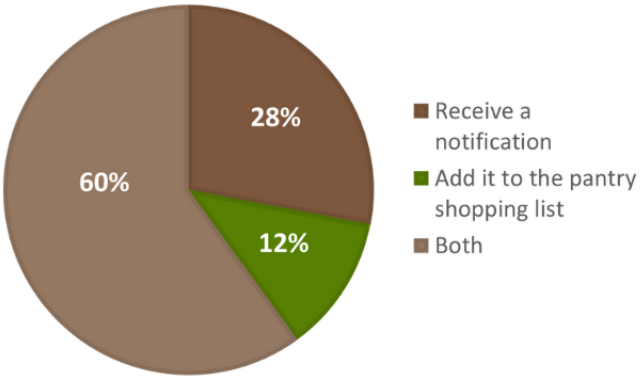
graph 6:

6-HOW MANY SMART SHELVES WILL YOU BE WILLING TO BUY FOR YOUR PANTRY?



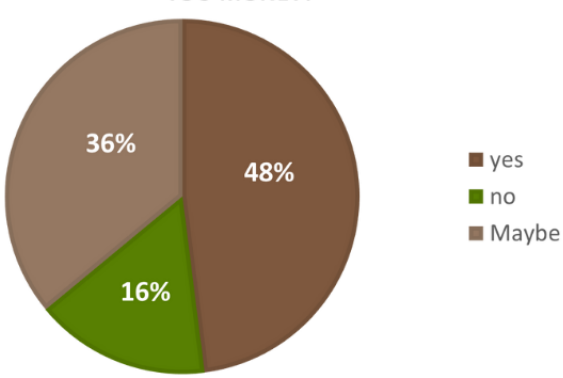
graph 7:

7-WHAT DO YOU WANT TO HAPPEN WHEN YOUR PRODUCT REACHES ITS LIMIT?



graph 8:

8-IS OWNING A SMART SHELF GOING TO SAVE YOU MONEY?



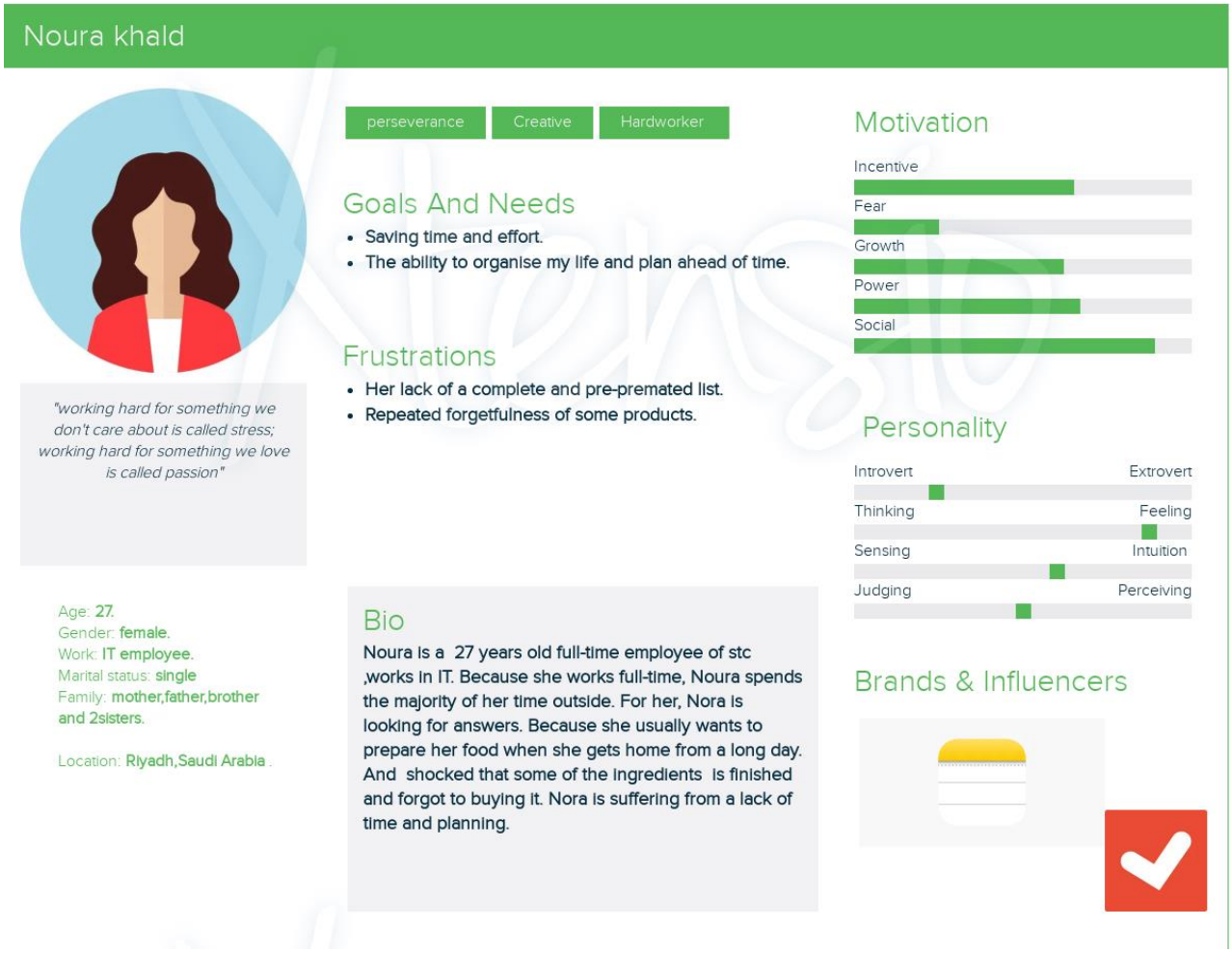
Personas:

We developed our personas based on the answers, outcomes of interviews and questioners, and affinity map.

The first persona is "Noura Khalid," who is 27 years old, and a full-time employee working for the STC business. Noura is always looking and working hard to find a solution to assist her in making a pantry shopping list because she does not have enough time to write a list and find the completed and needed products. we defined “Noura Khalid” based on Interview1(A: 3,8,9), Interview2(A: 4,7,9), Interview3(A: 8), Interview5(A: 10), Interview6(A: 2,8) and the affinity map.

The second persona that we developed is “Ahmed Salem” who is 43 years old, and work full-time in his dream job, which is an HR manager, Ahmed, who is in charge of purchasing food items, struggles with forgetting to buy certain items and making many trips to the supermarket, so he searches for a solution to assist him in figuring out what is in the pantry. We defined “Ahmed Salem” based on Interview 3(A:8, 9, 5), Interview 5(A;3), Interview 8(A;4, 8, 9), and the affinity map.

Graph 9: Persona Nora



Graph 10: Persona Ahmed

Ahmed Salem

HardWorker | Confident | Responsible

Goals And Needs

- lowering the budget allotted for food purchases.
- An app that aids in determining the amount of each item in the pantry.
- Reducing food waste.

Motivation

Incentive
Fear
Growth
Power
Social

"You can't truly be considered successful in your business life if your home life is in shambles."

Frustrations

- Often visiting supermarkets.
- Not Knowing the amount of groceries used in the house hold.
- Not remembering to buy certain items during shopping.

Personality

Introvert — Extrovert
Thinking — Feeling
Sensing — Intuition
Judging — Perceiving

Age: **34**
Gender: **Male.**
Work: **HR Manager.**
Martial Status: **married.**
Family: **3child (2 girls, 1 boy).**
Location: **Riyadh, Saudi Arabia.**

Bio

Ahmed, who is 34 years old and works full-time as an HR Manager in a big business, earns $23,000 monthly. Ahmed works primarily on the computer throughout the first half of the day in his workplace. He is in charge of picking up food items from the store and always prefers to go alone. If he forgets to prepare a shopping list, he may struggle to recall some items. as well as having to frequent the grocery store, Ahmed also has to put up with his wife's constant calls and messages reminding him of things or informing him of things she forgot to tell him about. In the end, Ahmed is shocked by the cost when he finishes shopping.

Brands & Influencers

Solution:

A smart shelf that is made of plastic and metal, it comes in a variety of sizes that you can buy and install in your pantry.

- It is connected to an application that can monitor and **track the products in the pantry through a sensor that acts like a scale**, the sensor is embedded in the smart shelf. When you add a certain product on the shelf it can feel the number of grams that has increased, or when you take anything from the shelf it can feel the number of grams that has decreased.
- Before you put your product on the shelf, you need to set up the product in the app by inserting the weight of the product, the minimum amount of the product that suits your consumption, and if you want to know **the approximate cost of your shopping list** in advance, you need to insert the expected price of each item individually, and it will be calculated.
- You can track the number of products in the pantry so that whenever you add or take a product from the shelf, the counter in the app updates the amount, so when you're away, **you can check all the products and their quantities in your pantry using the app.**
- When a certain product has finished or reached its limit that you set, you have the choice of receiving a notification, adding the product directly to the **shopping list in the app**, or both, so **you can be notified when a product is about to finish.**
- In the grocery shopping list, you can add the amount you need from each product or **edit your shopping list** by adding additional products manually.
- **The list has a checklist feature** where you can tap the empty circle next to the item to mark it as purchased.
- The application will have a **shared list feature** so that everyone in the family can contribute to writing it. You can invite anyone by sending them the link to the list, which will give them the ability to edit and add to the shopping list. **You can limit their access** to only viewing the list in case they are only in charge of the shopping process.

User Stories:

The primary tasks that E-pantry can perform will be discussed in this part, along with a summary of each task and its specifics and priority. Priority is broken down into three categories: high, which shows an essential function, medium, which refers to an important function but not one of the primary functions, and low, which means a less important function.

User story 1: Add a new category.	
Summary	As a user, I want to add a new category, so that I will be able to sort my shelves according to the category of food.
Details	i. User clicks “signs up” and complete his/her info(first name, last name, e-mail, password), ii. Then user clicks “Next”. iii. System shows feedback if the signs up has been confirmed or not. iv. Pantry page will apear. v. User clicks on the gray add icon on the above of the page. vi. System ask the user to write the category’s name. vii. User clicks “Done”. viii. The new category has been added.
Priority	Medium.

User story 2: Set up a shelf in the app.	
Summary	As a user, I want to associate a new shelf to the app, so that I can organize and be aware of my pantry.
Details	i. User clicks on the “Pantry icon" at the tab bar. ii. Then, user clicks on the green “add icon”. iii. System ask the user how he/she would like to add a new shelf. • By the shelf’s barcode. • By the shelf’s code. iv. If the user chooses “add by barcode”, the system will ask the user to point the camera at the barcode. v. If the user chooses” add by shelf code”, the system asks the user to enter shelf code, and user clicks “Next”. vi. System shows feedback if the add has been confirmed or not. vii. Add a new product page will appear. viii. User will complete product info(name, category, weight, maximum storage, minimum storage, cost). ix. User clicks “Next”. x. System shows feedback if the add has been confirmed or not.

Priority	High.

User story 3: Add product to the grocery list.	
Summary	As a user, I want to add products to the grocery list, because I want to buy a product that has not reached the minimum storage yet.
Details	i. User clicks “list” on the tab bar. ii. User press on the search bar. iii. User write name of product that she/he want to add to the grocery list. iv. System will provide auto-suggest to the user. v. User clicks on the “add icon” at the left of the product name. vi. The added product appears in the list.
Priority	Low

User story 4: Share the grocery shopping list .	
Summary	As a user, I want to share my list, so that my family can contribute to it.
Details	i. User clicks on “list” in the tab bar. ii. User clicks on the “share list" icon. iii. User clicks on “copy the ink of the list”. iv. Then the user will send the link to other users.
Priority	Low.

User story 5: Determine the notification status.	
Summary	As a user, I want to determine the notification status, because I don't like the current one.
Details	i. User clicks on the "account" on the tab bar ii. Then click "settings ". iii. Then click "notifications". iv. User can turn on and of either the "send a reminder" or "add immediately to the list" or both.
Priority	Medium.

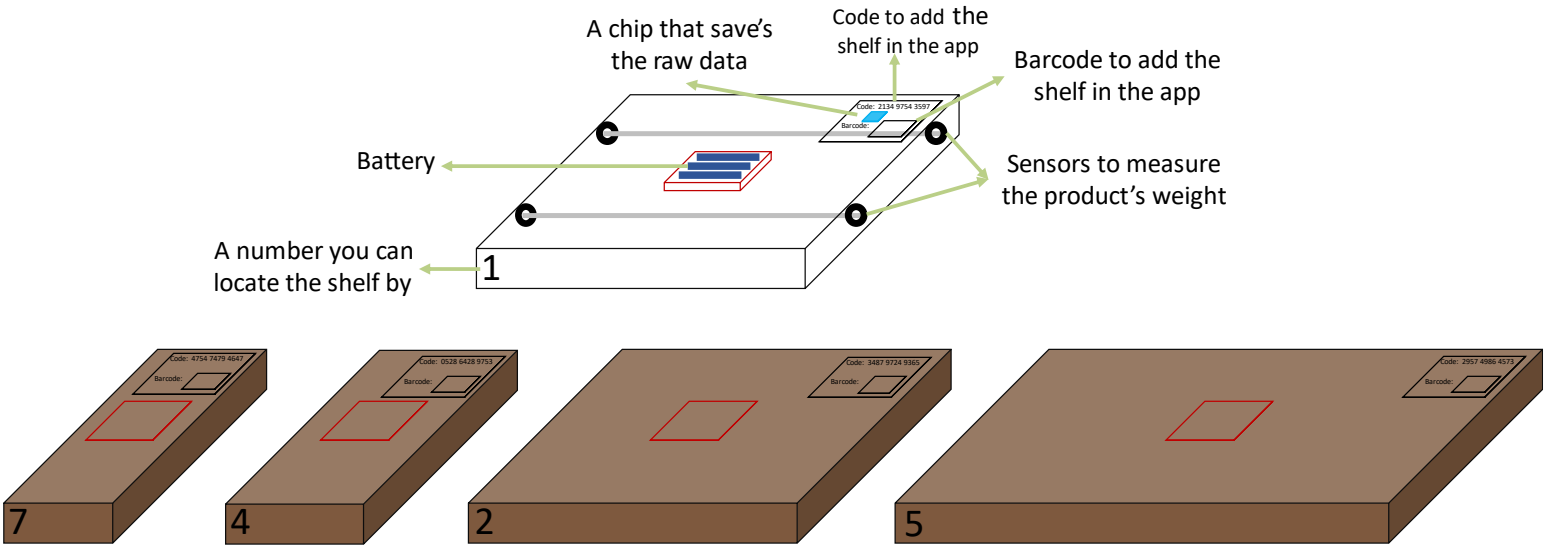
User story 6: Control the accesses of the participants in the shared list.	
Summary	As a user who created the shopping list, I want to determine the accesses of the participants in my shared list, because I do not want everyone to have the ability to edit.
Details	i. User clicks on "list" in the tab bar. ii. User clicks on the "share list" icon. iii. Then the participants in the list will appear to the user, and he/she can control the access of each one of them • He can choose between "view only" or "can edit" by clicking on them. • He can remove them from the list by clicking on the "trash can" icon and clicking "delete" when the confirmation message pops up.
Priority	Low

Sketches:

The sketches are broken down into two groups: first, there is the sketch for the device, and then there is the sketch for the app, which is divided into four categories: sign-in/up, account, list, and pantry.

a- sketch for the device:

Graph 11: sketch for the device

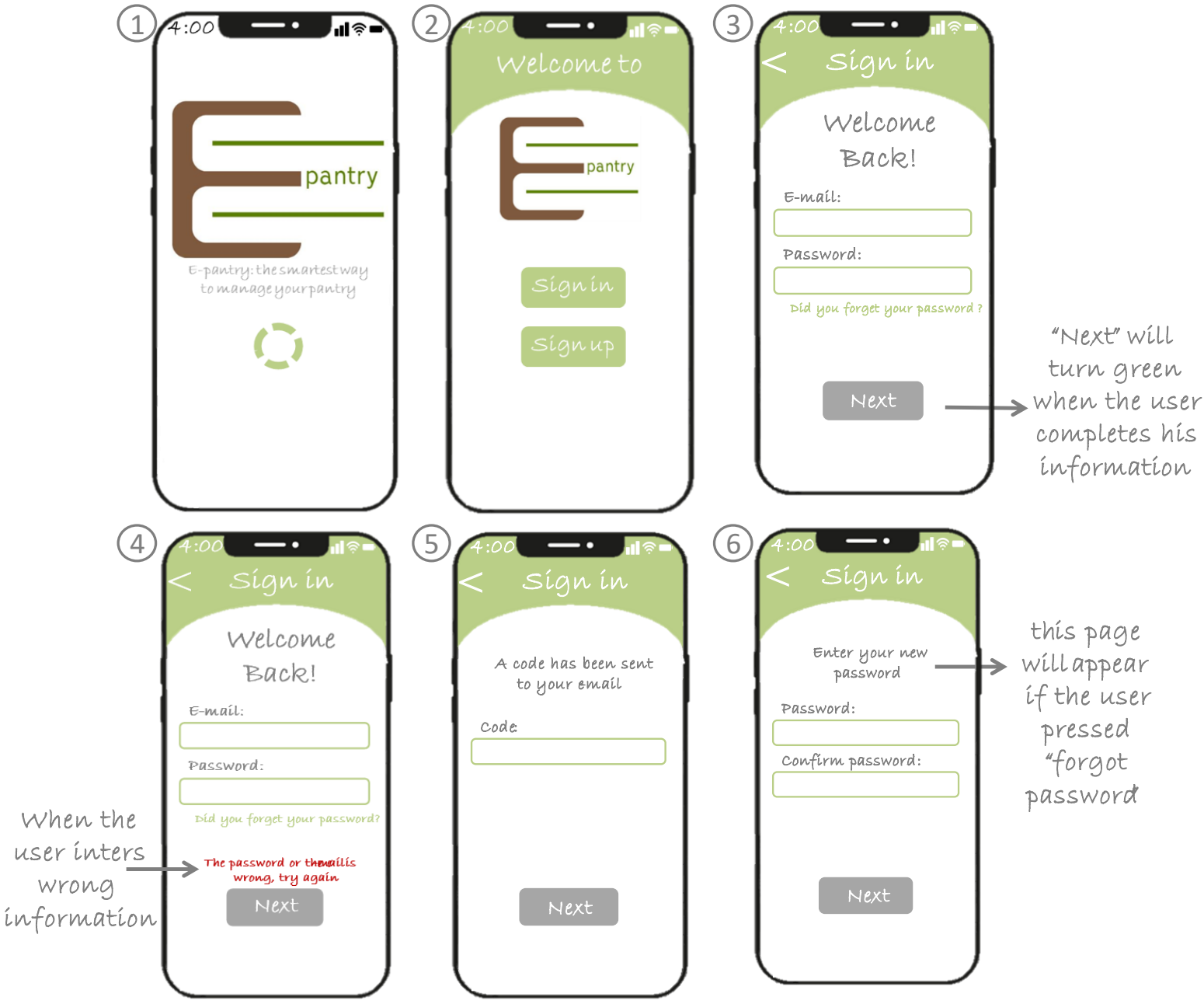


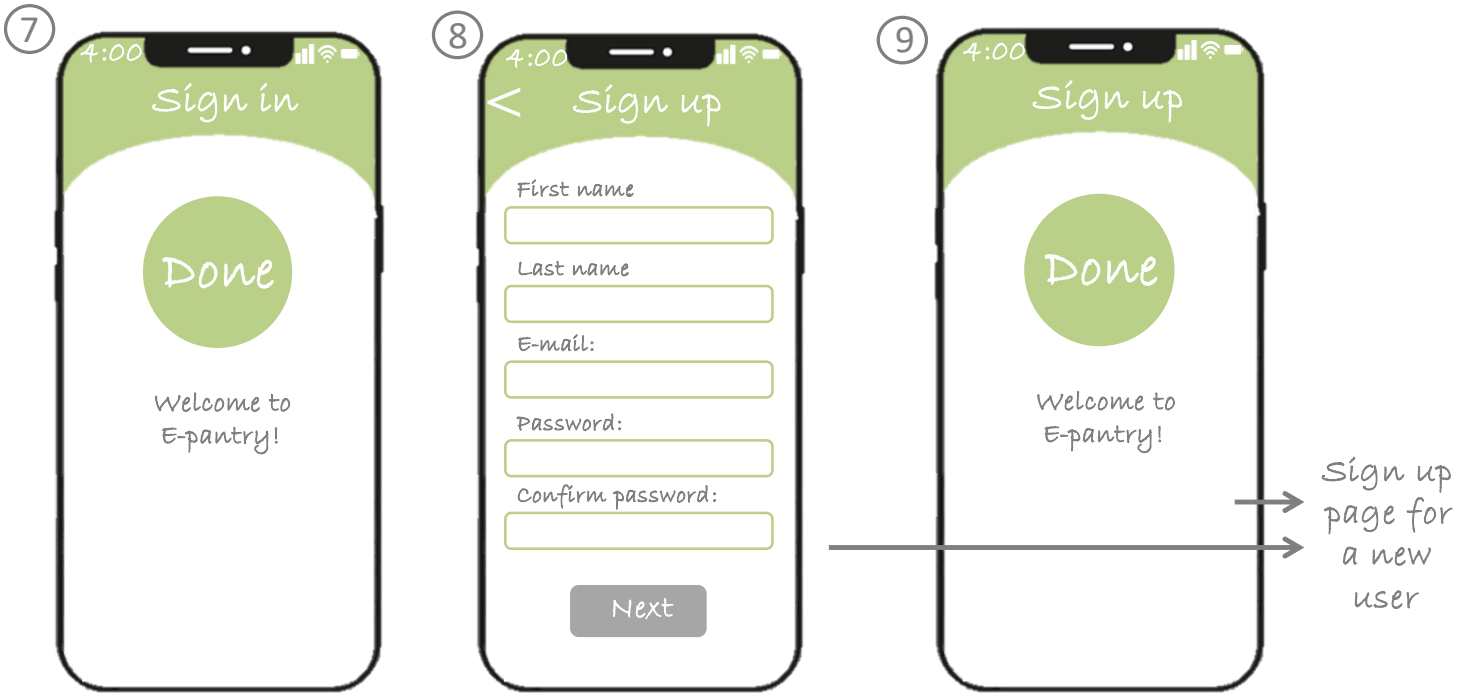
The shelves come in variety of sizes, and one shelf can hold only one product

b- sketch for the app:

1- Sign in/up:

Graph 12: Sign in/up sketches




7
4:00
Sign in
Done
Welcome to
E-pantry!
8
4:00
Sign up
First name
Last name
E-mail:
Password:
Confirm password:
Next
9
4:00
Sign up
Done
Welcome to
E-pantry!
Sign up
page for
a new
user

2-Account:

Graph 13: Account sketches

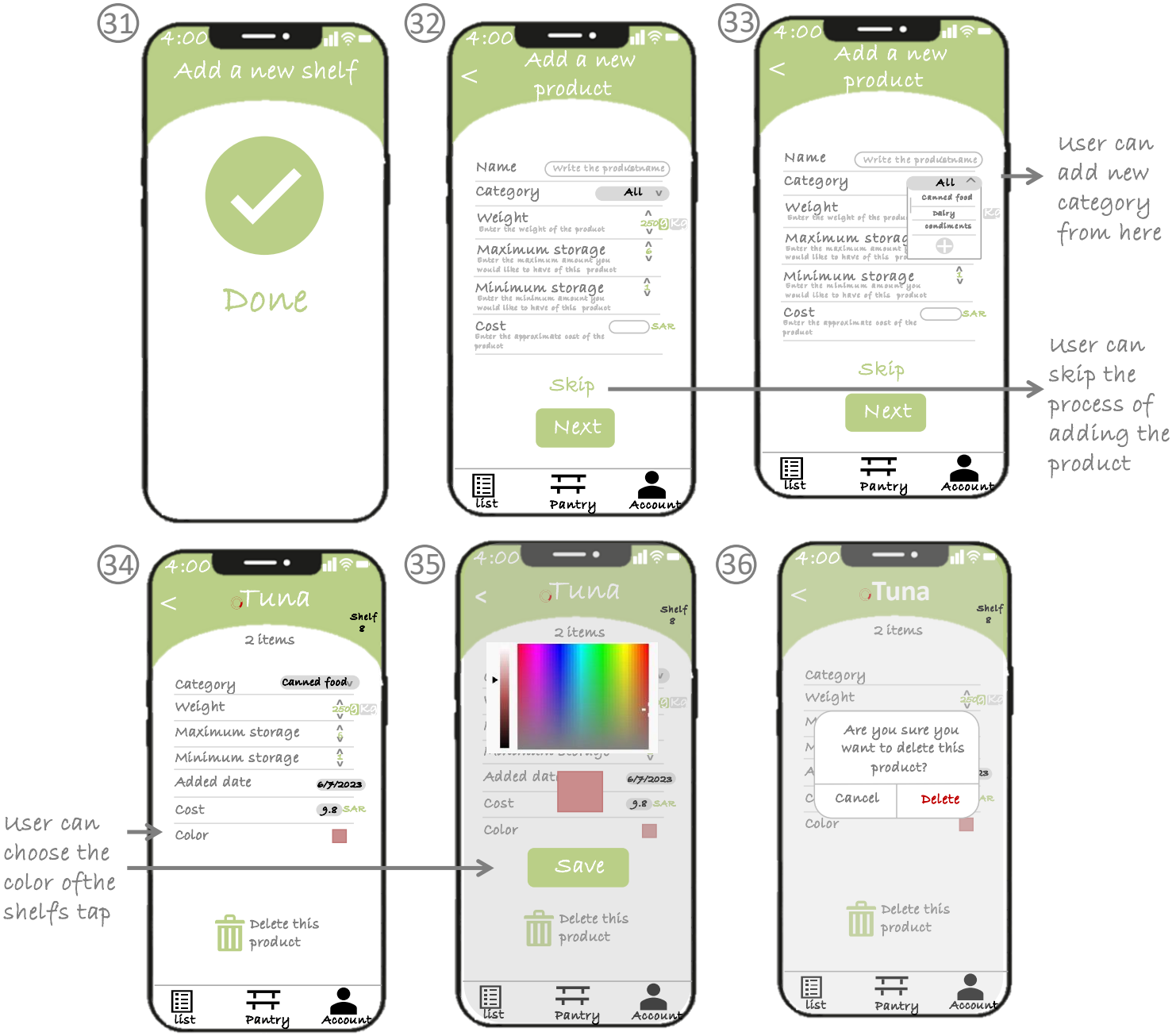
16
4:00
< Settings
Language
Are you sure you want todelete your account?
Cancel
Delete
Delete account
list
Pantry
Account
17
4:00
< Language
English
Arabic
list
Pantry
Account
18
4:00
< Language
English
Arabic
list
Pantry
Account
updating the system after changing the language

3- List:

Graph 14: List sketches

4- Pantry:

Graph 15: Pantry sketches


31
4:00
Add a new shelf
Done
32
4:00
Add a new product
Name
Write the productname
Category
All
Weight
Enter the weight of the product
250g
Maximum storage
Enter the maximum amount you would like to have of this product
Minimum storage
Enter the minimum amount you would like to have of this product
Cost
Enter the approximate cost of the product
SAR
Skip
Next
list
Pantry
Account
33
4:00
Add a new product
Name
Write the productname
Category
All
Canned food
Dairy
condiments
Weight
Maximum storage
Minimum storage
Cost
SAR
Skip
Next
list
Pantry
Account
User can add new category from here
User can skip the process of adding the product
34
4:00
Tuna
Shelf 8
2 items
Category
Canned food
Weight
250g
Maximum storage
Minimum storage
Added date
6/7/2023
Cost
9.8
SAR
Color
Delete this product
list
Pantry
Account
User can choose the color ofthe shelfs tap
35
4:00
Tuna
Shelf 8
2 items
Added date
6/7/2023
Cost
9.8
SAR
Color
Save
Delete this product
list
Pantry
Account
36
4:00
Tuna
Shelf 8
2 items
Category
Weight
250g
Are you sure you want to delete this product?
Cancel
Delete
Color
Delete this product
list
Pantry
Account

37
4:00
Add a new product
Done
38
4:00
Shelf 9
0 items
Sorry,You dont have a product on this shelf press on the button to add a new product
list
Pantry
Account
39
4:00
Welcome
Nora Ahmed
All
Canned food
Condiments
Your shelves:
What would you like the new category name to be?
Write theategory's name
Done
Salsa
x4
Tuna
x2
list
Pantry
Account
When adding the product is done successfully
This page would appear if the user added a shelf,but skipped addingproduct
user can add new category from here

Story Board:

a storyboard is a series of sketches showing how a user might progress through a task using a device, in our case our storyboard is about how a user can benefit our shelves and app.

Graph 16: Story Board

User Flow:

We have six user flows in this section, one for each user story. Each flow is numbered, and has hands that press the buttons, this way makes it easy to read and understand.

1- Add a new category:

Graph 17: User Flow: Add a new category

2- Set up a shelf in the app:

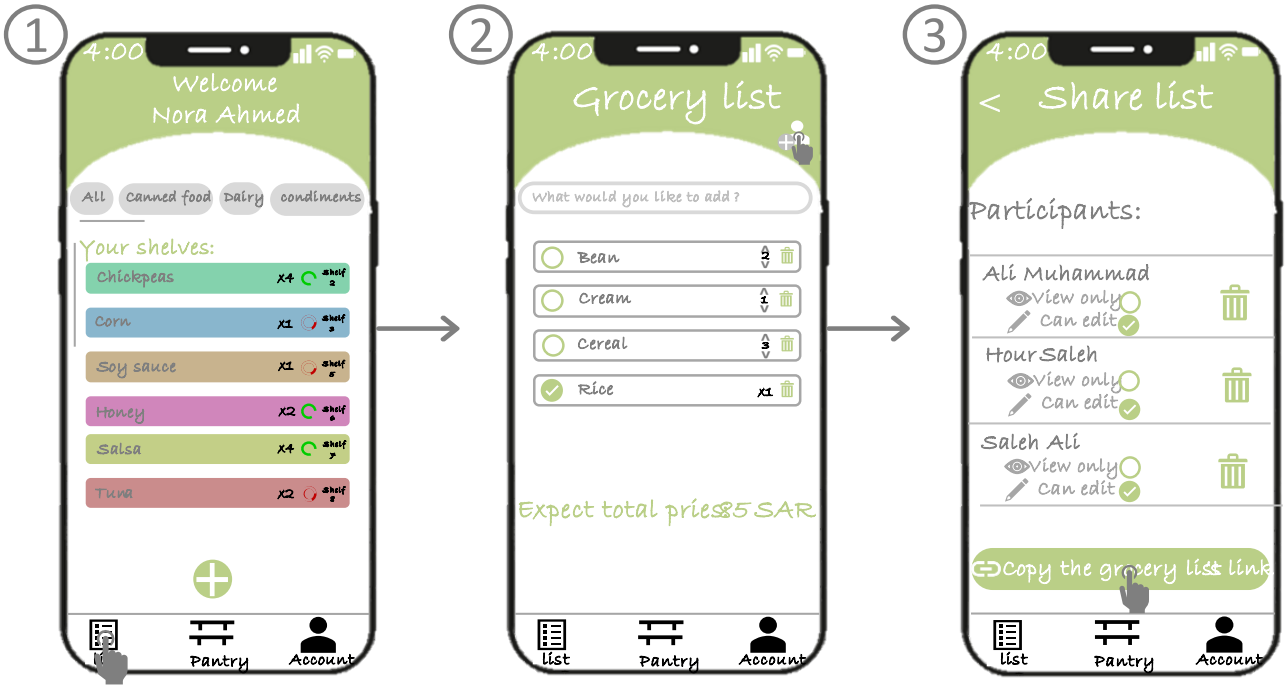
Graph 18: User Flow: Set up a shelf in the app

3- Add product to the grocery list:

Graph 19: User Flow: Add product to the grocery list

4- Share the grocery shopping list:

Graph 20: User Flow: Share the grocery shopping list



5- Determine the notification status:

Graph 21: User Flow: Determine the notification status

6- Control the accesses of the participants in the shared list:

Graph 22: User Flow: Control the accesses of the participants in the shared list

Design Rules:

Because we are developing for optimum usability, we followed several design rules in our sketches. Design rules are guidelines that a designer can employ to increase the usability of the software product.

Learnability Principles:

Learnability is the ease with which new users can begin effective interaction and achieve maximal performance. All five learnability principles, predictability, synthesizability, familiarity, generalizability, and consistency were implemented in our designs.

Table 1: Learnability Principles

Rule#	Principle		Sketch No/ User Flow No	Describe how you applied this principle
1 2	Predictability		All sketches Sketch #34,19 Ex. Sketch#25,22	- User can use the navigate bar to navigate between pages. - User can predict that pressing on the arrows around the number will increase or decrease the number. -The user can predict that the '+' button means adding something new.
		Operation visibility	Sketch#18 Sketch#4 Flow #1	- When the user changes the language, the screen gets greyer, and a loading sign appears which indicates that no operation is accessible until the changes are done. - When the user enters the wrong password the "next" button will be gray which indicates that it is not an available operation for now.

3	Synthesizability	Flow#3 Sketch#19	- When the user deletes or adds a product from the list, the expected price will change immediately.
		Sketch#19	-When the user taps the empty circle next to an item in grocery list, it will be immediately marked with a “check mark” indicating that it was purchased, and it will go to the bottom of the list immediately.
		Flow#2	- when the user inserts a new product /shelf correctly the “done” page will appear.
4	Familiarity	Sketches #14	- The “bin”, “globe”, “bell”, “money” icons are familiar to the user.
		Sketch#15,21 Flow#5	- the on and off switch icon is familiar to the user.
5	Generalizability	2,3,8 # Sketch	-Sign up /Sign in pages.
		Most of sketches	- The navigation arrow at the top left of the screen.
		Scetch#23 Flow#4	- The way that the user can copy the link of the share list is used in most of the apps.
		Sketch#27	- The user can pick a category to see its products, and this

			operation is used in a lot of systems.
6	Consistency	All Sketches and Flows Ex. Sketch#34,19 Scetch#1 Ex. Sketch#8,31,9 Flow#1 Sketch# 2,3,8,13	-title on each page. -delete icon. -logo page - the same confirmation message pops up before any deletion happens. -same screen layout of sign up, sign on ,contact page.

Flexibility Principles

Flexibility is the multiplicity of ways the user and system exchange information. Four out of five Flexibility principles, dialog initiative, Task measurability, Substitutivity and Customizability were implemented in our designs.

Table 2: Flexibility Principles

Rule#	Principle	Sketch No/ User Flow No	Describe how you applied this principle
7	Dialog initiative	Sketch#16,20, 28, 36 Flow#1,2 Flow#5	• System pre-emptive The user will not be able to continue without choosing one option from the modal dialog. such as when user deletes account /product / participate/list. - a message will pop up to choose the way to insert a shelf. • User pre-emptive - the user has the freedom to add shelf, add product, and category. - User can select the notification type.
8	Multi-threading (*if applicable*)	--	Not applied, our device is simple, there's no implementation for this princeple.
9	Task measurability (*if applicable*)	Flow #3.	If the product reached to minimum limit, the system would take control and add the product to the grocery list, also it's possible to transfer control to the user and he/she can add product does not reach to the minimum limit to the grocery list.
10	Substitutivity	Sketch#26,34	-There is more than one way for the user to know the status of the product (graph - the exact number).

		Sketch#32 Sketch#29,30 Flow#2	- user can choose the appropriate weight measurement unit (gram or kilogram) for each product. - there are multiple ways to add a shelf (scanning a barcode – code number).
11	Customizability	 Sketch#17 Sketch#35 Sketch#21 Flow#6	• Adaptability - user can change the language of the app. - user can change the color of the tap shelf in the app. - the user has the option to hide the expected price of the list if he doesn't want it. - user can control the accessibility of the participants in the share list.

Robustness Principles

Robustness is the level of support provided to the user in determining successful achievement and assessment of goals. All Four Robustness principles, observability, recoverability, responsiveness, and task conformance were implemented in our designs.

Table 3: Robustness Principles

Rule#	Principle		Sketch No/ User Flow No	Describe how you applied this principle
12 13	Observability	Browsability	Sketch #26	- user can see clearly the product's availability state, the amount of each product, the number of the shelf.
14 15		Defaults	Sketch #17 Sketch #32 Sketch#23, Flow#6.4, Flow#5 Flow#5	- English is the default language of the app. - The shelf will be added in the category "All" if the user did not add a category or skipped the process of adding a product. - The default state for the participants in the share list is "can edit". - The Notifications will be both "on" by defaults.
		Reachability	All Sketches	- The user can move around easily between the pages by the tab bar, or by the navigate arrow on the top left.
		Persistence	Sketch #26	- When a product reaches the minimum limit, the color of the circle will be red until the user refills it.
16		Recoverability	Sketch #4	- When the user makes a mistake during sign in such as entering a wrong password/email the system will show an informative error message.

17	Responsiveness	Sketch #18	-When user changes the language the download icon will appear where this an indication for user request.
18	Task Conformance	All sketches All Flows Sketch#12	- User has ability to do many tasks in the app such as inserting new product and shelf, creating new category, editing the grocery list, etc... (Take completeness) - The user can easily understand how to do tasks and reach their goals. (Task adequacy) - The user is provided with tutorial videos on how to do the main functions of the app. (Task adequacy)

Summary:

We initially observed that people struggle with their pantry, forgetting to include some items on their shopping list, finding it challenging to estimate the proper quantities to purchase because they are unsure of the quantities of the products in their pantry, and struggling to keep their pantry organized and clean ets...

Therefore, we offer e-pantry to assist customers in solving their pantry-related problems.

Tools

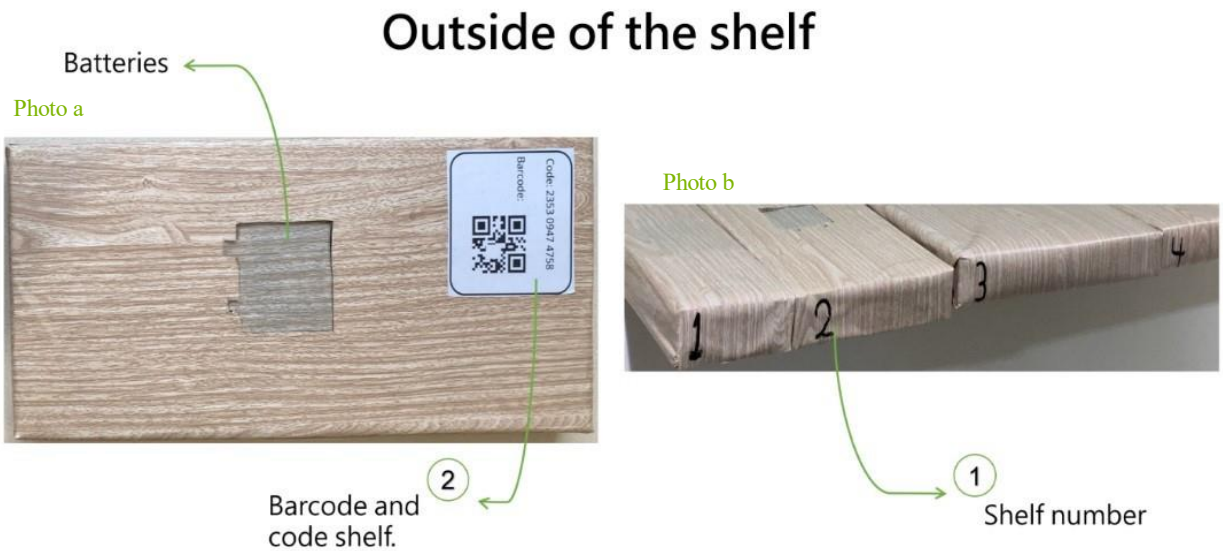
While developing our app we used a variety of tools to help us reach to the outcome that we desired, the tools are sup categorized into two categories hardware and software, hardware are the tools that we used to try to create a mock-up of our shelves, while the software are the tools that were used to create the UI.

- Hardware:

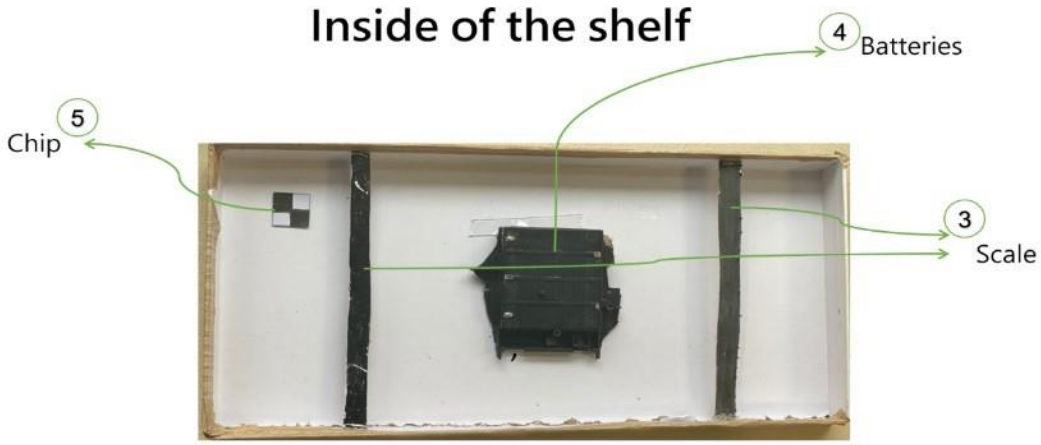
Our hardware is a shelf, we made a mock-up shelf by using carton box cover as "Shelf" covered with a wooden cover to be more realistic, with many components:

1- Shelf number: We hand-drawn it with a chalkboard pen, each shelf has its unique number (Graph 321).
2- The shelves code and barcode: we made it using printed paper, for add shelf in the app (Photo 2).
3- Scale: created from a cut carton box, painted black, and glued to our shelf, it acts as sensors to measure the product's weight to decrement and increment the number of products in each shelf (Graph 23.3).
4- Batteries: batteries from a kid's toy cut out and stuck it on our shelf, to supply the shelf with power so it can function (Graph 23.3).
5- Chip: Black-painted chip constructed of carton box; it exists to store a row data (Graph 23.3).

Graph 23: outside of the shelf photo



Graph 24: inside of the shelf photo



- Software:

-E-pantry UI was created using Figma (latest version 23.2.2), which we utilized on our laptops and mobile devices. Figma it is user-friendly and suitable for our needs and objectives since it has a lot of tools and flexibility so that we can make professionally interfaces, and we can make a flow for all pages, also ca, as a result, we built our pages and added some icons using Iconify.

-Video demonstration created by iMovie app (last version 3.0.1), An easy and flexible app that helped us cut video clips professionally, merge different clips, and insert sounds.

Features

Our shelves and app have many features that serve the user and meet all the requirements for their pantry, so after you purchase the smart shelves and upload E-pantry, you will get many features, including:

- For E-pantry app:

-Add shelf by two ways (barcode, code), to improve the user's freedom and flexibility when adding a shelf.

-Send notifications, to remind the user when product has reach to the minimum storage, also user has option to decide how to notifications send (Send a reminder or Add to the list or Both).

-The possibility of including people on the grocery list, as well as managing the user's accessibility in terms of editing and viewing.

-The availability of tutorial videos to aid in user comprehension of the app (such as how to add product, shelf, etc..).

-Divide shelves into categories, to give a user the ability to sort the shelves according to the category of the food.

-The possibility of knowing the expected price to the grocery list, to provide the user with a rough estimate of the cost to buy the items on the list, users can hide them if they don't need it.

-To make the program more flexible and usable, the user has a chance to change product information and change the product on the shelf.

-Giving the users auto-suggest when they try to add a product to the list by searching it, to facilitate access and satisfy the user.

-Get an efficient and joyful shopping experience because there is a grocery list available, allowing you to know the things you need.

-Giving the user the ability to sign in using different social media platforms.

-Giving the user the ability to change their password during sign-in in case they forgot it.

-Displaying the amount of the product on each shelf in a variety of methods, using a doughnut chart where the amount of filling and color fluctuate depending on amount of the product, or the number of product quantity .so, users can find what they look for quickly and easily.

-being able change the language from Arabic to English and vice versa, to suit the user's needs.

-After signing into the app, the user can update and modify their email and personal information.

-Having a section with all the app's social media accounts so that users can get in touch with us whenever they want.

-Having the ability to add new categories from numerous locations, to make it simpler for the user to do so anytime they need to.

-Having a checklist feature in the grocery list, to make the grocery shopping experience easier for the user.

- For the shelf:

-The user can easily replace the batteries.

-The shelves come in a variety of sizes, to accommodate various user needs and all types of foods.

-Each shelf has unique number, Therefore, the user can identify each shelf within the app by its number, even if the user has not added any product to the shelf yet.

- Each shelf has two ways to be connected to the app: either via barcode or a code, to increase the level of flexibility.

-The actual shelf is made of plastic and metal, we selected plastic to be the main material because it is cost-effective, long-lasting, and durable.

-Having the ability to accommodate various types of products from rice and sugar to canned food.

In conclusion, following the completion of all steps and procedures, we discovered that E-pantry and smart shelves were the preferred app for assistance from all types of people to meet their needs. We hope that the app's design will be clear and effective, in the coming phase, and well-liked by users. Finally, we produced an advertisement that includes information and instructions for using the E-Pantry app.

Video demonstration link:

https://youtu.be/MHW5UiCeUWc

Figma Link:

-pages

https://www.figma.com/file/kNO77DfUmbOUwnETjRKNIz/E-pantry(waref)?type=design&node-id=0%3A1&t=0PRXxfymFQPjGMs2-1

-Flow

https://www.figma.com/proto/kNO77DfUmbOUwnETjRKNIz/E-pantry(waref)?type=design&node-id=446-309&scaling=scale-down&page-id=0%3A1&starting-point-node-id=1%3A4

Usability testing

1- Participants

For the usability testing, in total, we have eight participants; each student has two participants of her own. Their ages range from 20 to 60, their genders are diverse, most of them have no prior experience with a comparable product, and their levels of knowledge with mobile website interfaces range from one to five, with one being the lowest and five being the highest.

Table 4: Participants

Participant name	*Age*	*Gender*	*Experience with similar products (1-5)*	*Use of mobile/website interface (1-5)*
1- Maha	50	Female	1	4
2- Raeed	23	Male	1	5
3- Elaf	20	Female	1	5
4- Basma	33	Female	2	5
5- Ameerah	20	Female	1	5
6- Noura	23	Female	1	5
7- Ahmed	60	Male	1	3
8- Asma	33	Female	2	5

2- Procedure

Outline of the procedure

Our procedure is going to be a field study where we will go to the user's environment to observe the system in action. This method has benefits and drawbacks. The benefits include the ability to observe users in their natural settings and observe how interactions play out in real-world situations. The drawbacks include the likelihood that users will be influenced by the evaluation team's recording environment and high levels of background noise.

Our participants are selected to reflect the expected user population; they will be asked to complete four predetermined tasks using E-panty's user interface. We, as the evaluators, will perform the testing using observational techniques and the query technique. Using the observational techniques, we will observe them interacting with the UI using the think-aloud technique, cooperative evaluation technique, protocol analysis technique with video and audio recording, and post-task walkthrough. Then, we will apply the query technique using a questionnaire, which is the System Usability Scale (SUS).

Timeline

User testing took place from Friday, May 26th to Sunday, May 28th.

We started the test by welcoming the participants, then introduced ourselves, explained the test, presented the consent form for them to read and sign, and then started the evaluation using the methods they agreed on. After we finished the evaluation, we asked them some questions that were part of the post-task walkthrough, and then we gave them the SUS questionnaire to fill out and give some suggestions.

Table 5: Timeline

Participant name	***Day***	***Date***	***Start session time***	***Finish session time***	***Duration of session***
1- Maha	Sunday	28/5/2023	9:30 AM	9:37AM	7m
2- Raeed	Sunday	28/5/2023	10:00 AM	10:05AM	5m
3- Elaf	Friday	26 / 5/ 2023	9:30 AM	9:42AM	12m
4- Basma	Friday	26 / 5/ 2023	1:00 PM	1:06AM	6m
5- Ameerah	Friday	26/5/2023	7:00 PM	7:05PM	5m
6- Noura	Saturday	27/5/2023	8:00 PM	8:07PM	7m
7- Ahmed	Sunday	28/5/2023	03:01 PM	03:06 PM	6m
8- Asmaa	Sunday	28/5/2023	12:30 PM	12:33PM	3m

Tasks

The first step in the testing process is to choose the tasks that will be performed by the user to evaluate the UI's performance. We chose four essential tasks to evaluate, and we tried to select tasks that would cover all of the app's functions (shelves, list, settings) so that we could get a fair usability evaluation of the entire app.

The first and primary task is to add a new shelf and a new product. After that, the user should add a product to the list. The third task is to control the accessibility of the participants in the shared list. And the last task is to change the notification's status in the settings.

Table 6: Tasks

Task #	***Task***	***Objective of the task***
1	Add new shelf, then add new product.	Check whether the user can add a shelf, and product correctly.
2	Add a product to the list.	Check whether the user can add a product to the list correctly.
3	Control the accessibility of the participants in the share list.	Check whether the user can control the accessibility of the participants in the share list.
4	Change the status of the notification.	Check whether the user can change the status of the notification.

Performance Measures and Feedback

We use a range of strategies in our testing process to obtain outcomes that are both useful and obvious. The "effectiveness" matrices, by which we quantify task success and the number of user errors encountered during testing, are what we used to gauge the app's performance. And "efficiency," in which we monitor the task's accomplishment within the allotted time. Additionally, "satisfaction" is measured by the user's response to surveys once the testing is complete.

Table 7: Performance Measures

Metric	***How was it measured?***	***How was the data created/captured?***
Effectiveness	Task success	By Observing the participants and count number of tasks completed successfully.
	Number of Errors	By absorbing the user while they are performing the task and counting the tasks that they don't finish or take a while to complete.
Efficiency	Time on Task	By setting a timer that counts the time for each task as well as the duration of the entire session.
Satisfaction	User surveys	We used Google Forms to create a survey with 12 questions, one for name, ten closed questions, and one open question for user suggestions. We asked the participant to fill it out after finishing the test. In order to determine the degree of user satisfaction, we calculated the responses that were received.

3- Results:

Task Completion Success Rate and Time on Task

We chose to use a timer to measure the amount of time the user spent on each task, and then, by calculating the average, we first determined if the user successfully completed each task. All participants successfully completed all 4 tasks (8/8), but task #1, which requires the user to add a new shelf and then add a new product, took the longest time (between 30 and 168 seconds, average = 57.375). Task #4 is about changing the notification's status; it takes less time than other tasks (between 9 and 18 seconds, average = 13.875). Task #2, which requires the user to add a product to the list, took time (between 8 and 38, average = 15.75), while task #3 took time (between 10 and 34, average = 18.375). Overall, the average time for all tasks varied from 13.875 to 57.375.

Table 8: Task Completion Success Rate and Time on Task

Participant	***Task 1*** (Add new shelf, then add new product)		***Task 2*** (Add a product to the list)		***Task 3*** (Control the accessibility of the participants in the share list)		***Task 4*** (Change the status of the notification)	
	Complete Task	***Time On Task***	***Complete Task***	***Time On Task***	***Complete Task***	***Time On Task***	***Complete Task***	***Time On Task***
1	√	32s	√	9s	√	10s	√	18s
2	√	30s	√	8s	√	19s	√	18s
3	√	32s	√	15s	√	26s	√	15s
4	√	40s	√	9s	√	11s	√	10s
5	√	30s	√	13s	√	14s	√	13s
6	√	32s	√	12s	√	34s	√	13s
7	√	168s	√	38s	√	22s	√	15s
8	√	95s	√	22s	√	11s	√	9s
Success	8/8	-	8/8	-	8/8	-	8/8	-
Completion Rates	100%		100%		100%		100%	
Average Time on Task	57.375s		15.75s		18.375s		13.875s	

Errors

In this section, we will identify the error that is obtained while the user is performing the task in order to determine whether it is critical or non-critical. "Non-critical" errors include those that occur while the user is performing the task but which the user can still complete, such as taking a long time to figure out the notification, and "critical "errors include those that occur while the user is performing the task but which the user cannot complete, such as can't find the button for notification.

Table 9: Errors

Tasks	*Number of errors*	*Errors description*	*Critical or non-critical (C, NC)*
Task 1	2	They don’t understand how add categories and take long time to figure it out.	NC
		They think they must add a category before adding the first shelf.	NC
Task 2	4	They took a long time to know where the list at.	**NC**
		didn't know how to add a product to the list, or it took too long to figure it out.	**NC**
Task 3	0	They took a long time to know where the share list at.	NC
Task 4	0	It took them a long time to know where the notification settings were.	NC

Summary of Data

To summarize the results, all the tasks were completed, but task one took the longest time because it combined adding a new shelf and a new product to the app with the ability to add a new category, and we believe that's the reason that led the users to take a long time on this task. Task two had the greatest number of errors, totaling 4, due to users' confusion over how to add a product to the list.

Table 10: Summary of Data

Tasks	*Task Completion*	*Errors*	*Time on Task*
Task 1	8	2	57.375
Task 2	8	4	15.75
Task 3	8	0	18.375
Task 4	8	0	13.875

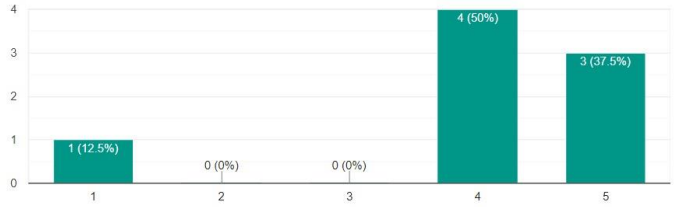
User Satisfaction

Using the SUS questionnaire, we measured user satisfaction; however, some of the questions were changed to better reflect our needs. "Strongly disagree" is represented by 1 in our questionnaire, and we'll keep going until we reach "strongly agree", which is represented by 5. We had to make changes to the SUS questionnaire since in some of its questions, a one indicates a higher level of user satisfaction, but in our situation, we need 5 to represent a higher level of satisfaction to determine the mean rating and the percent agree.

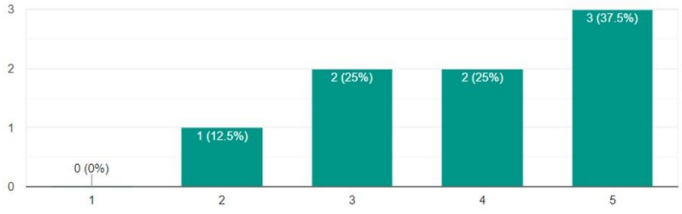
We calculated the mean rating for each question by adding the number representation of each response and then dividing them by the number of responses, and the percent agree was calculated by adding the number of strongly agree and agree responses and then dividing them by the number of responses and then multiplying them by 100. These two were calculated to know what the majority of the users think about E-pantry.

At this point, let's discuss the results. The highest satisfaction rate is 4.625, and it relates to finding the functions of the app well integrated. We believe that this requirement has the highest satisfaction rate. Since the functions of E-pantry are seamlessly integrated from the pantry to the account and the list, three out of 10 questions received an agreement present of 87.5%, indicating that the app matched these three requirements: wanting to use the app frequently, believing its features are well integrated, and finding the app to be consistent. Only one question got an agreement present of 50% and a 3.5 satisfaction rate, which is not needing to learn new things before using the app, and in our case, the user must purchase the shelf first and then read the shelf's instructions before they can start using the app.

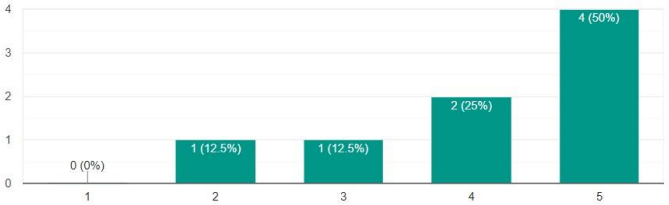
Graph 25:
1-I think I would like to use this app frequently.



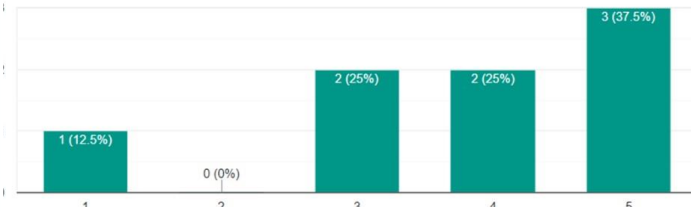
Graph 26:
2-I don’t find this app unnecessarily complex.



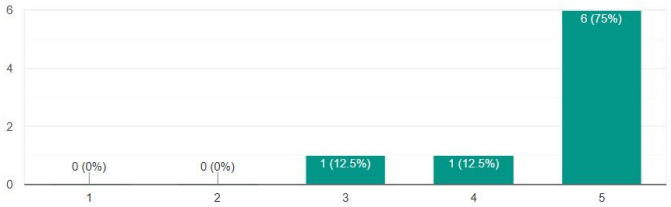
Graph 27:
3-I thought this app was easy to use.



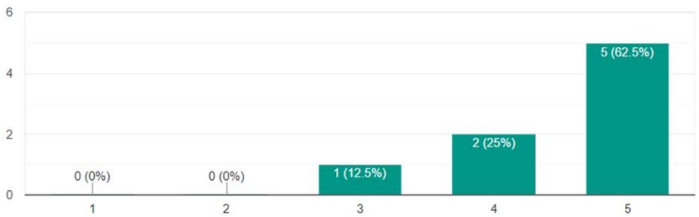
Graph 28:
4-I don’t think that would need assistance to be able to use this app.



Graph 29:
5-I found the various functions in this app.

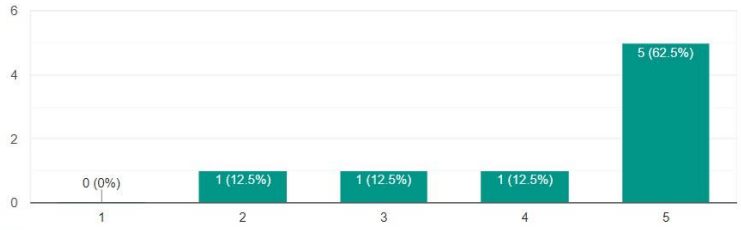


Graph 30:
6- I didn’t think there was too much inconsistency in this app.



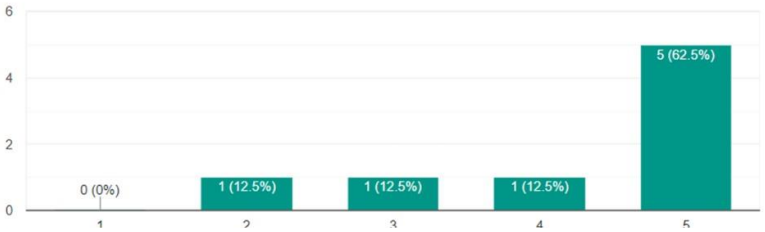
Graph 31:

7- I would imagine that most people would learn to use this app.



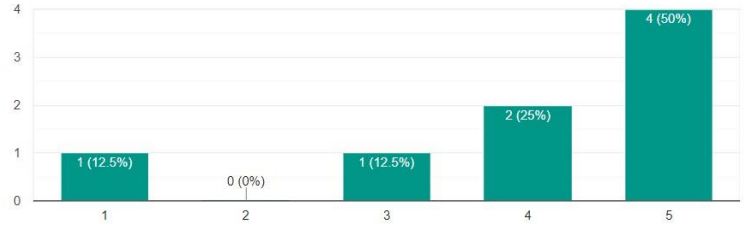
Graph 32:

8-I didn't find this app very cumbersome/awkward.



Graph 33:

9-I felt very confident using this app.



Graph 34:

10- I didn't need to learn a lot of things before I could get going with this app.

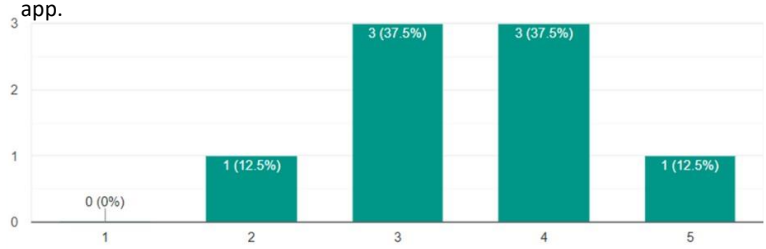


Table 11: User Satisfaction

Question	*Strongly Disagree*	*Disagree*	*Neutral*	*Agree*	*Strongly Agree*	*Mean Rating*	*Percent Agree**
1. I think that I would like to use this app frequently.	1			4	3	4	87.5%
2. I don't find this app unnecessarily complex.		1	2	2	3	3.875	62.5%
3. I thought this app was easy to use.		1	1	2	4	4.125	75%
4. I don't think that I would need assistance to be able to use this app.	1		2	2	3	3.75	62.5%
5. I found the various functions in this app were well integrated.			1	1	6	4.625	87.5%
6. I didn't think there was too much inconsistency in this app.			1	2	5	4.5	87.5%
7. I would imagine that most people would learn to use this app very quickly.		1	1	1	5	4.25	75%
8. I don't find this app very cumbersome/awkward to use.		1	1	1	5	4.25	75%
9. I felt very confident using this app.	1		1	2	4	4	75%
10. I didn't need to learn a lot of things before I could get going with this app.		1	3	3	1	3.5	50%

**Percent Agree (%) = Agree & Strongly Agree Responses combined*

a. Discussion:

After conducting 4 tests with 8 different participants, we identified two main sorts of test-related issues. The problems we discovered can be divided into major problems and minor problems; fortunately, we didn't face any critical problems while testing.

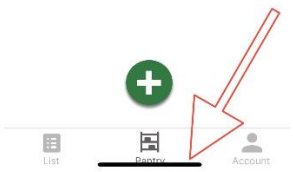
1- Critical problem:

We believe that there are no serious or critical problems since all the participants completed the test in a maximum of 12 minutes, taking into consideration their age and experience with similar products, they did not need any major help to complete all the tasks.

2- Major problem:

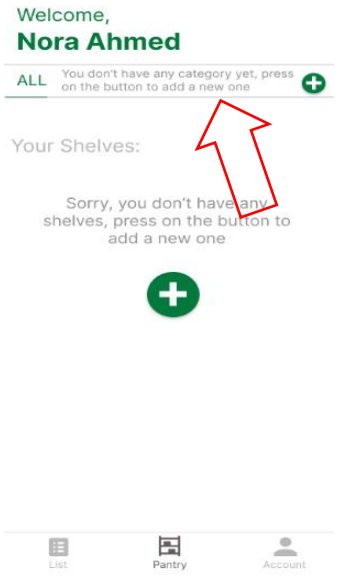
In task #2, it took two of the participants a while to figure out where the list page is, and we realized after the post-task walkthrough with both of them that the cause of this problem was the size of the tab bar since it was a bit smaller than most of the apps, and that made them unintentionally ignore it or at the very least not let it be their first guess when wanting to navigate to another page, but eventually they figured it out. In addition to that, the small size of the tab bar made the home indicator in iPhone devices cover some of its content (Graph 35).

Graph 35:tab bar screenshot



3- Minor problem:

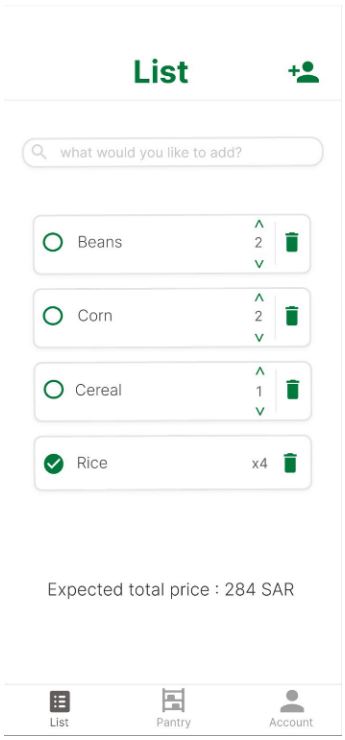
a- Some participants thought that they must first add a category before adding the shelves; however, in reality, the user can begin with either, whether it be adding a shelf or a category (Graph 36). After giving this issue a lot of thought, we end up realizing that adding a category from the home page is not a much-needed function since the user can add a new category when adding a product, so this function will be removed in order to effectively solve this issue and make our app more user-friendly.



Graph 36: Home page screenshot

b- In task #2, when the users entered the list page, two of them were unsure of where or how to add a new item to the list. We believe that this issue is due to the list page not having a plus button like the other pages but rather having a search bar from which users can add items to the list (Graph 37).

Graph 37: list page screenshot



b. Recommendations:

The usability testing step was helpful in making us see the app from another perspective, in addition to providing us with feedback from our potential users, which allowed us to discover errors that we were unaware of, and their recommendations and suggestions inspired us to develop solutions and improvements to those errors to enhance the usability of the interface.

After we discussed the errors and problems with the participants, we were able to classify the problems as "critical," "major," and "minor,".

Regarding critical problems, there might be no critical problems found in the app, especially in the tasks that have been tested; however, in the major problems, some participants didn't find the list page easily. After discussing this problem with the participants, we believe that the best way to address this issue is to change the size of the tab bar (Graph 36) so the word "list" appears more noticeably and can be clearly red if they don't understand the icon.

Another change we plan to make is that some users may have trouble understanding the “All” and” plus” icons when they want to choose a category when adding a product to the shelf. We thus think we should add a comment to make this function clearer to users.

Also, we faced a minor problem where the users couldn't figure out how to add a product to the list, and to fix this issue, we recommend getting rid of the search bar in (Graph 37) and replacing it with a plus button that opens a new page with a search box where you may look for the items you wish to add to the list.

In the future, we hope to make many improvements to the app and the shelves, including shelves with AI technology cameras that can recognize and read product information, which will save the user time and make the adding product function easier. We will also add a feature that can know the expiration date and inform the user when the date gets closer. We also hope to create a website to sell the shelves and deliver them to the user, which will increase the influence and profits of the E-pantry.

Conclusion:

The intentions of this project were to solve some of the problems that we noticed in our daily lives, such as having a hard time writing a grocery shopping list, forgetting to get some products when shopping since they do not know what exactly they have in their pantry, having a disorganized pantry that results in forgetting about some products in the pantry and not using them until they go bad, and much more.

E-pantry was developed to solve those problems. We reached out to the target audience by interviewing them and asking them to fill out questionnaires to understand their suffering, habits, and wishes on this subject so we could take a closer look at the situation and provide a better solution in a butter quality.

After receiving the responses, we conducted a percentage-based analysis to gain a more accurate understanding of their needs and preferences. And based on that we developed our personas, and also

determined the specific functions that the user can take advantage of that are simple to use and learn, such as a function to track all the products and their quantities in the pantry using the app, categorize the products, and to make a shopping list that includes any product that's about run out of pantry, providing the approximate cost of this list, the app sends a notification when a product is about to finish, and other features that will make the user's pantry more organized, and suitable for their needs, which will make the user use our application repeatedly.

The process of sketching and designing the application and determining the user flows was dependent on the design rules, to make the app more consistent and professional, we primarily used PowerPoint, Canva, and Figma to design our interfaces.

A usability test was conducted to evaluate our application and improve it by discovering the errors and problems we have, solving them, and benefiting from user's comments and suggestions to develop solutions.

In the future, we hope to make many improvements to the app and the shelves, including shelves with AI technology cameras that can recognize and read product information, which will save the user time and make the adding product function easier. We will also add a feature that can know the expiration date and inform the user when the date gets closer. We also hope to create a website to sell the shelves and deliver them to the user, which will increase the influence and profits of the E-pantry.

Resources:

1- Freepik website: https://www.freepik.com/free-vector/young-woman-character-animated-creation-people-with-emotions-face-animation-mouth_22383575.htm
2- Figma plugins: https://www.figma.com/community/tag/icons/plugins
3- Iconify website: https://iconify.design/
4- Google font website: https://fonts.google.com/icons?icon.style=Rounded
5- System usability scale: https://www.measuringux.com/SUS.pdf

Work Distribution:

Name	ID	Percentage	Work
Waref Alyousef	442200377	25%	Questions- Questionnaires- Interviews results- Questionnaires results- Solution- Sketches- Story Board- User Flow- hardware mock-up- shooting the video- summary-Figma-video transitions-Participants- Outline of the procedure- Timeline- Tasks- Summary of Data- User Satisfaction-graphs (25-34)- Table 11- Discussion Minor problem b- Recommendations
Reema Alkhaldi	443201003	25%	Introduction- Questions -Questionnaires-methodology-persona- Sketches –Design rule-user story-Summary - shooting the video- Figma- Timeline- Tasks- Recommendations-Conclusion-performance Measures- Table8,9,10.
Hind Alhujilan	443200971	25%	Questions- Questionnaires- Interviews results- Questionnaires results- Solution- Sketches - Design Rule- User Story - shooting the video-editing the video- Figma- video transitions.
Wiam Baalahtar	443200416	25%	Questions- Questionnaires- Introduction- Methodology- Persona - Sketches –Design Rule-User Story -shooting the video- Figma- summary- Participants-Timeline-Tasks- Performance Measures and Feedback-Results-Discussion-Conclusion-Facilitator Script.

Appendix A: Interviews:

Questions:

1- What are your pantry grocery shopping habits?
(ما هي العادات التي تفعلها بشكل متكرر اثناء التسوق لمخزن الأغذية الخاص بك؟)

2- How do you organize your pantry?
(ما هي طريقتك في ترتيب مخزن المواد الغذائية الخاص بك؟)

3- What are the problems that you face while buying pantry groceries?
(ما هي المشاكل التي تواجهها اثناء شراء أغذية المخزن؟)

4- How do you write your grocery shopping list? Do you consider it difficult and time consuming?
(ما هي طريقتك في كتابة قائمة تسوق الأغذية؟ وهل تعتبرها مهمة صعبة وتستغرق وقتا طويلا؟)

5- have you ever been shocked by the cost of your grocery shopping bill? If so, why?
(هل سبق أن ذُهلت بسعر فاتورة المشتريات الغذائية؟ ولماذا؟)

6- What is the minimum quantity of each product that requires you to restock it?
(ما هو الحد الأدنى لكمية كل منتج الذي عندما يصله تقوم بإعادة تخزينه؟)

7- Do you find it challenging to include the grocery shopping list with the wishes of the entire family? Do you have any solutions to this issue?
(هل تواجه صعوبة في إضافة رغبات جميع أفراد العائلة في قائمة تسوق الأغذية؟ وهل لديك اقتراحات لحل هذه المشكلة؟)

8- What do you think about smart shelves that can track the products in your pantry, would you get them, and why?
(ما هو رأيك في أرفف ذكية التي يمكنها تتبع المنتجات الموجودة في مخزنك، هل ستشتريها، ولماذا؟)

9- Is it important for you to be aware of how many items are left of each product you have in your pantry؟ If so, why?
(هل هناك أهمية بأن يكون لديك معرفة مسبقة بكمية توفر المنتجات في مخزنك؟، ولماذا؟)

10- Do you prefer aesthetically pleasing shelves or practical ones? and why?
(هل تفضل أرفف ذات منظر أنيق أم أرفف عملية؟، ولماذا؟)

Interview #1:

المقابل: وريف.
المقابل معه: مها، ٥٠ سنة.

ج١: كتابة الأغراض المطلوبة، التأكد من تاريخ الصلاحية، البحث عن السلع التي عليها عروض، الحرص على إحضار كل النواقص وعدم إغفال شي، التأكد من السعر الكلي يناسب الميزانية، شراء أغراض ربما لا نحتاجها ولا نستهلكها.

ج٢: أصنفها ثم أرتبها مراعية وضع السلع الاقدم في الأمام لاستهلاكها أولا، فأضع المنتجات الثقيلة كالأرز والسكر في الاسفل، وأضع في الرف بعدها المنتجات الخفيفة.

ج٣: نسيان بعض الطلبات، عدم توفر المطلوب، عدم معرفة الصنف الأجود.

ج٤: كتابة الطالبات على مدى أيام حتى لا أنسى شي. وأراها مهمة صعبة وتستهلك الكثير من الوقت لأنني غالبا ما أنسى تدوين أغراض ناقصة ولا أتذكرها كلها إلا بعد العودة للمنزل .

ج٥: نعم، لأننا نشتري أغراض ولا نحسب أسعارها قبل البدء بالتسوق فنتفاجأ بالسعر العالي.

ج٦: علبتان من كل منتج في المنتجات المعلبة، وفي الأكياس ككيس الأرز عند وصوله لنصف العلبة نعيد التخزين.

ج٧: نعم، المقترح أن يرسل كل فرد الأغراض التي يرغب بها إلى رب الأسرة. أيضا وضع ورقة على للثلاجة يدون كل فرد ما يريد.

ج٨: أراها تقنية ضرورية جدا وتوفر الوقت والجهد والمال وتحد من الهدر.

ج٩: نعم مهم جدا حتى يتسنى لي تحديد موعد الذهاب للتسوق، وللتأكد من توفرها لو أردت البدء في عمل صنف من الطعام.

ج١٠: أرفف عملية طبعا، لأن الأنيق لا يقدم إلا الجمال البصري، ينما العملي يخدمني كثيرا خاصة في ظل كثرة المشاغل وتشعبها.

Interview #2:

المقابل: وريف.
المقابل معه: رؤود، ٢٤ سنة.

ج١: من أهم العادات التي تساعدني بتوفير وقت أثناء التسوق هو أن يكون لدي قائمة تحوي جميع المشتريات التي أحتاجها، ولكيلا يقود ذلك لشراء مالا احتاجه أيضًا.

ج٢: لا يوجد ترتيب معين، ولكن قد اصنف وافرز المنتجات على سبيل المثال أن تكون المعلبات في جانب مخصص لها في المخزن .

ج٣: قد يكون نسيان بعض النواقص من أبرز المشاكل التي أوجهها عند التسوق، او عدم الانتباه أن بعض الأطعمة قد اقتربت من النفاذ.

ج٤: اكتب جميع الحاجيات في قائمة الكترونية واتفقدها أثناء التسوق لمعرفة المتبقي. قد تكون كتابة قائمة التسوق فيها القليل من الصعوبة في حالة لم أستطع بحصر جميع النواقص في المنزل. وتستوجب الكثير من الوقت لأنها مهمة تتطلب أكثر من التذكر لوحده، فأنا عليّ أن أتأكد بنفسي من الكميات المتبقية من مختلف المنتجات بشكل دوري.

ج٥: على الأغلب لا أذهل بسعر الفاتورة؛ لأني عندما أتسوق أتبع قائمة محددة وأحسب جميع الأسعار التي أضيفها لسلة التسوق لأتجنب أية مفاجآت عند محاسبة الفاتورة.

ج٦: يعتمد على نوع المنتج فالمعلمات أعيد تخزينها حين يبقى علبتان، أما المنتجات التي تأتي بكيس نفس الأرز والدقيق فأعيد تخزينها عنما تصل كمية الكيسة للمنتصف.

ج٧: قد تكون هذه أحد أبرز التحديات التي تواجه العوائل الكبيرة، لأن ذلك يتطلب سؤال أفراد الأسرة عن كل ما ينقصهم، من الممكن أن يتم وضع قائمة التسوق في مكان معروف لجميع أفراد الأسرة وأن يكون أيضًا تاريخ التسوق معروف، ليتسنى لجميع أفراد الأسرة كتابة ما يحتاجون من المتجر قبل تاريخ يوم التسوق.

ج٨: سيكون توفر تقنية تساعد في عملية الجرد للمخزن وحصر المنتجات التي قاربت على الانتهاء فعالًا جدًا ويختصر الكثير من الوقت.

ج٩: نعم، معرفة الكميات المتبقية هو أساس الذهاب للمتجر للشراء، بدون معرفة الكميات المتبقية قد يقود إلى هدر للمال في حالة الشراء أكثر من اللازم، أو على النقيض تمامًا فقد يتم نسيان شراء بعض المنتجات إذا لم تكن لدي المعرفة الكاملة بما يتوفر لدي في المخزن.

ج١٠: اعتقد أنه يمكن الجمع بين المنظر الأنيق والعملية، ولن ان اضطررت للاختيار فسأختار العملي لأنه سيوفر علي الكثير من الوقت والمال على المدى البعيد.

Interview #3:

المقابل: ريما.
المقابل معه: منيرة ،٤٨ سنة.

ج١: من العادات المعتادة لدي هي التركيز على شراء المنتجات الأكثر أهمية واستهلاك عن طريق وضعها في مقدمه قائمة التسوق بعد ذلك التركيز على تواريخ الانتهاء للمعرفة الحد او الكمية الأعلى التي يمكنني شراءها واستخدامها اثناء هذي الفترة .

ج٢: وضع بعض أنواع الطعام في منظمات خاصه ووضعها في مكانها المخصص حسب نوع الطعام أيضا يكون الترتيب حسب الأهمية حيث المنتجات المهمة والأكثر استهلاك تكون الأقرب للنظر مثل الأرفف السفلية والأقل أهمية ابعد .

ج٣: من المشاكل التي أوجهها هي عدم معرفتي للكمية الكافية التي تتناسب مع مدى استهلاكي وأيضا وقت بحثي للمنتجات التي نفذت او قاربت النفاذ.

ج٤: وضع قائمة في الجوال، نعم بسبب اختلاف متطلبات ومدى استهلاك أفراد الأسرة فهذا الاختلاف يؤدي إلى اخذ وقت أكثر وعدم ثبات او سهوله كتابة القائمة.

ج٥: نعم بسبب انه اختلاف السعر للمنتجات المعتاد شرائها عن ا لمتوقع ومن الممكن يكون بسبب تغييري للكمية ووزن المنتج عن المعتاد.

ج٦: حسب المنتج وأهميته حيث انه بعض المنتجات الجانبية يكون الحد الأدنى هو عند انتهائها لكن المنتجات الأساسية أو الضرورية أقوم بشرائها عندما تقارب من النفاذ مثل الأرز والسكر.

ج٧: نعم كثيرا بسبب اختلاف الطلبات والاعداد والاهتمامات وهذا يؤدي الى اختلاف السعر المتوقع بعض الحلول أقوم بتغيير ترتيب الرغبات ووضع الأولوية كل فتره لشخص معين.

ج٨: تقنيه مفيدة وفعاله باعتبارها تختصر عليّ الكثير من الوقت وتسهل عليّ عملية التسوق وتوفير المال ومعرفة الحد التقريبي للسعر .

ج٩: نعم بسبب انها تقوم بحفظ الكثير من المال وحفظ المنتجات واستهلاكها قبل الانتهاء.

ج١٠: أفضل الأرفف العملية لإنه سوف أقوم باستهلاكها بشكل كبير ودائم لذا أريد أرفف عمليه وتتحمل مختلف الأوزان.

Interview #4:

المقابل: ريما.
المقابل معه: نورة،٢٥سنة.

ج١: التركيزعلى تاريخ الانتهاء والاهتمام بالقيمة الغذائية واستغلال العروض.

ج٢: أراعي دائمًا في ترتيبي للمنتجات أن أقسمها لفئات معينه مثل: تاريخ الانتهاء -النوعية (بقوليات وغيرها) -الحجم .

ج٣: التلاعب بالأسعار بتغيير سعر المنتج فالنظام عن العرض وقله عدد المحاسبين وتكدس المنتجات على الرفوف مما يسبب صعوبة عند أخذ منتج معين.

ج٤: وضع ورقة مصنفه تبعًا لنوعية المنتجات مع تحديد الميزانية -مهمة سهله لمحدودية المنتجات التي يتم استخدامها.

ج٥: لا وذلك لأنني دائمًا أضع سعر تقديري فالحسبان.

ج٦: في حاله المنتجات الرئيسية مثل الخبز والحليب أحرص على أن أجلب المزيد منها قبل انتهائها أما المنتجات الأخرى أقوم بتعبئتها بعد انتهائها بشكل كامل.

ج٧: أحيانًا بالرغم من إعدادي لقائمة مشتريات قد أنسى إضافة بعض المنتجات -ابتكار وسيلة تتيح إبلاغ أفراد الأسرة وذلك من خلال قائمه الكترونيه يتمكن أفراد الأسرة بتعديل المنتجات وتحديثها.

ج٨: خدمة جميلة وموفرة للمال بحيث تتجنب شراء اي منتج قد يكون لديك الكثير منه دون علمك.

ج٩: نعم حتى لا يتم تكديس المنتجات فالمخزن بغض النظر عن الخسائر المالية.

ج١٠: أفضل عمليه لاستخدامها لأطول فتره ممكنه وتجنب تغييرها بشكل دوري.

Interview #5:

المقابل: هند.
المقابل معه: أحمد، ٦٠ سنة.

ج١: اتابع أوقات التخفيضات وأستفيد منها، واطلب من أهلي تقديم قائمة طلباتهم بشكل اسبوعي وأنسق القائمة والشراء من الأسواق التي تقدم أفضل عروض الأسعار.

ج٢: احفظ في المخزن المكسرات والبقوليات الجافة والمعلبات والبهارات والملح والسكر والزيوت، وأرتبهم حسب تاريخ انتهاء صلاحيتهم بحيث يكون المنتج الاقدم هو الاقرب لليد والعين.

ج٣: بعض الاحيان اثناء التسوق يرسل الاهل اضافات متكررة وأحيانا حتى بعد ما اخرج من السوق يرسلون مقاضي اضافيه فعدم وجود قائمة كاملة مشكلة اعاني منها.

ج٤: طريقتي هي أني أكتب قائمة أبجدية شاملة كمرجع للطلبات ثم اخذ قائمة طلبات الاهل وادققها وانسقها، وهذي القائمة تتحدث حسب الظروف والمواسم، طبعا المهمة ليست صعبة بالنسبة لي الان ولا تأخذ مني الكثير من الوقت، وأعتقد أن الوقت المطلوب لإعدادها يختلف من شخص لآخر لأنها تعتمد على الخبرة وعلى مدى تعاون العناصر المشاركة في اعدادها، مثل (الزوجة والخادمة)، فاذا كانوا يكتبون القائمة بشكل مستمر كلما نقص منتج ستكون مهمة سهلة.

ج٥: نعم، لأني وقتها لم أحدد مسبقا الأسعار والكميات، وقد أشتري أغراض غير مذكورة في القائمة.

ج٦: يعتمد على نوعية المنتج وسعره ومدة صلاحيته وكمية استهلاكنا له، فكل منتج له حد أدنى خاص به.

ج٧: احيانا، حيث تختلف الأذواق بين أفراد الاسرة ويمكن حل ذلك اما باعتماد اصناف متفق عليها او التناوب في تلبية طلبات كل منهم.

ج٨: سيكون شيئًا ممتازًا، تبدو كتقنية تسهل عليك الحياة وتأخذ عن عاتقك مسؤولية متعبة.

ج٩: بالتأكيد نعم، وذلك لتجنب الإحراج عند تعذر اعداد وجبة ما بسبب عدم توفر بعض عناصرها، ولتجنب الاضطرار لشرائها بسعر مرتفع.

ج١٠: أحب أن تكون عملية وأنيقة معاً، لكن عند تعذر ذلك فأن تكون عملية هو اهم عندي.

Interview #6:

المقابل: هند.
المقابل معه: أسماء، ٣٣ سنة.

ج١: أبدأ التسوق بالخضار والفواكه ثم المخبوزات والمعلبات والمبردات وأنتهي بالمجمدات، أهتم بقراءة مكونات المنتجات قبل شرائها، وأطلع على العروض وأقارن الأسعار.

ج٢: في الواقع مخزن الأغذية الخاص بي فوضوي بعض الشيء بسبب أنه لا يوجد عندي طريقة معينة في ترتيبه، فبعد التسوق أقوم بوضع كل المنتجات المتشابهة بالقرب من بعض، ولكني لا أقوم بعمل ترتيب دوري الا نادرًا .

ج٣: عدم وجود الاسعار على بعض المنتجات، عدم توفر كل القائمة في محل واحد فأضطر للذهاب لعدة محلات خصوصا لو كنت ابحث عن الجودة والسعر الأفضل.

ج٤: لا أكتب قائمة لأني لا أحب هذه المهمة أبدًا أفضل أن أذهب للسوق وأمر على أغلب الأرفف وأتذكر احتياجاتي، وأحيانًا أغير المنتجات المقررة لطبخة معينة الى منتجات اخرى مخفضة تناسب طبخة اخرى.

ج٥: غالبًا، لأن الاسعار تبدو معقولة وهي متفرقة فتكون أكبر من المتوقع إذا اجتمعت.

ج٦: يعتمد على المنتج لكن غالبا إذا أصبح يكفي مرتين الى ٤ مرات من الاستخدام أعيد تخزينه.

ح٧: لا ليس هناك مشكلة لأن عائلتي صغيرة ونذهب للسوق سويًا .

ج٨: هذه فكرة ممتازة بالنسبة للأشخاص الذين لا يحبون كتابة قوائم التسوق مثلي .

ج٩: نعم خصوصًا للمنتجات الاستهلاكية لكي يتم شراء كمية جديدة عند اقترابها من النفاذ.

ج١٠: كلاها جيد لكن العملية أهم للمنتجات الاستهلاكية (الاستخدام الدائم) والانيقة للمنتجات قليلة الاستخدام.

Interview #7:

المقابل: وئام
المقابل معه: ساره, ٢٤ سنة.

ج١: البحث عن مركز يبيع جميع المنتجات الغذائية التي احتاجها، وأيضا شراء منتجات غذائية صحية قدر الإمكان، استخدام قسائم الشراء.

ج٢: اضعها بشكل ارتجالي في المخزن، ولكني أجد صعوبة فيما بعد بالبحث عما احتاج وفي عملية الجرد، وأحيانا أحاول ترتيبها بحيث اجعل الأشياء التي استعملها بشكل متكرر أقرب لمتناول اليد وعلى أطراف الرف، بينما الأقل استخدامًا اضعه في الخلف.

ج٣: اواجه صعوبة في انني أهمل شراء المنتجات الغذائية الأساسية وبدلًا من ذلك، اشتري مسليات غير ضرورية او منتج غذائي سبق وجودة بشكل كافي في المخزن، وهذا أدى لوجود منتجات معينه بكميات كبيره في المخزن، وكذلك أجد صعوبة في تحديد الكميات والأحجام التي اشتريها.

ج٤: نعم، في الحقيقة انا لا اكتب قائمة تسوق لأنها تأخذ وقت وجهد كبير مني، وعندما اقرر كتابتها أجد صعوبة في تذكر الأشياء خاصتا إذا لم يتبقى منها شيء في المخزن.

ج٥: نعم، لأنني سبق وذكرت بأني لا اكتب قائمة تسوق، فهذا أدى بغض الأحيان الى زيادة في الفاتورة بسبب شراء أشياء موجودة مسبقا في المخزن بكميه كافيه او شراء حاجيات غير ضرورية، او شراء احجام كبيرة لا اشتريها عادتًا .

ج٦: يعتمد ذلك على نوع المنتج واستخدامي له، فمثلًا الأشياء الضرورية والتي يتم استعمالها بشكل يومي اشتريها بشكل اسبوعي، وأحيانا اشتري كميات كبيرة منها بحيث اعيد شرائها شهريًا، اما بالنسبة لباقي المنتجات الغذائية ففي غالب الأحيان اعيد شرائها عندما الاحظ تبقّي علبة.

ج٧: في الواقع اسألهم عبر قروب واتس اب عن ماذا يحتاجون قبل ذهابي للتسوق، ولكني أجد صعوبة احيانًا في ارسالهم المتكرر بأوقات متفاوتة خصوصًا عند ارسالهم بعد خروجي من السوبرماركت.

ج٨: اظن انني احتاج تقنية مشابهه لها، حيث انها ستوفر الكثير من الوقت، ولن اتفاجأ بعدم وجود بعض المنتجات اللازمة عندما ابدأ بطبخه معينه، ولكن قد تكون غير مناسبه للأشخاص ذو الأعمار الكبيرة، حيث خبرتهم في التقنية قليله واعتادوا على الأساليب البسيطة.

ج٩: أجد أنها مهمه للغاية، لان ذلك سيساعد على الحد من شراء المنتج بكمية زائدة، او نسيان بعض المنتجات المهمة، وكذلك التقليل من عدد مرات الذهاب الى المتجر.

ج١٠: أفضل الارفف ذات المنظر الأنيق، لان ذلك يعطي منظر جمالي للمخزن، وبالتالي سيحفزني ذلك على إبقاء الرفوف منظمة لحد أطول.

Interview #8:

المقابل: وئام.
المقابل معه: بسمة, ٤٤ سنة.

ج١: كتابة قائمة فيها كل المنتجات الغذائية الضرورية، ترتيب المخزن وتنظيمه بشكل دوري بحيث اتأكد من وجود وعدم وجود المنتجات الغذائية، اصطحاب أحد أفراد الأسرة عند الذهاب، فحص المنتج والتأكد من تاريخ انتهائه، عدم شراء المنتجات التي تنتهي صلاحيتها بسرعة بكميات كبيرة (كالخضروات والفواكه).

ج٢: اخصص رف لكل الأشياء المتشابه فمثلا اضع المعلبات برف واحد، والاشياء التي يتم استعمالها بشكل يومي برف واحد، والمنتجات التي اشتريها بأحجام كبيرة (كالرز والسكر والمكرونة...) برف واحد.

ج٣: ليست لدي مشاكل كثيره اثناء التسوق، ولكن من أبرز الأشياء التي اعاني منها هي عدم معرفة الشركة الأنسب للمنتج الواحد، وكذلك شراء احجام غير مناسبة، والوصول الى الأرفف البعيدة، وايضًا الانتظار الطويل بصف الحاسبة .

ج٤: احضر ورقة بها جميع الأشياء التي احتاجها والتأكد من وجودها في المخزن او عدم وجودها وسؤال افراد العائلة ومن ثم كتابة طلباتهم بالقائمة، نعم أجد انها مهمه صعبة وتحتاج الى وقت، ولكنها مفيدة من ناحية تجنب النسيان وتقليل العشوائية في الشراء.

ج٥: لا، لأنني أحاول قدر الإمكان تجنب شراء منتجات لم اخطط لشرائها في قائمة التسوق، ولكن في بعض الأحيان اتفاجأ عندما اذهب الى مركز تسوق لم اعتاد على الذهاب اليه، فيكون هناك اختلاف في الأسعار عن الذي اعتدته.

ج٦: يعتمد ذلك على الكمية والشهر والاكل اليومي، فمثلًا الحد الأدنى لشهر رمضان يكون مختلف عن الأشهر الباقية، ولكن في الغالب يكون الحد الأدنى للأشياء التي استعملها بشكل يومي او شبه يومي (2-3) وبعدها أقوم بشرائها، وبالنسبة لباقي المنتجات (التي لا استعملها بشكل يومي) اشتريها عندما الاحظ نفاذها او عندما اريد تجربة طبخة جديدة.

ج٧: نعم، لان عائلتي كبيره واستهلك طاقة وجهد بالذهاب لكل واحد وتسجيل ماذا يريد واحيانًا يكون أحدهم خارج المنزل واضطر للاتصال به وفي بعض الأحيان لا يرد.

ج٨: تقنية ممتازة، حيث ان ذلك سيوفر عليّ الكثير من الجهد، كما انني في بغض الأحيان أنسى تسجيل بعض المنتجات الناقصة في قائمة التسوق، ولن احتاج الى الذهاب الى المخزن في كل مره اود فيها من تجهيز قائمة التسوق .

ج٩: طبعًا، لأنه سيسهل علي معرفة ماذا احتاج وماهي المنتجات المتوفرة بشكل كافي او التي اقتربت من الانتهاء، ولكن يصعب تسجيل كمية توفر المنتجات بشكل يدوي.

ج١٠: اختار الارفف العملية، لأنها ستبقى معي لفترة أطول، وستسهل على المحافظة عليها وإعادة تخزينها.

Appendix B: Questionnaires:

Questions:

1-Does it take a lot of time to figure out the products that need a restock in your pantry?

i-Yes ii- No

2-How many products do you usually forget to buy when you shop for pantry's groceries?

i- 0-2 ii- 3-5 iii- 6-8 iv- 9 and more

3-Are you the only person responsible for writing the shopping list in your home?

i- Yes ii- No

4- Do you find products that were not used during your periodic arrangement of pantry?

i- Rarely ii- Sometimes iii- Mostly iv- Always

5-Do you use shelves in your pantry?

i- Yes ii-No

6-How many smart shelves will you be willing to buy for your pantry?

i-0 ii- 3-1 iii- 6-4 iv- 9-7 v-10 and more

7-What do you want to happen when your product reaches its limit?

i- Receive a notification ii- Add it to the pantry shopping list iii- Both

8-Is owning a smart shelf going to save you money?

i- Yes ii- No iii- Maybe

the link to the questionnaire: https://forms.gle/ko5jdheXDbRxpAG77

the link to the raw data: https://docs.google.com/spreadsheets/d/1UMHCEaI0V07HhisGQUJTlzUh6dfWvVi61MNNcp5N9qM/edit?usp=sharing

Appendix C:

Facilitator Script

Scenario:

Imagine having a busy life filled with obligations, such as writing a grocery list and going supermarket, but you always struggle to identify the pantry's deficiencies and the proper quantities. By chance, you came across an advertisement for smart shelves linked to an E-pantry app that has a variety of features that will help you save a ton of time and effort by getting your pantry organized and list-ready.

Tasks:

1-Add new shelf, then add new product.

2-Add product to the list.

3-Control the accessibility of the participants in the share list.

4-Change the status of the notification.

Satisfaction Questionnaire Form

What is your name?

1-I think I would like to use this app frequently.

- 1. Strongly disagree
- 2. disagree
- 3. Neutral
- 4. Agree
- 5. Strongly Agree

2- I don't find this app unnecessarily complex.

- 1. Strongly disagree
- 2. disagree
- 3. Neutral
- 4. Agree
- 5. Strongly Agree

3-I thought this app was easy to use.

- 1. Strongly disagree
- 2. disagree
- 3. Neutral
- 4. Agree
- 5. Strongly Agree

4- I don't think that I would need assistance to be able to use this app.

- 1. Strongly disagree
- 2. disagree
- 3. Neutral
- 4. Agree
- 5. Strongly Agree

5-I found the various functions in this app.

- 1. Strongly disagree
- 2. disagree
- 3. Neutral
- 4. Agree
- 5. Strongly Agree

6- I didn't think there was too much inconsistency in this app.

- 1. Strongly disagree
- 2. disagree
- 3. Neutral
- 4. Agree
- 5. Strongly Agree

7- I would imagine that most people would learn to use this app.

- 1. Strongly disagree
- 2. disagree
- 3. Neutral
- 4. Agree
- 5. Strongly Agree

8- I don't find this app very cumbersome/awkward to use.

- 1. Strongly disagree
- 2. disagree
- 3. Neutral
- 4. Agree
- 5. Strongly Agree

9-I felt very confident using this app.

- 1. Strongly disagree
- 2. disagree
- 3. Neutral
- 4. Agree
- 5. Strongly Agree

10- I didn't need to learn a lot of things before I could get going with this app.

- 1. Strongly disagree
- 2. disagree
- 3. Neutral
- 4. Agree
- 5. Strongly Agree

Please provide any comments about this app. (Open question)

the link to the questionnaire: https://forms.gle/FzWfzA2id2SzAs3L7

the link to the raw data:
https://docs.google.com/spreadsheets/d/1UGBl7Gets36XGLdIInMLaPeXct4G-Y1NAn7YhOcTZzo/edit?usp=sharing

Consent Form:

Graph 38: Consent forms

EVALUATION E-PANTRY APPLCATION

Goal:
The goal of this evaluation is to test the usability of the E -pantry app prototype, in order to improve this app in terms of user- friendliness.

Procedure:
In your environment you will carry out tasks with the prototype, which will be provided by the evaluator. While carrying out the tasks you are asked to think aloud, and you are encouraged to see yourself as a collaborator in the evaluation, also the evaluator can ask you questions during the evaluation as well as you can ask the evaluator anything that comes to your mind. After completing the tasks, the evaluator will ask you some questions and tell you to walk through the tasks that you just preformed, and you will fill in a short questionnaire. The evaluation will take around 25 minutes.

You may stop, take a break, or ask a question at any moment.

Recording:
We ask for your permission to record the evaluation session to allow the design team to observe and analyze it and benefit from your comments for the purpose of improving the designs being tested, the recording will only be used by the design team and will not be shared with anyone outside the team.

Participation doesn't have any risks or consequences for you.
- Your answers and details will be processed anonymously.
- We judge the quality of the prototype, not your performance.

Informed consent:
By signing this form, you acknowledge to have read and understood the information in this document and agree to this information.

Name:
Date:
Signature:

Do you agree with the recording?
- ❑ Yes, video, and sound recording.
- ❑ Yes, only sound recording.
- ❑ No, rather not.

EVALUATION E-PANTRY APPLCATION

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Participation doesn't have any risks or consequences for you.
- Your answers and details will be processed anonymously.
- We judge the quality of the prototype, not your performance.

Informed consent:
By signing this form, you acknowledge to have read and understood the information in this document and agree to this information.

Name: نورة الخلاوي
Date: 27/5/2023
Signature:

Do you agree with the recording?
☑ Yes, video, and sound recording.
☐ Yes, only sound recording.
☐ No, rather not.

EVALUATION E-PANTRY TOOL

Goal:
The goal of this evaluation is to test the usability of the E-pantry tool prototype, in order to improve this tool in terms of user- friendliness.

Procedure:
You will carry out tasks with the prototype, which will be provided by the facilitator. While carrying out the tasks you are asked to think aloud. After completing the tasks, you will fill in a short questionnaire and the facilitator will ask you some questions. The evaluation will take around 25 minutes.

You may stop, take a break, or ask a question at any moment.

Recording:
We ask for your permission to record the evaluation session to allow the design team to observe and analyze it and benefit from your comments for the purpose of improving the designs being tested, the recording will only be used by the design team and will not be shared with anyone outside the team.

Participation doesn't have any risks or consequences for you.
- Your answers and details will be processed anonymously.
- We judge the quality of the prototype, not your performance.

Informed consent:
By signing this form, you acknowledge to have read and understood the information in this document and agree to this information.

Name:
Date: 28/5/2023
Signature:

Do you agree with the recording?
☑ Yes, video, and sound recording.
☐ Yes, only sound recording.
☐ No, rather not.

EVALUATION E-PANTRY APPLCATION

Goal:
The goal of this evaluation is to test the usability of the E-pantry app prototype, in order to improve this app in terms of user- friendliness.

Procedure:
In your environment you will carry out tasks with the prototype, which will be provided by the evaluator. While carrying out the tasks you are asked to think aloud, and you are encouraged to see yourself as a collaborator in the evaluation, also the evaluator can ask you questions during the evaluation as well as you can ask the evaluator anything that comes to your mind. After completing the tasks, the evaluator will ask you some questions and tell you to walk through the tasks that you just preformed, and you will fill in a short questionnaire. The evaluation will take around 25 minutes.

You may stop, take a break, or ask a question at any moment.

Recording:
We ask for your permission to record the evaluation session to allow the design team to observe and analyze it and benefit from your comments for the purpose of improving the designs being tested, the recording will only be used by the design team and will not be shared with anyone outside the team.

Participation doesn't have any risks or consequences for you.
- Your answers and details will be processed anonymously.
- We judge the quality of the prototype, not your performance.

Informed consent:
By signing this form, you acknowledge to have read and understood the information in this document and agree to this information.

Name:
Date: 26/5/2023
Signature:

Do you agree with the recording?
☑ Yes, video, and sound recording.
☐ Yes, only sound recording.
☐ No, rather not.

EVALUATION E-PANTRY APPLCATION

Goal:
The goal of this evaluation is to test the usability of the E-pantry app prototype, in order to improve this app in terms of user- friendliness.

Procedure:
In your environment you will carry out tasks with the prototype, which will be provided by the evaluator. While carrying out the tasks you are asked to think aloud, and you are encouraged to see yourself as a collaborator in the evaluation, also the evaluator can ask you questions during the evaluation as well as you can ask the evaluator anything that comes to your mind. After completing the tasks, the evaluator will ask you some questions and tell you to walk through the tasks that you just preformed, and you will fill in a short questionnaire. The evaluation will take around 25 minutes.

You may stop, take a break, or ask a question at any moment.

Recording:
We ask for your permission to record the evaluation session to allow the design team to observe and analyze it and benefit from your comments for the purpose of improving the designs being tested, the recording will only be used by the design team and will not be shared with anyone outside the team.

Participation doesn't have any risks or consequences for you.
- Your answers and details will be processed anonymously.
- We judge the quality of the prototype, not your performance.

Informed consent:
By signing this form, you acknowledge to have read and understood the information in this document and agree to this information.

Name:
Date: 28/5/2023
Signature:

Do you agree with the recording?
☑ Yes, video, and sound recording.
☐ Yes, only sound recording.
☐ No, rather not.

EVALUATION E-PANTRY APPLCATION

Goal:
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Procedure:
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You may stop, take a break, or ask a question at any moment.

Recording:

We ask for your permission to record the evaluation session to allow the design team to observe and analyze it and benefit from your comments for the purpose of improving the designs being tested, the recording will only be used by the design team and will not be shared with anyone outside the team.

Participation doesn't have any risks or consequences for you.

- Your answers and details will be processed anonymously.
- We judge the quality of the prototype, not your performance.

Informed consent:

By signing this form, you acknowledge to have read and understood the information in this document and agree to this information.

Name: [illegible]

Date: 28/5/2023

Signature: [illegible]

Do you agree with the recording?

- ☑ Yes, video, and sound recording.
- ☐ Yes, only sound recording.
- ☐ No, rather not.

EVALUATION E-PANTRY TOOL

Goal:
The goal of this evaluation is to test the usability of the E-pantry tool prototype, in order to improve this tool in terms of user- friendliness.

Procedure:
You will carry out tasks with the prototype, which will be provided by the facilitator. While carrying out the tasks you are asked to think aloud. After completing the tasks, you will fill in a short questionnaire and the facilitator will ask you some questions. The evaluation will take around 25 minutes.

You may stop, take a break, or ask a question at any moment.

Recording:

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Informed consent:

By signing this form, you acknowledge to have read and understood the information in this document and agree to this information.

Name: [illegible]

Date: 28/5/2023

Signature: [illegible]

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- ☑ Yes, video, and sound recording.
- ☐ Yes, only sound recording.
- ☐ No, rather not.

EVALUATION E-PANTRY APPLCATION

Goal:
The goal of this evaluation is to test the usability of the E-pantry app prototype, in order to improve this app in terms of user- friendliness.

Procedure:
In your environment you will carry out tasks with the prototype, which will be provided by the evaluator. While carrying out the tasks you are asked to think aloud, and you are encouraged to see yourself as a collaborator in the evaluation, also the evaluator can ask you questions during the evaluation as well as you can ask the evaluator anything that comes to your mind. After completing the tasks, the evaluator will ask you some questions and tell you to walk through the tasks that you just preformed, and you will fill in a short questionnaire. The evaluation will take around 25 minutes.

You may stop, take a break, or ask a question at any moment.

Recording:

We ask for your permission to record the evaluation session to allow the design team to observe and analyze it and benefit from your comments for the purpose of improving the designs being tested, the recording will only be used by the design team and will not be shared with anyone outside the team.

Participation doesn't have any risks or consequences for you.

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- We judge the quality of the prototype, not your performance.

Informed consent:

By signing this form, you acknowledge to have read and understood the information in this document and agree to this information.

Name: أمين الخالدي

Date: 26/5/2023

Signature: [illegible]

Do you agree with the recording?

- ☑ Yes, video, and sound recording.
- ☐ Yes, only sound recording.
- ☐ No, rather not.

EVALUATION E-PANTRY APPLCATION

Goal:
The goal of this evaluation is to test the usability of the E-pantry app prototype, in order to improve this app in terms of user- friendliness.

Procedure:
In your environment you will carry out tasks with the prototype, which will be provided by the evaluator. While carrying out the tasks you are asked to think aloud, and you are encouraged to see yourself as a collaborator in the evaluation, also the evaluator can ask you questions during the evaluation as well as you can ask the evaluator anything that comes to your mind. After completing the tasks, the evaluator will ask you some questions and tell you to walk through the tasks that you just preformed, and you will fill in a short questionnaire. The evaluation will take around 25 minutes.

You may stop, take a break, or ask a question at any moment.

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Participation doesn't have any risks or consequences for you.

- Your answers and details will be processed anonymously.
- We judge the quality of the prototype, not your performance.

Informed consent:

By signing this form, you acknowledge to have read and understood the information in this document and agree to this information.

Name: إبراهيم الشعوبي

Date: 26/5/2023

Signature: [illegible]

Do you agree with the recording?

- ☑ Yes, video, and sound recording.
- ☐ Yes, only sound recording.
- ☐ No, rather not.