
GHORER BAZAR

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United International University
QUEST FOR EXCELLENCE

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
UNITED INTERNATIONAL UNIVERSITY

Certificate

I do hereby declare that the research works embodied in this project entitled “**Ghorer Bazar**” is the outcome of an original work carried out by Md. Jabid Hasan Tonmoy, Tabassum Hossain , Farzana Yesmin, Muhammad Al Amin, Taskia Taher Oyshi, Numair Bin Sharif under my supervision.

I further certify that the dissertation meets the requirements and the standard for the degree of B.Sc. in Computer Science and Engineering.

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Abstract

Listing for groceries is a very difficult and time-consuming work of our life. It is related to the daily life of every person. So, the main goal of our project is to make an application for our users, for their daily uses and to make their life easier. Users can make wish list and improve it further.

Acknowledgement

Firstly we would like to thank the almighty Allah. We would also like to express our special thanks of gratitude to our supervisor Dr. Hasan Sarwar sir, for his able guidance and support in completing our project.

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Ghorer Bazar

1 Introduction

In this chapter, we will talk about our project overview, motivation, objectives and we will also provide a little bit briefing of our project methodology.

1.1 Project Overview

In our app users can create their monthly or weekly grocery list. They can search for the product they need. They can also quickly type any product they need so that they don't forget to buy this product. Users can select product for the wish list and remove it if they want. they can get information about price details of each product. In our app there are two sides,those are- user side and admin side.

1.2 Motivation

In today's busy world, people use apps for almost everything. Everyone is trying to do all the daily necessities in an easy way. It is very time consuming to list the grocery items by using pen and paper and buy products on a regular basis. Sometimes people forget to buy many necessary products as well. Sometimes the person who makes grocery list does not know what the rest of the family needs. After thinking about these problems we decided that we would make an app where users make their monthly grocery items list.

1.3 Objectives

Our main objective is to simplify the process of creating a grocery item list by using our app.

1.4 Methodology

We want to create an app where users can see all the grocery items, they can search for products and by selecting them they can make their grocery list. Firstly we used adobe XD and adobe illustrator for UI/UX design. For frontend design we are using Dart (core

language) and Flutter (frame work). We need a reliable database for our app. We are using Firebase and MongoDB (query language). API implemented by Dart.

1.5 Project Outcome

The outcome of this project is to be able to implement a listing system which eases manual troublesome listing system. Users can make multiple lists for different types of grocery items as per their need. This enables the user to see the latest price of desired products so that he or she can get the estimated costing of the listed products for a certain period of time.

1.6 Organization of the report

In this report, in the first chapter we have introduced our project and we explained the project overview, motivation, objectives, methodology, project outcome and organization of the report. In the second chapter we have explained the project background, we have written about the similar applications and we have shown the benchmark analysis. In third chapter, we have discussed about UI design, context diagram, activity diagram, use case diagram and task analysis. In chapter 4 we discussed about database, APIs, interfaces(Dart, Flutter) . In chapter 5 we have shown standards and design constraints, complex engineering problem attributes according to our project, design thinking and cost analysis. In chapter 6, we gave the limitation and future work and we have written the overall summary of our project and also gave the reference.

2 Background

2.1 Literature reviews and analysis

There are many grocery list making apps for android and IOS. But the concerning point is, only two app is available for Bangladesh. So our app will be very useful for local people. There are an unique feature named wish list in our proposed application. Besides, users will get an estimation of cost of their grocery list through this project. There will also a feature to give weekly or monthly reminder of

bazar. Though there are several features which are common in those apps like - multiple list making.

2.1.1 Similar Applications

Here we will discuss about our findings that we have got from the applications related to our project.

- BD Shopping List

It is an app for grocery list creation for Bangladesh. User can create a grocery list and add their products based on product category. User can create one or many lists at a time. Many types of categories are available here.



Figure 1: BD Shopping List application interface

- GroLister

It is the 2nd app which has been created for Bangladesh. Here, user can create list and add products by searching product's name. The grocery list is saved by product category. User can mark the product which is bought already. User can add price, quantity and vat also for each product.

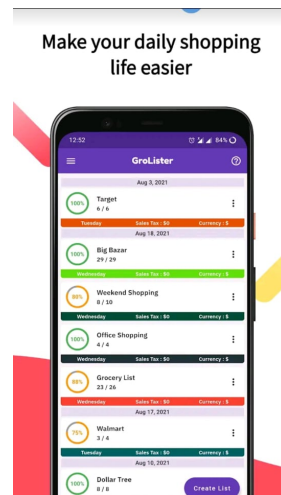


Figure 2: GroLister application interface

- Cozy Family Organizer

It is basically an event creating list, but grocery list can also be created on this app. In this app, family members can also access to the list and can add their products. Products can be added by typing their names. Selected Products are organized by their category. One list can access up to 12 family members. There is also notification system for upcoming events.

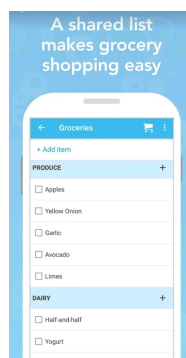


Figure 3: Cozy Family Organizer

- OurGroceries

It is another popular app in terms of making grocery lists. In this app, user can create a shopping list and add their items there. Items can be selected by typing their names and selecting from the suggested list. Besides, quantity can also be added with every items. Products are saved by their categories. User can also create recipes here. It has also a premium version where user can take pictures of products and save it in the list. Premium version also has a barcode scanning feature.

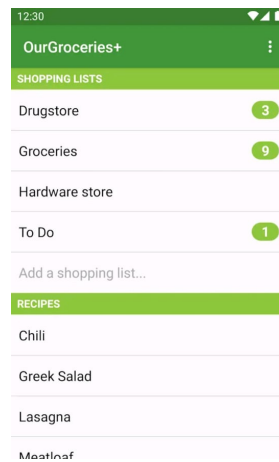


Figure 4: OurGroceries application interface

- AnyList

It works like other grocery creating apps as well. Products can be add by typing the product names. User can add photos to the product, add price, quantity and store names. Besides, this app has a meal plan feature and recipe feature as well. User can share the lists with anyone and also print the list.

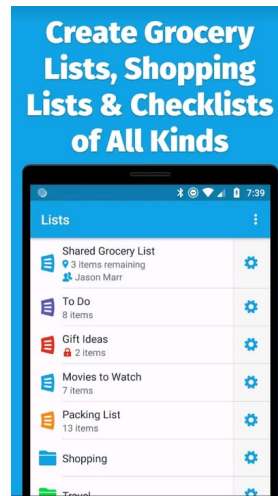


Figure 5: AnyList application interface

- Bring

In this app, user can select their products by product category or by searching. User can also add product quantity. The grocery list can be shared with multiple users as well. Besides, grocery list can be sent to anyone and also can print the list.

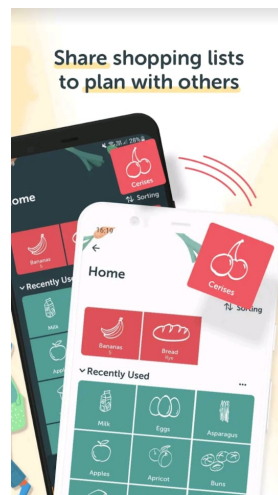


Figure 6: Bring application interface

2.1.2 Benchmark Analysis Of Different Related applications

Apps	BD Shopping List	GroLister	Cozy Family Organizer	Our Groceries	AnyList	Bring
Multiple list creation	●	●	●	●	●	✕
Product category	●	●	●	●	●	●
Product Quantity	●	●	●	●	●	●
Market Price of product	✕	✕	✕	✕	✕	✕
Product list with picture	✕	✕	✕	✕	✕	●
Family Member access	✕	✕	●	✕	✕	●
To-do list Creation	✕	●	●	✕	✕	✕
Print or send list	✕	●	✕	●	●	●
Weekly/Monthly Notification	✕	✕	✕	✕	✕	✕
Weekly/Monthly Reminder	✕	✕	✕	✕	✕	✕

2.2 Summary

In this part we searched some apps which can be similar to our app. We reviewed and analyzed those apps for depth understanding. This allows us to get a general idea of how our app measures up to its competition. After searching we did a benchmark analysis with all the information.

3 Project design

3.1 Requirement Analysis

After reviewing all the existing applications, we have thought about some features which will ease user's daily life. We have seen that many apps don't have pictures of product. User have to search or type products name and add it to the list. To remove this problem, we have thought of a feature where user can see the picture of the product and also see the market price of the product. The proposed features of our system are: 1. Product name with images 2. Wish list 3. Product price and details 4. Bengali interface 5. Category wise products 6. Weekly/Monthly List notification

3.2 Features of proposed system

Product name with images:

Sometimes It is difficult to choose a product by searching their names. Besides, without picture user can get confused of their products. To remove this hassle, we keep this feature where user can easily see their product images and select for their wish list.

Wish list:

This is a very unique feature that do not exist in any other similar application. In this wish list users can list their needed things which they don't want to buy at that moment but are of their interest. It will allow a user to keep their groceries in one place that might be forgotten later. Besides, if any guests are invited to the users' home for a later event, the grocery list for that program can be included in the wish list also.

Product Price and Details:

In our app people can see the prices and details of each product. When users make their weekly or monthly grocery list, they can not get idea about their expenses of that particular time. So by using our app one can get information about their weekly or monthly expenses for groceries by calculating the total prices of all selected products.

Bengali Interface:

We want to keep our application user friendly. That's why we created the interface in Bangla language as we build this app for Bangladesh. By this, any user can use this app and do their works.

Category Wise Products:

For all the products, we set up different categories. User can also search their products by searching their categories and choose items from the category. It will help a user from seeing all the products accordingly.

Weekly/monthly List Notification:

In this feature, user get a notification after a week or a month to let them know if they want to add items that is finished within a week or month. It helps users to know about the quantity of their products before it is finished.(We will implement this feature in future)

Family Member Access:

In this feature, all members of the family can access to a list. They can add their desired products and can remove from the list. They need a code to access in the same list. By this, user can access to the list with their own device from anywhere.(We will implement this feature in future)

3.3 Methodology and Design

We designed the activity diagram, context diagram, use case diagram for all of our actors that will aid the development process of our system. These diagram will ease the development process when we will be implementing the system.

Activity Diagram

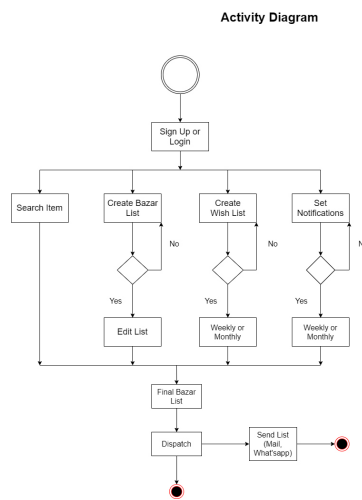


Figure 7: Activity Diagram

Context Diagram

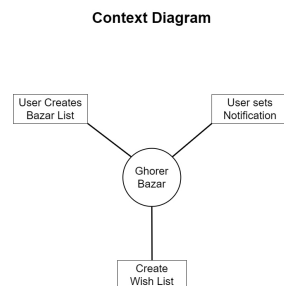


Figure 8: Context Diagram

Use Case Diagram

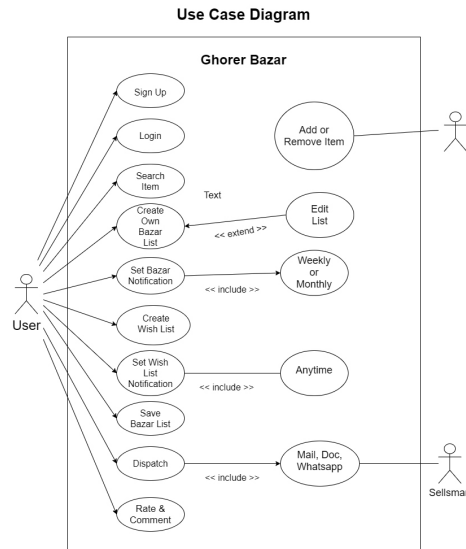


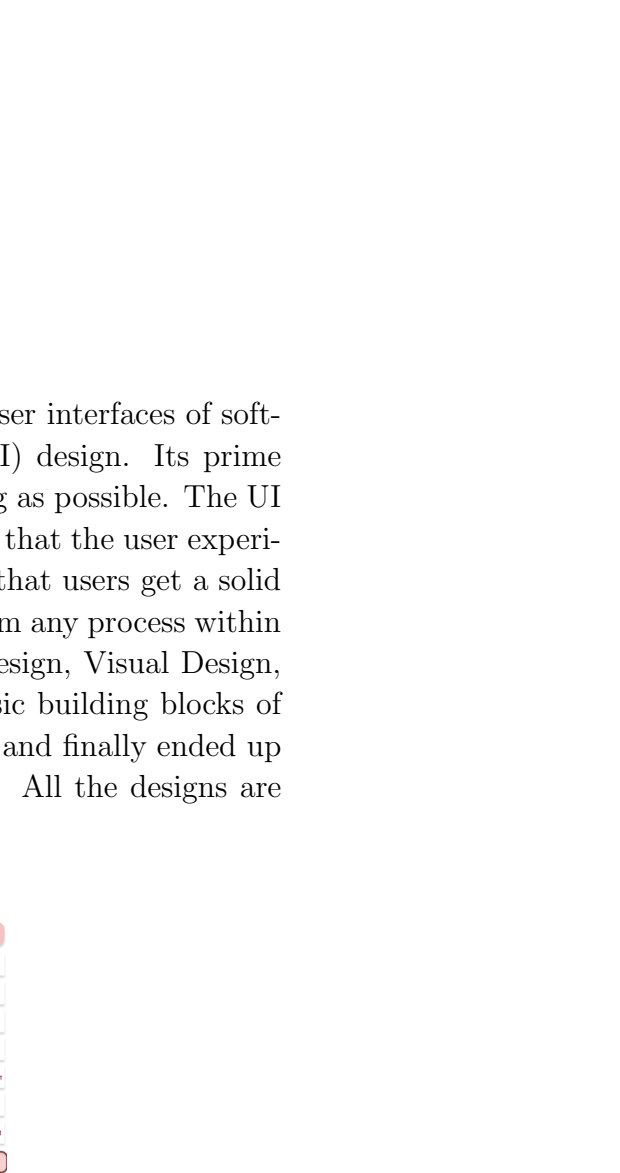
Figure 9: Use Case Diagram

3.4 Tasks and deliverable

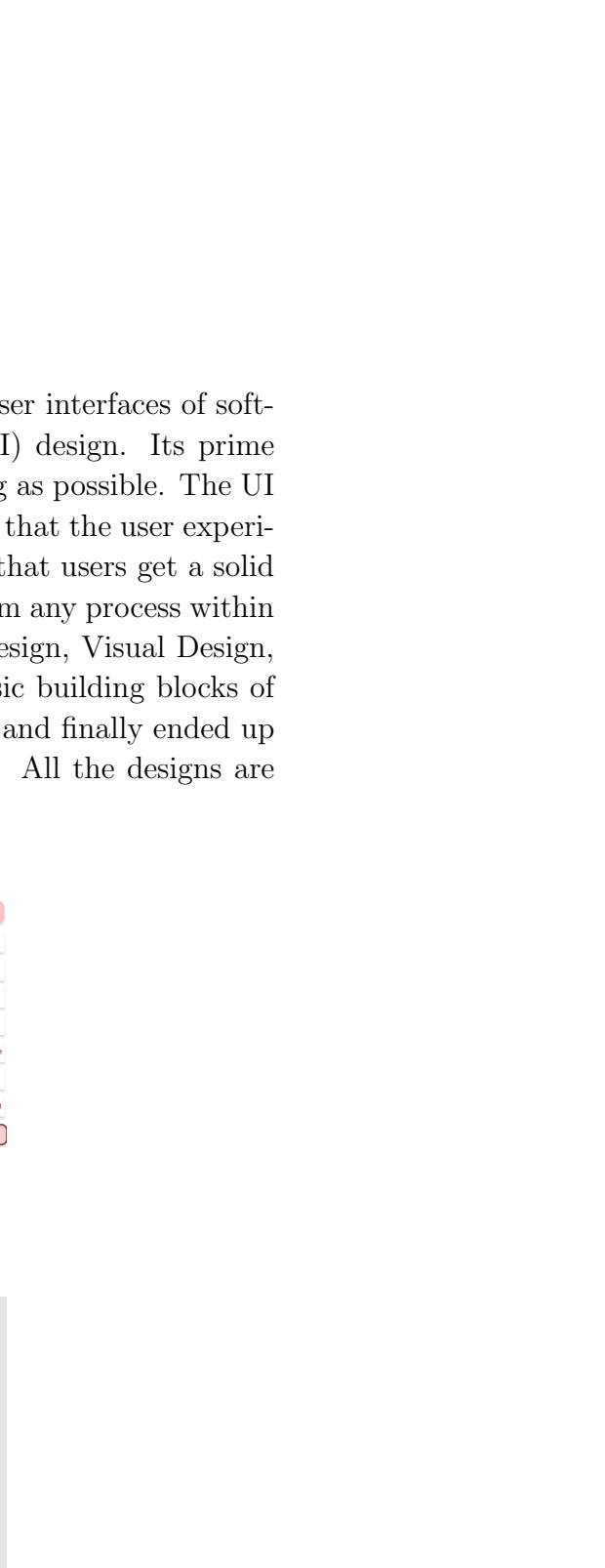
It is necessary to decomposing all of the tasks into subtasks. For completing a project efficiently, a task can be split down into subtasks, as though project management is the coordination of individual tasks. Tasks must be completed by a specific deadline and contribute to the achievement of work-related goals.

Task Description	Deliverables	Status	Completion%
1.Project Conception	(1.1) Problem Statement	Completed	100%
1.2 Discussion with Stakeholder	(1.1.1) Approach to the issue	Completed	100%
1.3 Analysing User's Need	(1.2.1) Idea Generation	Completed	100%
2.Project Planning	(1.3.1) Requirements of the users	Completed	100%
(2.2) Benchmark Analysis	(2.1) Scope & Goal Setting	Completed	100%
(2.3) Affinity Diagram Designing	(2.1.1) Identifying Goals	Completed	100%
(2.4) Business Process Modeling	(2.2.1) Uniqueness of our project	Completed	100%
(2.5) Budget	(2.3.1) When to use An Affinity Diagram	Completed	100%
3. Prototype	(2.3.2) Affinity Diagram Design	Completed	100%
(3.1) UI Design		Completed	100%
(3.2) Developing Application	(3.1.1) Project Design	Completed	100%
	(3.2.1) Developing our app	Completed	100%

Figure 10: Tasks



the user interfaces of soft-
(UI) design. Its prime
ing as possible. The UI
both that the user experi-
re that users get a solid
form any process within
Design, Visual Design,
basic building blocks of
ns and finally ended up
a 3. All the designs are



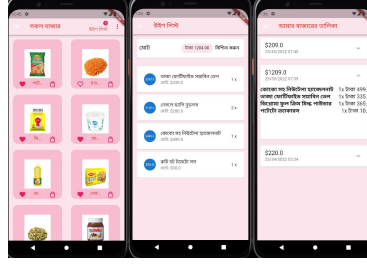


Figure 13: UI Design 3

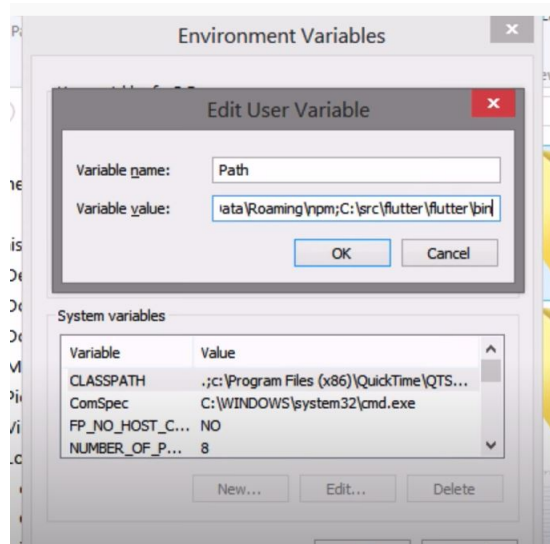
3.6 Summary

we talked with some real users to know about their requirement and problems that they face while doing manual grocery list. From the feedback of them we have found that they will appreciate and like our app because of our features. A deep analysis of the system allowed for a brief data flow to conceptualize the app. Having a good UI is always the first important step in terms of developing a project.

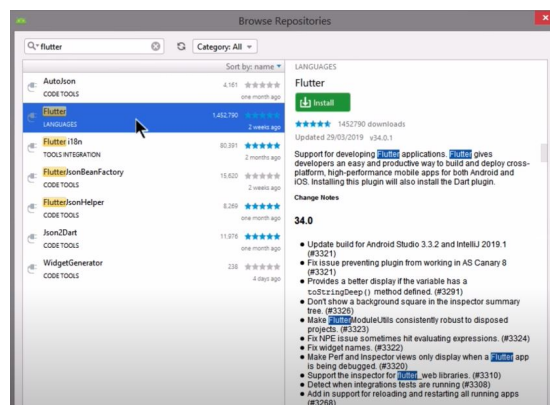
4 Implementation and results

4.1 Environment Setup

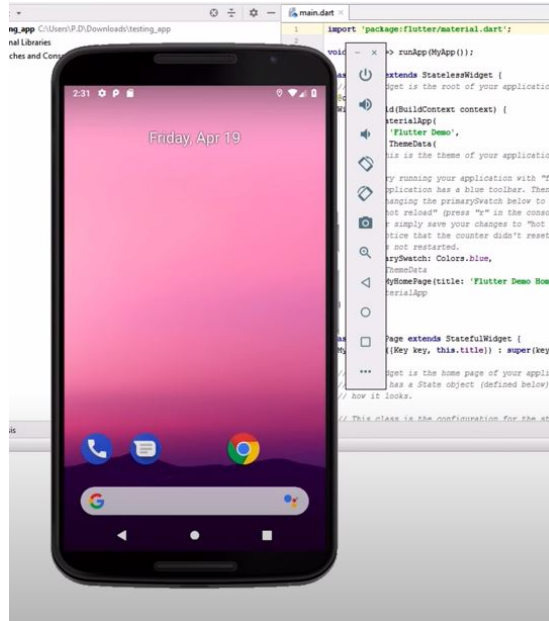
We have chosen windows first for the programming environment. After that we chose Android Studio and to use this for the app we had to install Flutter and git bash because it requires git bash.



Then we had to set the environment variable path of windows and then we installed the Android Studio. If we do not change the environment variable path, windows and android would not recognise Flutter. Git bash helps to maintain Flutter in the windows system.



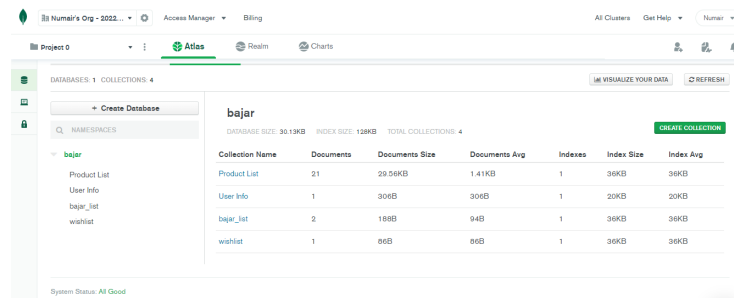
To run Flutter project, Android Studio requires Flutter and Dart plugins. After that when we will start the Android Studio it will show an extra option to make Flutter project for installing the Flutter plugin.



Android will setup virtual device manager to run Android emulator. We had to create a virtual device to run the emulator and an Android device. In the emulator the Flutter project is simulated. It eases to visualize the project and make it simple to spot a bug.

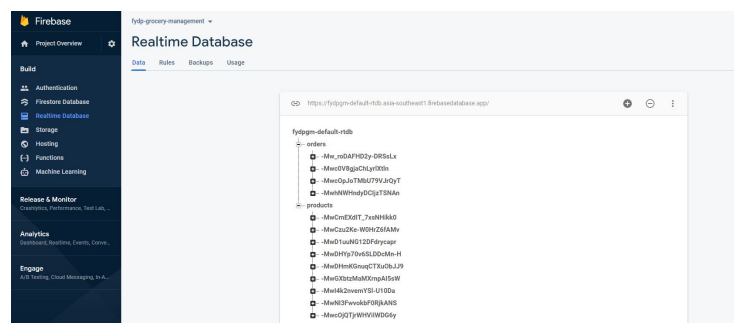
4.2 Database

For research purpose at first we have created MongoDB database. For storing this in cloud we have used MongoDB Atlas which is basically a fully managed global cloud database. Here we can see that there are 4 collections in the database. Each collection stores data. The database and collections are implemented through python language and data are stored in JSON format.



4.2.1 Firebase

After our research on MongoDB we faced some difficulties to connect with the backend and we switched on Firebase. We connected to Firebase with Dart API .



We can see there are two tables of objects. One holds the grocery list and other one holds the products.



In order list we can see the grocery list that we selected in the app. Every order object has its details.



In this picture we can see every product of a JSON object. The product object has its details in each section.

4.3 APIs

An application programming interface is a connection between computers and web server. It is a type of code, offering a service to other pieces of software and web server. A document or standard that describes how to build or use such a connection or interface is called an API specification. Modern APIs maintain some standards like HTTP and REST. It helps the developer for maintain the data. We used HTTP requests such as get, post, patch and delete.

```
Future<void> fetchAndSetProducts() async {
  final url =
    'https://fyd92-gs-default-rtdb.firebaseio.com/products.json?auth=$authToken';

  try {
    final response = await http.get(Uri.parse(url));
    dynamic extractedData =
      json.decode(response.body) as Map<String, dynamic>;
    if (extractedData == null) {
      return;
    }
    final List<Product> loadedProduct = [];
    extractedData.forEach((products, prodData) {
      loadedProduct.add(Product(
        id: prodId,
        title: prodData['title'],
        description: prodData['description'],
        price: prodData['price'],
        isFavorite: prodData['isFavorite'],
        imageUrl: prodData['imageUrl'],
      ));
    });
    _items = loadedProduct;
    notifyListeners();
  } catch (error) {
    throw (error);
  }
}
```

We implemented data fetch API with HTTP get request of Dart. We fetched the data in JSON object format and decoded it into a Dart object. Dart object is a dynamic class object.

```

Future<void> updateProduct(String id, Product newProduct) async {
  final prodIndex = _items.indexWhere((prod) => prod.id == id);
  if (prodIndex >= 0) {
    final url =
      'https://f9d2-gs-default-rtdb.asia-southeast1.firebaseio.com/products/$id.json';
    await http.patch(
      Uri.parse(url),
      body: json.encode({
        'title': newProduct.title,
        'description': newProduct.description,
        'price': newProduct.price,
        'imageUrl': newProduct.imageUrl,
      })),
    );
    _items[prodIndex] = newProduct;
    notifyListeners();
  } else {
    print('...');
  }
}

```

We implemented the data add and update operation with HTTP post and patch request of Dart as well as the delete operation. To make this operation most smoother we had to use an abstract class named Future. a future is used to present a potential value or error that will be available at some time in the future. Receivers of a Future can register callbacks that handle the value or error once it is available. In every HTTP operations we used this Future abstract class.

4.4 Interface

Dart

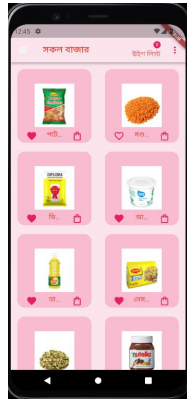
Dart is a programming language designed for client development, such as for the web and mobile apps. It is developed by Google and can also be used to build server and desktop applications. Dart is an object-oriented, class-based, garbage-collected language with C-style syntax.

Flutter

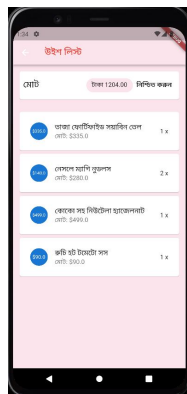
Flutter is an open-source UI software development kit created by Google. It is used to develop cross platform applications for Android, iOS, Linux, Mac, Windows, Google Fuchsia, and the web from a single codebase. Flutter is Google's UI toolkit for building beautiful, natively compiled applications for mobile, web, desktop and embedded devices from a single codebase.

4.4.1 Application Outcome

Basic App



Inside the app, there is a product view list. Products can be selected for grocery list. We can like and unlike the products from the list as well as it can be selected for the wish list. When we select product for wish list a popup message will appear at the bottom of the home page with a button. When a user presses the button the it will undo the operation.



In the wish list we can see each product as tiles. We can confirm our wish list and move the products to our grocery list. User will find a confirm button. When it will be pressed with some items of wish list a circle progress indicator will appear till the operation is

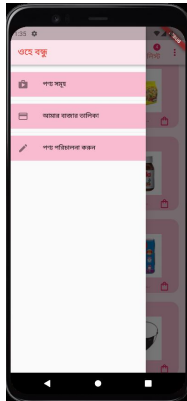
done. At the top of the wish list user will find the total value of items.



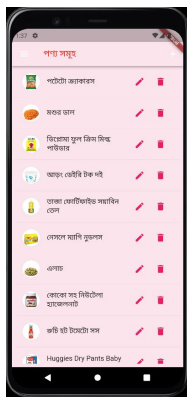
In the grocery list we can see our chosen groceries. We can make multiple grocery lists. There is a expandable button on the right side of the list tile. The button will expand the grocery list and another click will reverse the operation. In the list, users will see every grocery product, they have selected with price and quantity. The total price will appear at the top of the list.



If we click on a product, it will take us to the product details page. This page has product description, product price and product image.



In this image we will find a drawer on left side of the app bar. Here are three options to choose- "Ponno shomuho", "Amar bazar talika". For the admin side, we implemented- "Ponno porichalona korun".



In this section app admin can add, edit and delete products. When delete button is pressed a popup message will appear and confirm the deletion. If server throws a error then it will show a failure popup message.



Admin can edit this information of product and also can add product from this page. There is a implementation of multiple error handling. Such as for title it will show an alert to input a title if its missing. For the price there are multiple alerts, those are for entering a price, entering a valid price and also entering a price which is grater than zero. For the description section, an alert will appear to input at least 10 characters for the description of the product. As well as the url section has a alert about a valid url link.

5 Standards and Design Constraints

In this chapter we will discuss about various standards, design constraints, design thinking, complex engineering problem and design thinking, cost analysis.

5.1 Compliance with the Standards

Here, for our project we have followed some standards. Those are-

- UI Standards
- Project Management Tools

5.1.1 Software Standards

We have used Dart, Flutter, Firebase for implementing our project.

5.1.2 Programming Language

We have used Dart as programming language.

5.2 Complex Engineering Problem and Design Thinking

We are solving a complex engineering problem. In this section we will discuss the reasons for calling it a complex engineering problem.

5.2.1 Complex Problem Solving

- Depth of Knowledge Required:

Knowledge of software engineering, system analysis and design, data structure and algorithm, project management, clear concept of programming language.

- Range of conflicting requirements:

Technical issues-

From many alternatives we choose Dart over Java Android, Swift, Kotlin. Flutter over React native, Android SDK. Firebase over IBM, SQLite. Xd and Illustrator over Sketch, Figma.

Engineering issues-

It is an engineering issue that whether we will use cloud or phone to store our database in terms of better performance of our application.

Other issues-

People of all classes might not be found easier to use this application.

- Depth of analysis required:

Our project is different from other competitive apps in terms of some features:

User can make wish list

Weekly and monthly bazar reminder

- Familiarity of issues

This step is not applicable for our project.

- Extent of Applicable codes

We have to maintain some ethics such as keeping privacy of our client's information.

- Extent of Stakeholder involvement and needs

Users, front end and back end developers, admins.

5.3 Design Thinking

Empathize:

We have talked with some real users and tried to figure out what problem they face while making grocery list. We have also spoken with our family members and tried to know if they want any app where they can make this list easily.

Define:

- Manually counting all the amounts of goods for a whole month.
- Hard to recall all the goods and their amount which are gradually decreasing.
- Difficulties to remember all the goods which are recalled instantly or previously.
- Very limited user friendly app available.

Ideate:

To counter the problems, we tried to figure out solutions. We think of an app.

- Where users can search their desirable products.
- Calculating and computing all goods and their amounts.
- User can make grocery list.
- Wish list or note.

Prototype:

Here is the app Design of an app that we visualized.

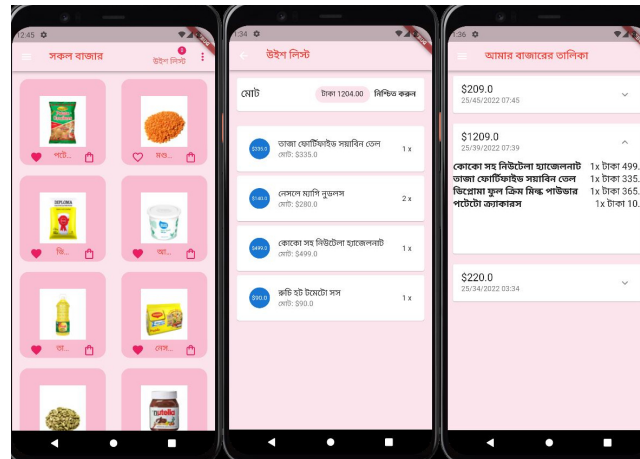


Figure 14: Prototype

5.4 Cost analysis

Cost analysis is one of the most important components of any project's implementation. So we have analyzed approximate cost of our project. We assumed a baseline cost first and then after starting to work on our project, we got our actual cost. After finishing the whole work we can see from the table(Figure 13) that our actual cost is not more than approximate cost.

Task Description	Task Owner	Duration	BaseLine			Duration	Actual		
			Start Date	End Date	Cost per day		Start Date	End Date	Cost per day
Problem Statement	Tabassum	6	July 6, 2021	July 13, 2021	600.00Tk	5	July 6, 2021	July 12, 2021	3,000.00Tk
Discussion with Stakeholder	Taskila	4	July 14, 2021	July 20, 2021	2,400.00Tk	4	July 21, 2021	July 26, 2021	2,400.00Tk
Analysing User's Need	Numar	5	July 14, 2021	July 20, 2021	3,000.00Tk	6	July 21, 2021	July 26, 2021	3,000.00Tk
Scope & Goal Setting	Jahid	6	July 21, 2021	July 28, 2021	3,600.00Tk	7	July 21, 2021	July 28, 2021	4,200.00Tk
Benchmark Analysis	Numar	8	July 28, 2021	August 8, 2021	4,800.00Tk	6	July 30, 2021	August 5, 2021	3,600.00Tk
Business Process Modeling	Taskila, Farzana	4	July 29, 2021	August 3, 2021	4,800.00Tk	5	July 30, 2021	August 4, 2021	6,000.00Tk
affinity Diagram Designing	Tabassum	6	August 4, 2021	August 11, 2021	3,600.00Tk	4	August 5, 2021	August 10, 2021	2,400.00Tk
Budget	Alamin	7	August 12, 2021	August 21, 2021	4,200.00Tk	8	August 11, 2021	August 21, 2021	4,800.00Tk
UI Design	Tabassum,Taskila,Farzana	90	August 22, 2021	December 5, 2021	54,000.00Tk	40	August 23, 2021	October 7, 2021	26,000.00Tk
Developing Application	Numar,Jahid,Alamin	120	August 22, 2021	January 5, 2022	72,000.00Tk	140	August 23, 2021	February 1, 2022	84,000.00Tk
				TOTAL	156,000.00Tk			TOTAL	136,000.00Tk

Figure 15: Cost Analysis

5.5 Design Constraint

5.5.1 Ethical Constraint

Our project will not be used for any unfair means at any situation. Besides, we have maintained engineering ethics.

5.5.2 Social Constraint

Our app is socially acceptable and people of all sectors can use this. Besides it will help users to get a smart grocery listing system which will be hassle free.

6 Conclusion

In this section, we have provided a final overview of our work.

6.1 Summary

Developing any project from scratch is always challenging. While developing this project we have gone through a lots of problems and challenges but at the same time learned a lot. We worked for our project in two phases. In phase 1 or FYDP-1, we first wanted to check the public requirement towards this project. We have also compared our app with similar applications and realized that we can add some new and improved features to our app. After that we mapped our problem with complex engineering problem, and worked on design thinking etc. In FYDP-2 we implemented the whole project step by step. We discussed all of our project work details in this report. Actually, Grocery shopping is a daily routine in our daily lives. We hope our project will simplify the process of creating a grocery shopping list. It will save time of users. However we have a plan for new features and updates in near future.

6.2 Limitation

Despite our best efforts to eliminate major limitations from the system, some features remain to be desired. We faced lack of tutorial based information and knowledge on front end library Flutter. Those which are exists are outdated. Very frequent updates of Flutter makes the development process very slow. Every update comes with so many different rules than previous versions.

6.3 Future Work

We will aim to conduct research on a larger scale in the future for our app to be very advanced. We want to add some advanced features like notification system by which users can be notified about their weekly/monthly grocery list. We have another plan to create a feature by which users will get an individual privacy and security with sign up and sign in options.

References

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