**Home Cart – Grocery Delivery App**

**CS19611 – Mobile Application Development Laboratory**

***Submitted by***

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# COMPUTER SCIENCE AND ENGINEERING



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**BONAFIDE CERTIFICATE**

Certified that this Project titled **“Home Cart– Grocery Delivery App”** is the bonafide work of **“ BLESSY ABIDHA B S (2116220701047)”** who carried out the work under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

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# ABSTRACT

This report presents the development of **Home Cart– Grocery Delivery App**, a modern Android application built using **Kotlin** in **Android Studio**. The primary objective of this project is to create a convenient and efficient mobile solution for ordering groceries, tailored to meet the growing demand for online shopping in the post-pandemic era. The app allows users to search for grocery items, view a list of products with prices and icons, add selected items to a cart, manage item quantities, and place an order — all within an intuitive and visually appealing user interface.

The application follows a modular structure that enhances maintainability and scalability. It features a searchable product list screen that displays items with relevant emojis, names, and prices. Users can interact with the cart screen to increase or decrease item quantities dynamically, with real-time price calculation updating the total cost as changes are made. Upon placing the order, the app transitions to an order confirmation screen that presents a summary of the purchased items along with an estimated delivery time.

From a technical perspective, this project showcases effective use of Kotlin programming concepts such as classes, data models, and Recycler View adapters for dynamic list rendering. The user interface is constructed using XML layout files and follows Material Design guidelines to ensure a smooth and consistent user experience. Screen navigation is managed through Intents, and key data like item names, prices, and quantities are passed efficiently between activities. Although this version operates with in-memory state management for simplicity, it is structured to support future integration with databases like Firebase or Room, and REST APIs for real-time backend interaction.

In conclusion, **Home Cart – Grocery Delivery App** demonstrates the practical application of Android development principles and offers a solid foundation for building scalable e-commerce applications. The project reflects strong technical proficiency and a focus on user-centered design, making it a relevant and adaptable solution for today’s digital grocery shopping needs.

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## 

| **Abbreviation** | **Full Form** |
| --- | --- |
| UI | User Interface |
| UX | User Experience |
| XML | Extensible Markup Language |
| API | Application Programming Interface |
| IDE | Integrated Development Environment |
| DB | Database |
| CRUD | Create, Read, Update, Delete |
| ETA | Estimated Time of Arrival |
| OTP | One-Time Password |
| ML | Machine Learning |
| AI | Artificial Intelligence |
| JSON | JavaScript Object Notation |
| SDK | Software Development Kit |
| JVM | Java Virtual Machine |
| DFD | Data Flow Diagram |
| UML | Unified Modeling Language |
| MVC | Model-View-Controller |
| MVVM | Model-View-ViewModel |
| RAM | Random Access Memory |
| CPU | Central Processing Unit |
| APK | Android Package Kit |
| XML Layout | Extensible Markup Language Layout |
| HTTP | HyperText Transfer Protocol |
| HTTPS | HyperText Transfer Protocol Secure |
| CDN | Content Delivery Network |
| Firebase | Firebase (Google’s Backend-as-a-Service Platform) |
| Room | Room Persistence Library (SQLite wrapper in Android) |
| RecyclerView | Android UI component for displaying scrollable lists |
| Toast | Short message notification in Android UI |
|  |  |

**CHAPTER 1**

**INTRODUCTION**

* 1. **GENERAL**

"Home Cart – Grocery Delivery App" is a Kotlin-based Android application designed to simplify and modernize grocery shopping for users. With the rise of online shopping and demand for quick delivery, this app provides a streamlined experience for browsing, selecting, and ordering grocery items directly from a mobile device. The app includes features such as product search, itemized cart management, order confirmation, and an aesthetically pleasing user interface that enhances user engagement.

# OBJECTIVE

The primary objectives of this project are:

* To develop a user-friendly Android application for grocery delivery using Kotlin.
* To implement essential e-commerce functionalities such as item listing, cart management, and order processing.
* To enhance the shopping experience through responsive design and real-time interactions.
* To create a scalable base for future integration with backend services and databases.

# EXISTING SYSTEM

Current grocery delivery systems often rely on large-scale apps with complex user interfaces and backend infrastructures. Many of these platforms are difficult for small vendors to adapt to and can be overwhelming for users seeking a quick and simple experience. Additionally, they may require continuous internet connectivity and depend heavily on server-side databases, limiting flexibility during initial stages of development. While some online platforms exist, they may lack user-friendly interfaces or specific features that enhance the shopping experience. The **Get it** app aims to bridge this gap by offering an intuitive and efficient solution for grocery shopping.

# CHAPTER 2 LITERATURE SURVEY

# Several studies and projects have explored the development of groscery shopping applications. For instance, the "Online Grocery Store Android Application" by IRJET discusses the implementation of a user-friendly interface for grocery shopping, emphasizing the importance of local vendor integration for timely deliveries . Another project, "Grocery Android App Final Report," highlights features like shopping list creation and expense tracking to enhance user convenience . These studies underscore the growing need for efficient and user-centric grocery shopping solutions.

# 2.1 Existing Applications

# BigBasket

# One of India’s largest online grocery stores, offering a wide range of products from vegetables to household items.

# Blinkit (formerly Grofers)

# Known for instant delivery (within 10 minutes in metro cities), but has limited availability in smaller towns.

# Amazon Fresh

# A sub-service within Amazon offering fresh produce and groceries with quick delivery options for Prime members.

# JioMart

# Reliance’s grocery platform integrated with WhatsApp ordering, focused on combining offline kirana stores with online reach.

# Swiggy Instamart

# A branch of the Swiggy food delivery service, delivering snacks, groceries, and daily essentials in under 30 minutes.

# 2.2 Limitations of Existing Systems

Despite the success of established grocery delivery platforms, several constraints limit their effectiveness and adaptability, particularly for small vendors or users with specific needs. These constraints are:

* **Complex User Interfaces**: Existing apps often have cluttered, feature-heavy interfaces, making them overwhelming for new or non-technical users. Navigating through categories, promotions, and offers can be time-consuming.
* **Mandatory Account Registration**: Most popular grocery apps require users to sign up, log in, and input their location before even browsing products. This can discourage casual shoppers or those who want to make quick, one-time purchases.
* **Dependence on Internet Connectivity**: These platforms are entirely dependent on internet connectivity for every action. In regions with unreliable or slow internet, users face delays or interruptions in their shopping experience, which can be frustrating.
* **High Storage and Battery Usage**: Large apps like BigBasket and Grofers consume significant storage space and battery power due to real-time updates, background processes, and data-heavy media content (e.g., product images, videos).
* **Limited Customization for Local Businesses**: The existing systems are not customizable enough for local grocery stores or smaller vendors to list their products. The closed nature of the platforms also restricts the ability to modify the user experience according to regional preferences.

# 2.3 Need for the Proposed System

# The "Get it – Grocery Delivery App" addresses the gaps and limitations found in the existing solutions, offering a simpler and more flexible alternative for both end-users and small vendors. The need for this project arises from the following factors:

#  Simplified User Experience: With an intuitive and minimalistic interface, "Get it" focuses on providing a straightforward shopping experience. Users can quickly browse products, add them to the cart, and place orders without unnecessary steps. This reduces friction for users who prefer a quick and easy shopping experience.

 **Low Resource Consumption**: The app is designed to be lightweight, consuming minimal storage space and battery power. This makes it suitable for low-end devices with limited storage and battery life.

 **Scalability for Small Vendors**: "Get it" offers an easy-to-use platform for local grocery vendors to list their products without needing complex backend infrastructure. It provides the flexibility to integrate with future databases and cloud services for scaling.

**CHAPTER 3**

**PROPOSED SYSTEM**

* 1. **GENERAL**

The proposed system is a mobile application that allows users to browse grocery items, add them to a cart, and place orders seamlessly. The app is designed with a focus on user experience, ensuring that even individuals with minimal technical knowledge can navigate and use the application effectively.

# SYSTEM ARCHITECTURE

# The system architecture comprises the following components:

# User Interface (UI): Developed using XML layouts, providing intuitive navigation and interaction.

# Application Logic: Implemented in Kotlin, handling user inputs, data processing, and navigation between screens.

# Data Storage: Utilizes in-memory data structures for managing cart items and order details.

# Future Integration Points: Provision for integrating with backend services and databases like Firebase or Room for persistent data storage.

# 3.3 ADVANTAGES OF PROPOSED SYSTEM

 **Simplified User Experience**  
The app provides a minimalist and user-friendly interface, making it easier for customers, including those who are not tech-savvy, to navigate through the app and complete transactions with minimal effort.

 **Offline Functionality**  
Unlike most grocery delivery apps, "Get it" allows users to browse products and manage their cart without an internet connection. This feature is particularly beneficial in regions with unreliable or low-speed internet.

 **Lightweight and Resource-Efficient**  
The app is designed to consume minimal storage space and battery power, making it suitable for low-end devices with limited resources. This ensures that users can enjoy a smooth experience without worrying about device performance.

 **Cost-Effective Solution for Small Vendors**  
The app is ideal for local grocery vendors, as it doesn't require expensive backend infrastructure. Vendors can list their products easily, offering a low-cost solution to tap into the growing demand for online grocery shopping.

 **Scalability and Future Integration**  
The app’s architecture is designed to support future integrations with cloud-based services, such as Firebase or Room for persistent data storage. This allows the app to scale up as needed without a major overhaul.

 **Customizable for Local Markets**  
Unlike large, one-size-fits-all platforms, the "Get it" app allows for customization based on local vendor needs, ensuring a better fit for specific communities or niche markets. This flexibility makes the app adaptable to a variety of use cases.

 **No Complex Registration Process**  
Users can browse and make purchases without the need for complex sign-ins or account creation, streamlining the shopping experience for quick and hassle-free transactions.

 **Quick Order Processing**  
The app's simple and efficient architecture allows for fast processing of orders, making it ideal for customers looking for a speedy and straightforward grocery shopping experience.

 **Future-Proof**  
Although the app currently relies on in-memory data storage, it is designed with future enhancements in mind. Backend services, payment gateways, and AI-powered features like product recommendations can be integrated seamlessly.

 **Better Performance for Users with Low Bandwidth**  
The app operates well even under conditions of low bandwidth or intermittent internet connectivity. This makes it suitable for users in remote areas or places with limited data access.

# 

**Fig 3.1: System Architecture**

# DEVELOPMENTAL ENVIRONMENT

* + 1. **HARDWARE REQUIREMENTS**

The hardware specifications serve as the foundation for implementing and running the mobile application smoothly. A clear understanding of hardware requirements is crucial to ensure compatibility, responsiveness, and stability during both development and usage. These specifications help guide design decisions and ensure reliable performance on real Android devices and emulators.

**Table 3.1 Hardware Requirements**

# Development Machine:

# Processor: Intel i5 or higher

# RAM: 8 GB or more

# Storage: 500 GB HDD/SSD

# Operating System: Windows 10/macOS/Linux

# Testing Device:

# Android Smartphone with Android 5.0 (Lollipop) or higher

# Minimum 2 GB RAM

# SOFTWARE REQUIREMENTS

# The software requirements define the essential components required for the design, development, testing, and deployment of the Get It – Grocery Delivery App These specifications ensure that developers have the necessary tools and environments for efficient development.

**3.2 Software Requirements**

# Android Studio (Latest Version)

# Kotlin Programming Language

# XML for UI Design

# Emulator or Physical Device for Testing

# Version Control System (e.g., Git)

# DESIGN OF THE ENTIRE SYSTEM

# 

# ACTIVITY DIAGRAM

The Activity Diagram models the logical flow of the application from launch to interaction and illustrates the flow of user interactions within the app:

1. **Launch App:** User opens the application.
2. **Browse Products:** User views the list of available grocery items.
3. **Add to Cart:** User selects items to add to the shopping cart.
4. **View Cart:** User reviews selected items and adjusts quantities if necessary.
5. **Place Order:** User confirms the order for processing.
6. **Order Confirmation:** App displays order summary and estimated delivery time.

# 

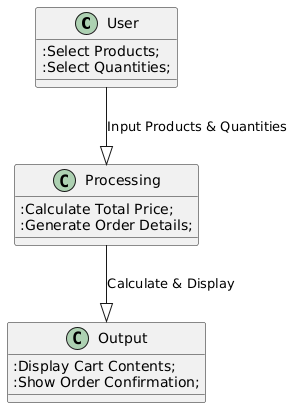
**Fig 3.2: Activity Diagram**

# 3.4.2 DATA FLOW DIAGRAM

The data flow diagram showcases the movement of data within the system:

* **User Input:** Selection of products and quantities.
* **Processing:** Calculation of total price and order details.
* **Output:** Display of cart contents and order confirmation

.



**Fig 3.3:Data Flow Diagram**

# CHAPTER 4 MODULE DESCRIPTION

This section provides a comprehensive breakdown of the internal modules that make up the Get it – Grocery Delivery App. The application has been designed using modular architecture, separating concerns such as UI, data handling, and user interaction, thereby improving maintainability and scalability.

# SYSTEM ARCHITECTURE

# User Interface Design

# The User Interface (UI) plays a critical role in the overall user experience. The design philosophy followed here is *“functionality with simplicity.”* Key aspects of the UI include:

# Clear Categorization:

# Products are grouped under clearly labeled categories such as *Fruits*, *Vegetables*, *Beverages*, etc., enabling faster discovery.

# Icons and images are used to visually differentiate product categories.

# Intuitive Navigation:

# A straightforward flow ensures that users can easily move between product browsing, cart management, and order confirmation.

# Buttons like “Add to Cart,” “View Cart,” and “Place Order” are strategically placed for quick access.

# Responsive Design:

# The layout adapts to various screen sizes and device resolutions, ensuring compatibility across a wide range of smartphones and tablets.

# Scroll views and constraint layouts are used for dynamic adjustment of UI elements.

# USER INTERFACE DESIGN

# 

# Fig 4.1: SEQUENCE DIAGRAM

# BACK END INFRASTRUCTURE

# At present, the backend is lightweight, using in-memory Kotlin data structures such as lists and maps to store cart items and order details. However, the code is written with extendability in mind:

# Future Integration Plans:

# Firebase Realtime Database or Firestore can be used to sync cart data, store product inventories, and manage user authentication.

# Room Database integration could provide offline capabilities and data persistence even when the app is closed or restarted.

**4.2 Data Collection & Preprocessing**

Since this is a prototype application, the data handling modules are kept simple yet structured, focusing on accuracy and consistency.

**4.2.1 Dataset & Data Labeling**

* The current dataset comprises a manually curated list of grocery items.
* Each item includes:
  + Product Name (e.g., Apple, Milk)
  + Price (e.g., ₹45/kg)
  + Representative Icon/Image
* This structured approach ensures a consistent UI and enables dynamic population of views.

**4.2.2 Data Preprocessing**

* Before data is presented to the user, it is organized into **custom Kotlin data classes**.
* This allows for type safety and ease of access within activities and adapters.
* The product list is converted into **RecyclerView-friendly formats** for display.

**4.2.3 Feature Extraction**

* From the raw data, the following features are extracted for display:
  + **Product Name**
  + **Price per Unit**
  + **Quantity Selected**
* These features enable users to make informed purchase decisions and facilitate backend processes like price calculation.

**4.2.4 Classification & Model Selection**

* This module is **not implemented in the current version**, as no AI/ML models are used.
* Future updates could explore:
  + **Collaborative filtering** for product recommendations.
  + **Image classification** for barcode or product scanning.
  + **NLP-based chatbot** for user assistance.

**4.2.5 Performance Evaluation**

* Performance metrics are qualitative and include:
  + **UI Responsiveness**: Assessed based on load times and transition speeds between activities.
  + **User Satisfaction**: Collected through peer feedback during testing.
  + **Error Rates**: Monitored through validation checks, such as handling empty carts or invalid inputs.

**4.2.6 Model Deployment**

* No AI/ML models are deployed at this stage.
* However, the app is structured in a way that allows for modular plugin of future model components using Android ViewModel and Repository architecture.

**4.2.7 Centralized Server & Database**

* Currently absent, all operations are local to the device.
* A **cloud-based backend infrastructure** is planned:
  + Firebase for user accounts, orders, and real-time updates.
  + Google Cloud Functions for business logic (e.g., calculating delivery ETA).
  + Hosting static product image assets on Firebase Storage or AWS S3.

**4.3 System Workflow**

This module outlines how the user interacts with the app and how data flows within the system based on these interactions.

**4.3.1 User Interaction**

* The app is designed around **touch interactions**, including taps, scrolls, and long-presses.
* Users navigate through a linear path:
  1. Launch the app.
  2. Browse products.
  3. Select and add items to cart.
  4. View cart and adjust quantities.
  5. Place the order and view confirmation.

.

**4.3.2 Result Display & Reporting**

* Upon successful order placement:
  + A **confirmation screen** is shown with a breakdown of items, prices, total amount, and estimated delivery time.
  + Users may also receive a **Toast notification** for confirmation.
  + Provision for future integration of email or push notifications.

**4.3.3 Continuous Model Improvement**

* Though no machine learning model is present currently, future enhancements can include:
  + **User feedback collection** through surveys or rating systems.
  + **Automatic updates** based on usage patterns (e.g., frequently bought items shown at the top).
  + **A/B testing** to evaluate UI and functionality improvements.

# CHAPTER 5 IMPLEMENTATION AND RESULTS

# IMPLEMENTATION

# The development of the Get it – Grocery Delivery App was carried out using Android Studio, the official integrated development environment (IDE) for Android app development. The application is built using Kotlin, a modern, expressive, and type-safe programming language that is fully supported by Google for Android development. The user interface (UI) of the app is designed using XML, enabling the creation of a visually appealing and user-friendly experience across different screens.

# The system follows a modular structure, where each activity represents a specific feature or module. These include:

# MainActivity: The launcher activity that provides access to product categories and navigation.

# ProductListActivity: Displays a curated list of grocery items fetched either from a local array or intended future backend.

# CartActivity: Allows users to view, edit, and manage selected items. Quantities can be adjusted dynamically.

# OrderConfirmationActivity: Summarizes the cart, displays total cost, and confirms the purchase.

# SplashScreen/OnboardingActivity: Designed for user onboarding, to be enhanced later with authentication and personalization.

# All data manipulation—such as cart updates, price calculation, and product management—is handled using in-memory data structures, primarily Kotlin collections. This ensures swift performance without requiring external storage.

# The app also includes Intents for navigation between activities, Toast messages for user feedback, and custom adapters for dynamically loading list items into RecyclerView components.

# OUTPUT SCREENSHOTS

# 

# 

# 

**CHAPTER 6**

**CONCLUSION AND FUTURE ENHANCEMENT**

# CONCLUSION

# The Get it – Grocery Delivery App proves to be an effective prototype for a grocery e-commerce application tailored for Android users. With a minimalist design, responsive interactions, and core functionalities like product browsing and order placement, the app offers a complete end-to-end shopping experience.

# This project highlights how Kotlin and Android development tools can be leveraged to build lightweight and scalable applications even without a backend initially. It is particularly suitable for individual developers or startups looking to validate ideas with a Minimum Viable Product (MVP).

# Key achievements include:

# Intuitive navigation and responsive user interface.

# Real-time cart updates.

# Modular code structure following Android activity lifecycle best practices.

# FUTURE ENHANCEMENT

# To enhance the application's functionality and scalability, the following future enhancements are proposed:

# Integration with Backend Services:

# Real-time product availability, pricing updates, and order storage can be achieved by integrating services like Firebase Firestore or MySQL with REST APIs.

# Secure Payment Gateway:

# Integration with payment gateways such as Razorpay, Google Pay API, or Paytm will enable seamless, secure in-app transactions.

# User Authentication:

# Implementing Firebase Authentication or OAuth 2.0 would allow users to create profiles, save order history, and receive personalized recommendations.

# Order Tracking:

# Real-time tracking of order status (e.g., “Preparing,” “Out for Delivery,” “Delivered”) using a notification system and Google Maps API.

# Customer Support Chatbot or FAQ:

# An integrated support section with chatbot capabilities using tools like Dialogflow or live chat APIs will improve user trust and retention.

# Admin Panel for Store Management:

# A companion web interface where store managers can update inventory, manage orders, and view analytics.

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