

Virtual Internship - Android Application Development Using Kotlin



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INTRODUCTION

a).OVERVIEW:

Groceries are one of the most essential daily requirements of a family. Quite often, we do not pay much attention to it and we just go on a shopping spree without any proper list of required items and quite often we forget many items and are not aware of the total cost of all the items.

In today's digitalised world making a list of items and calculating their total cost on a pen and paper seems to be a very lethargic task.

Hence we bring to you a grocery app, in which you can easily list all your items with their total cost. We have made database of our app using room database and we have used MVVM for architecture purpose of our app. Designing of the app is purely done on XML and backend of the app is done in Kotlin language.

b).PURPOSE:

The main purpose of this app is to simplify your shopping list and save your precious time.

It also helps to estimate total cost required for the required items.

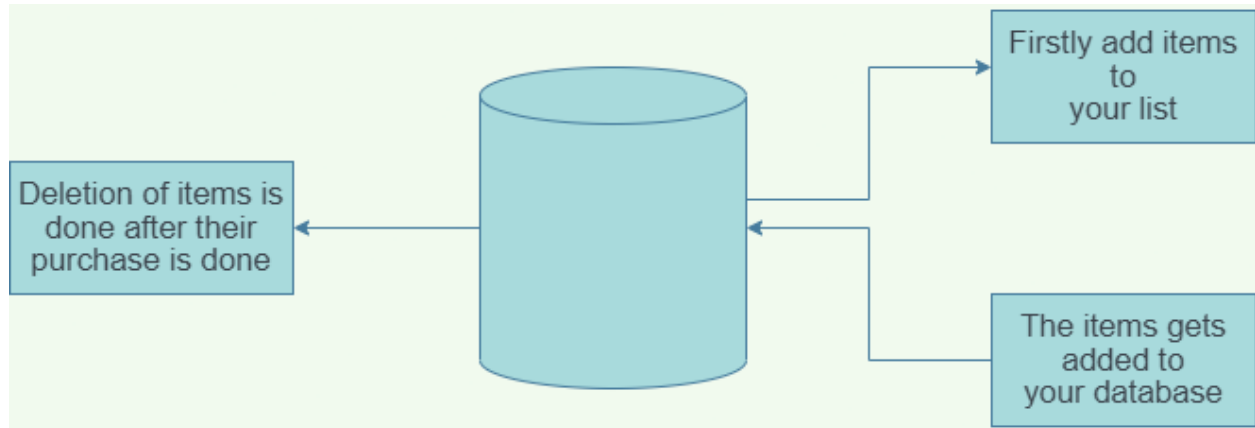
It is a very simplified app which can be used by anyone, who does not have any knowledge about digital world.

After buying the items users can delete the following item, which helps them to keep track of the items they have to purchase. It helps in reduction of human errors of forgetting items.

This app is quite useful as in today's busy world no one has time to list down items on a pen and paper, hence listing down items on an app is much simplified and time efficient

2. THEORITICAL ANALYSIS

2.1 BLOCK DIAGRAM:



2.2 HARDWARE & SOFTWARE REQUIREMENTS:

1. Software Requirements:

- a). OS:** Windows 10
- b). IDE:** Android Studio Dolphin
- c). Programming Language:** Kotlin IDE

2.3 Hardware Requirements:

- a). Processor:** i5 10th gen and above
- b). RAM:** 8GB of RAM
- c). Storage:** 50MB of HDD space

d). Testing: External Android device for testing

3. Architectural Design Of The Project

In this project, we are using MVVM (Model View ViewModel) for architectural patterns, Room for database, Coroutines and RecyclerView to display the list of items.

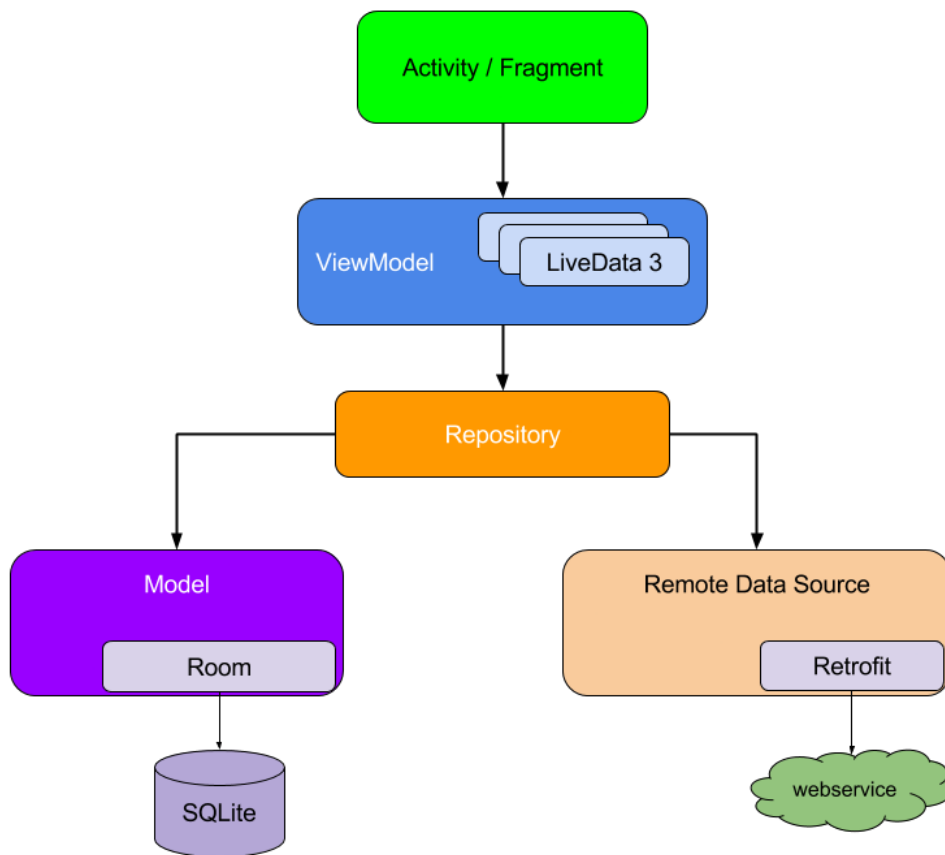
• MVVM (Model View ViewModel):

MVVM architecture in android is used to give structure to the project's code and understand code easily.

Model-view-viewmodel (MVVM) is a software architectural pattern that facilitates the separation of the development of the graphical user interface (the *view*) – be it via a markup language or GUI code – from the development of the business logic or back-end logic (the *model*) so that the view is not dependent on any specific model platform.

The MVVM is basically separated into three layers:

1. **Model:** This layer is responsible for the abstraction of the data sources. Model and ViewModel work together to get and save the data.
2. **View:** The purpose of this layer is to inform the ViewModel about the user's action. This layer observes the ViewModel and does not contain any kind of application logic.
3. **ViewModel:** It exposes those data streams which are relevant to the View. Moreover, it serve as a link between the Model and the View.



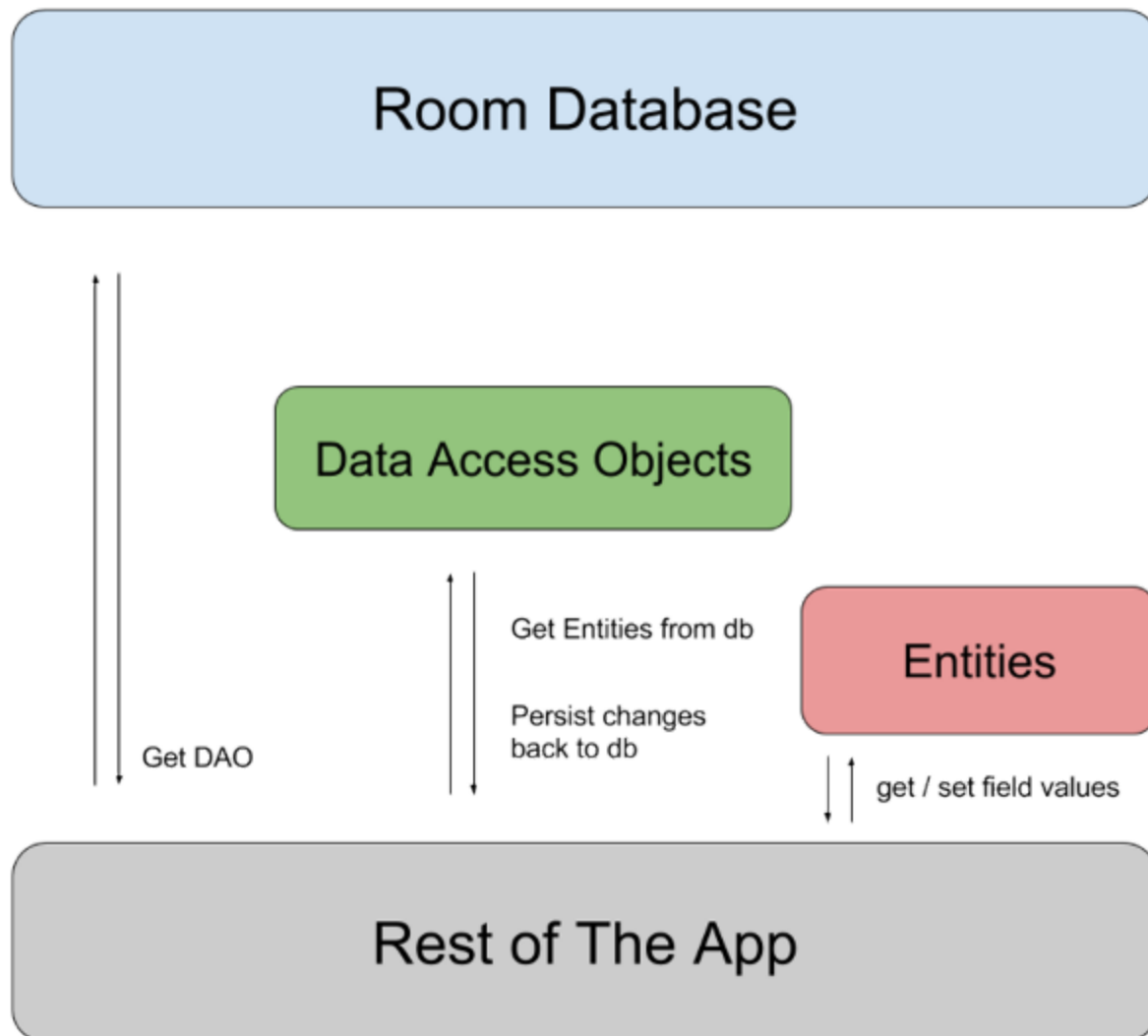
ROOM Database:

Apps that handle non-trivial amounts of structured data can benefit greatly from persisting that data locally. The most common use case is to cache relevant pieces of data so that when the device cannot access the network, the user can still browse that content while they are offline. The Room persistence library provides an abstraction layer over SQLite to allow fluent database access while harnessing the full power of SQLite. In particular, Room provides the following benefits:

1. Compile-time verification of SQL queries.
2. Convenience annotations that minimize repetitive and error-prone boilerplate,

There are three major components in Room:

1. The **database class** that holds the database and serves as the main access point for the underlying connection to your app's persisted data.
2. **Data entities** that represent tables in your app's database.



Structure Of Project

- **Step 1: To create a new project:**

To create a new project in Android Studio please refer to How to Create/Start a New Project in **Android Studio**. Note that select Kotlin as the programming language.

- **Step 2:** Before going to the coding section first you have to do some pre-task Before going to the coding part first add these libraries in your gradle file and also apply the plugin as '**kotlin-kapt**'.

- **Step 3: Implement Room Database :**

- a). **Entities class :**

The entities class contains all the columns in the database and it should be annotated with **@Entity (tablename = "Name of table")**. Entity class is a data class. We will add Primary Key for auto-increment .Create Kotlin file/class and name the file as GroceryEntities.

- b) **DAO Interface :**

The **DAO(Data Access Objects)** is an interface in which we create all the functions that we want to implement on the database. Now we will create a function using suspend function which is a coroutines function. Here we create three functions, First is the insert function to insert items in the database and annotated with **@Insert**, Second is for deleting items from the database annotated with **@Delete** and Third is for getting all items annotated with **@Query**

- c) **Database class :**

Database class annotated with **@Database(entities = [Name of Entity class.class], version = 1)** these entities are the entities array list all the data entities associating with the database and version shows the current version of the database. In GroceryDatabase class we will make an abstract method to get an instance of DAO and further use this method from the DAO instance to interact with the database.

Step 4 :Now we will implement the Architectural Structure in the App:

a) Repository class :

The repository is one of the design structures. The repository class gives the data to the ViewModel class and then the ViewModel class uses that data for Views. The repository will choose the appropriate data locally or on the network.

b) ViewModel class :

ViewModel class used as an interface between View and Data. Grocery View Model class inherit from View Model class and we will pass constructor value by creating instance variable of Repository class and stored in repository variable. As we pass the constructor in View Model we have to create another class which is a Factory View Model class. Create a Kotlin file/class and name the file as GroceryViewModel.

c) FactoryViewModel class : We will inherit the Grocery ViewModel Factory class from ViewModelProvider. NewInstanceFactory and again pass constructor value by creating instance variable of GroceryRepository and return GroceryViewModel (repository). Create a Kotlin file/class name it GroceryViewModelFactory.

Step 5 : Now let's jump into the UI part

In the activity_main.xml file, we will add two ImageView, RecyclerView, and Button after clicking this button a DialogBox open and in that dialog box user can enter the item name, item quantity, and item price.

Step 6: Let's implement RecyclerView :

Now we will code the UI part of the row in the list. Add a Layout Resource File and name it as GroceryAdapter. We will code adapter class for recycler view. In Grocery Adapter we will override three functions:

onCreateViewHolder, getItemCount, and onBindViewHolder, we will also create an inner class called grocery view holder.

Step 7 :

To enter grocery item, quantity, and price from the user we have to create an interface. To implement this interface we will use DialogBox. First create UI of dialog box. Three edit text to enter grocery item name, quantity and

price. After clicking the save text all data saved into the database and by clicking on the cancel text dialog box closes.

Step 8 :

In this final step we will code in our MainActivity. In our MainActivity, we have to set up the recycler view and add click listener on add button to open the dialog box.

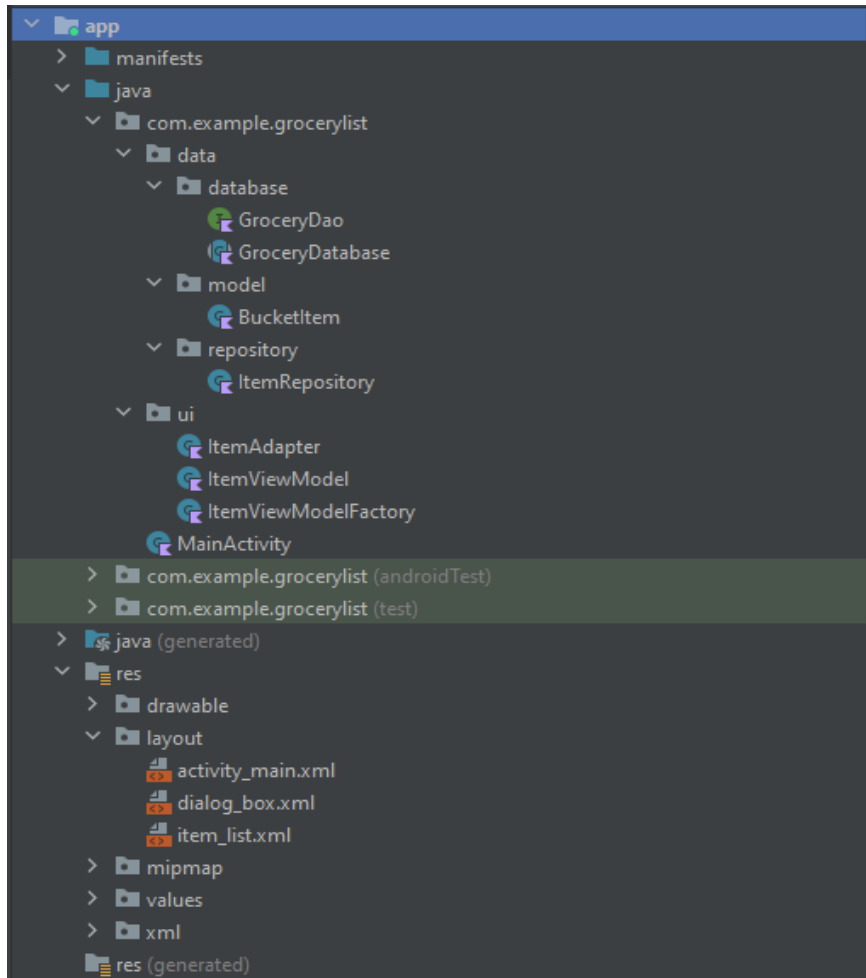
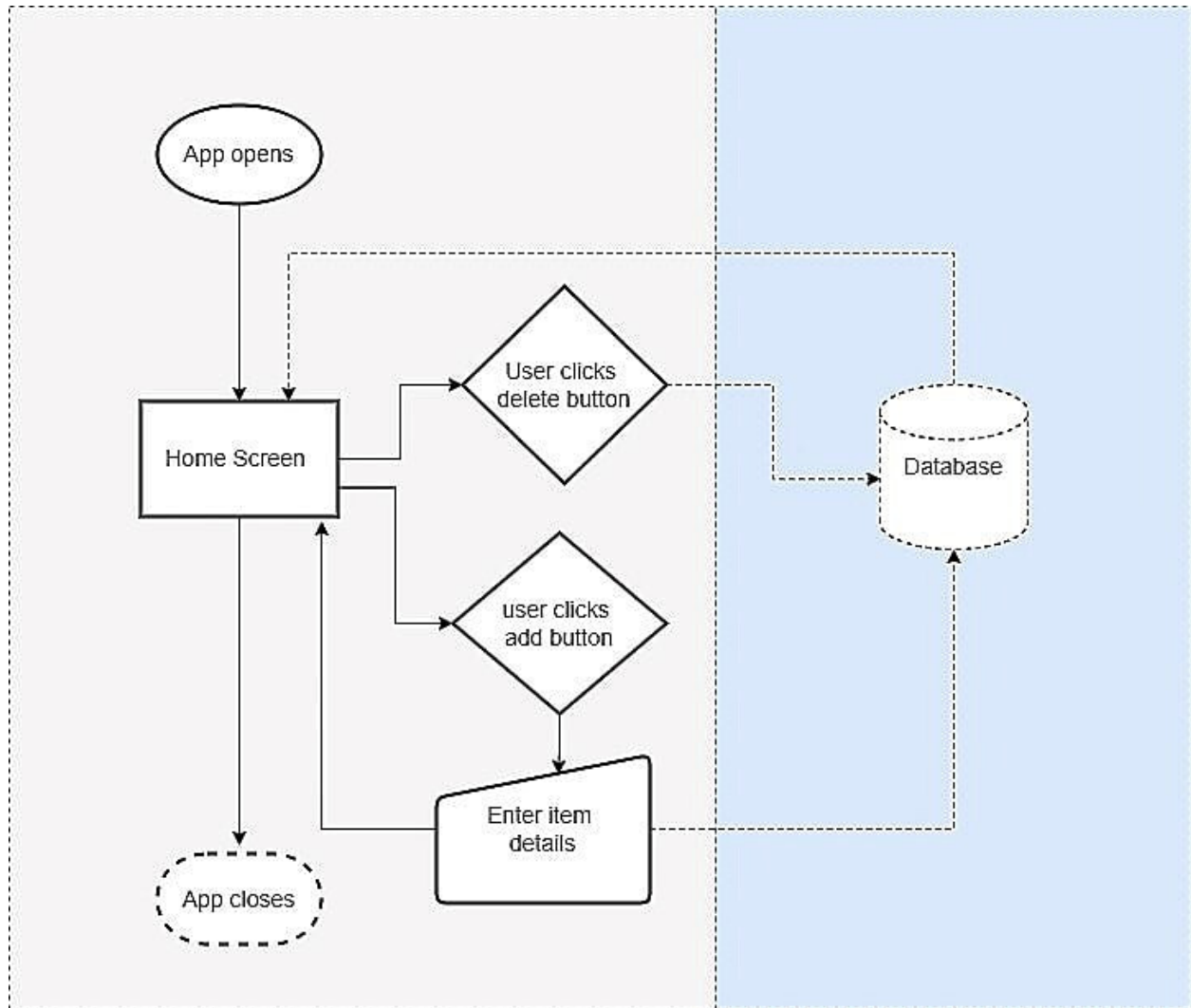


Fig: Structure Of Project

Flowchart



Advantages

- In today's digitalised and hectic world no one has time to remember a list of grocery items to be purchased. This app makes our life easier as we no longer have to remember items.
- It helps save a lot of our crucial time
- It is a very simple to use grocery list app which can be used by anyone.

- Our habit of forgetting items is overcome by this app.
- It also helps us to estimate the total cost of all our items and helps to manage our expenses.
- Changes to the list of items can easily be accommodated without any major issues.

Disadvantages

- One of the major drawbacks of this app is that it does not tell the cost of the item we want to purchase. Prices of the product have to be mentioned manually and may vary from the store to store.
- Another drawback is that it does not tell whether the following items mentioned in the list are available in the nearby store or not.
- After all it is an application, and may crash due to database or server error.

Applications

- This app is majorly used while shopping a variety of items from supermarkets or provisional stores.
- We can easily tally the given bill by the shopkeeper and our list of items so as to avoid any error in the billing.
- We can instantly verify the cost of the item we want to purchase in the supermarket with our list and check whether there is an increase in the price of the items or not.
- It can be used by major Supermarkets for purchasing a bulk of items and get their estimated cost.

Conclusion

I conclude that this app is a major breakthrough in today's tech world as this will help us provide the list of items we want to purchase with their total cost. This app store data in our own local storage hence making changes in that app will not be a major issue. This app help us in advancement of our technology and start to live in a modern world.

Future Scope

- A major change that can be accomodated in future is that we can add the prices of particuar product in the list in nearby stores which will help users to get best value of their required product.
- Also we can add a timer in the app to help us remember to bring our grocery items in time.
- Another feature that we can add in the near term future is the recommendations of similar grocery items that we regulary use through Artificial Intelligence.
- We can improve the quality of server so as to store more items at the same time without any crashing of the app.
- We are open to any changes in our app that will help in enhancement of our app.

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