ANDROID APPLICATION DEVELOPMENT

An Android Application for Snack Squad: A Customizable Snack Ordering and Delivery App

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COIMBATORE – 641046

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SNACK SQUAD: A CUSTOMIZABLE SNACK ORDERING AND DELIVERY APP

PROJECT OVERVIEW :

The Snack Squad app is an Android-based snack ordering and delivery application designed to provide a convenient and visually appealing e-commerce experience. Built using Android Jetpack Compose, the app introduces a modern UI approach that aligns with the latest design trends and improves user interaction. Snack Squad enables users to browse a variety of snacks, add them to a shopping cart, and proceed to checkout, creating a simple yet effective shopping experience. Additionally, the app features an admin interface, enabling administrators to log in and manage orders directly from the app. This project aims to offer a customizable solution for snack e-commerce, allowing developers to gain hands-on experience with Android Compose UI, database integration, and essential user authentication flows.

OBJECTIVES :

Business goals :

The Snack Squad project aims to develop an efficient ordering system by designing a straightforward and rapid ordering process that enhances customer satisfaction through a streamlined shopping experience. Additionally, the project includes an Admin Order Management feature, providing an intuitive interface for administrators to efficiently view and manage customer orders, ensuring smooth backend operations. Another key

business objective is to demonstrate the capabilities of Jetpack Compose by showcasing Android's latest UI toolkit. This will help create a modern, responsive, and flexible user interface that enhances the app's usability and aesthetic appeal, reflecting current industry standards in Android app design.

Specific Outcomes:

A primary outcome of this project is implementing secure User Authentication, allowing users to register and log in confidently, with their information securely managed via Firebase Authentication. Additionally, the project focuses on Cart and Checkout Management by developing a smooth, user-friendly workflow for selecting items, adding them to the cart, and completing purchases. To support administrators, a streamlined Order Review for Admins is also implemented, allowing efficient viewing and management of orders placed by users. Finally, the project includes Comprehensive Database Integration, establishing a robust system to manage user accounts, snack items, and order data, enabling smooth data handling throughout the app.

KEY FEATURES AND CONCEPTS UTILIZED :

The Snack Squad app utilizes several modern Android libraries and features to achieve its functionalities. The core of the UI is powered by Android Jetpack Compose, a toolkit that simplifies UI development by enabling developers to create interactive and responsive user interfaces with significantly reduced code. Jetpack Compose powers the snack browsing screen, cart view, and checkout page, enhancing the app's overall look and feel with transitions and animations that engage users.

To secure user accounts, the app employs Firebase Authentication, providing a seamless and secure way to manage user registration and login. This tool allows for easy setup and robust security, ensuring that user data remains private. For data storage and retrieval, the app integrates Room Database (or alternatively, SQLite), which serves as the backbone for managing user accounts, snack inventory, and order history. Database entities and data access objects facilitate efficient storage and retrieval, ensuring data is quickly accessible and updated as needed. The app also incorporates navigation controls, allowing users to move fluidly between the login, main page, cart, and checkout sections, with separate admin navigation to access the order management dashboard.

DETAILED STEPS TO SOLUTION DESIGN :

UI Design :

- Home Screen : Displays a list of available snacks using a vertical list layout. Each snack item includes a name, description, price, and "Add to Cart" button.
- Cart Screen : Shows items added by the user, with quantities, and a "Checkout" button.
- Checkout Screen : Final page where users can review their order and confirm the purchase.
- Admin Dashboard : Accessible only by admins, showing a list of orders with customer details.

Data Model :

- User Entity : Stores user information, including username, email, and login credentials.
- Snack Item Entity : Represents each snack with fields like name, price, description, and image.
- Order Entity : Tracks orders, including user details, items ordered, and order status.

Database and Business Logic :

- Room Database : Manages persistent data storage with entities representing users, snacks, and orders.
- DAO Classes : Encapsulate methods to insert, delete, update, and fetch data from the database.
- Business Logic Layer : Coordinates the app's core logic, including adding items to the cart, processing orders, and managing user authentication.

User Authentication Flow :

- Users register or log in to access the main shopping page.
- Login credentials are verified via Firebase Authentication to ensure secure access.

Admin Flow :

- Admins log in through a separate interface, gaining access to an order management dashboard to view all placed orders.

TESTING AND VALIDATION :

Unit Testing is performed on all core functionalities, including database operations and business logic. The database testing confirms that information is correctly stored and retrieved, while business logic testing verifies the proper functioning of cart management, item selection, and order processing.

User Interface Testing plays a critical role in validating the app's flow and ensuring that users can navigate effortlessly from one screen to the next. Visual checks are conducted to confirm the layout renders correctly across different screen sizes, guaranteeing a consistent experience for all users.

Security Testing focuses on verifying the integrity of Firebase Authentication, confirming that only registered users can access their accounts and that only authorized admins can view and manage orders through the admin dashboard.

KEY SCENARIOS ADDRESSED :

The Snack Squad app addresses several critical user and admin scenarios to provide a comprehensive e-commerce experience. The User Registration and Login scenario enables users to securely create an account or log in to access the snack catalog. Firebase Authentication plays a key role here, ensuring that all credentials are securely managed. In the Snack Browsing and Selection scenario, users can view a list of available snacks, each presented with essential details like price and description. A simple "Add to Cart" button allows users to build their orders with minimal effort.

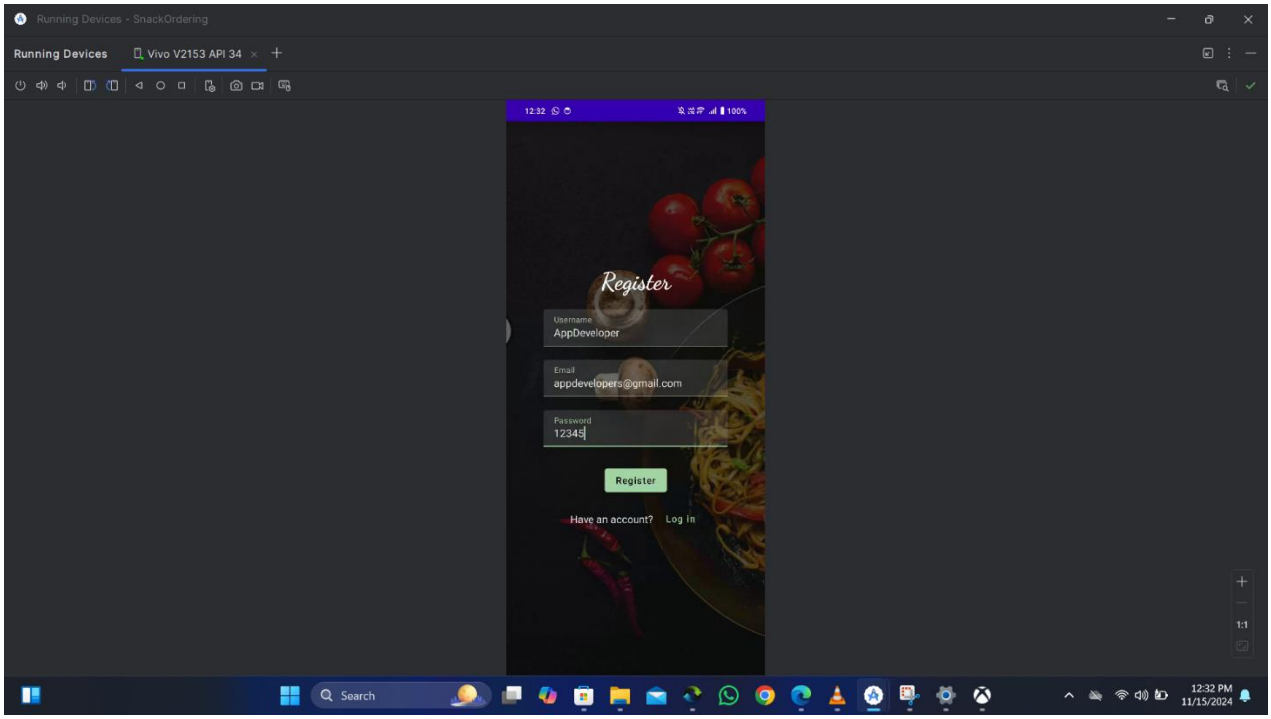
CODE :

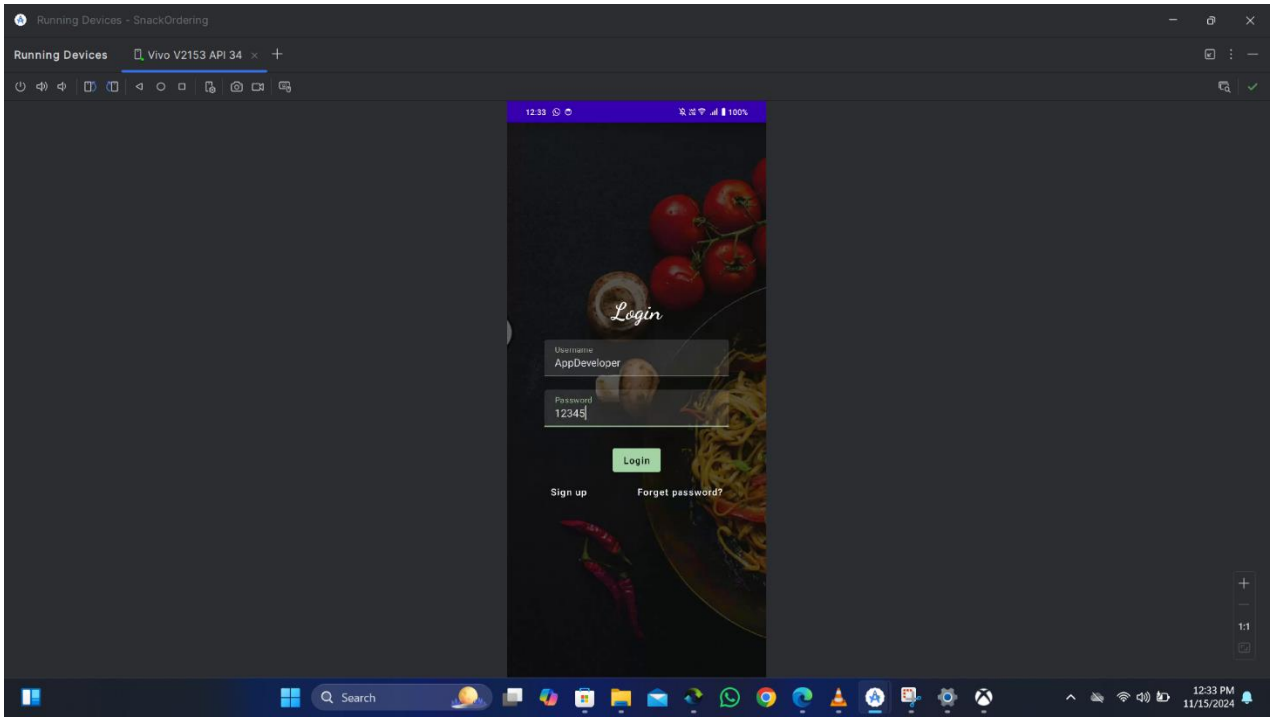
AndroidManifest.xml :

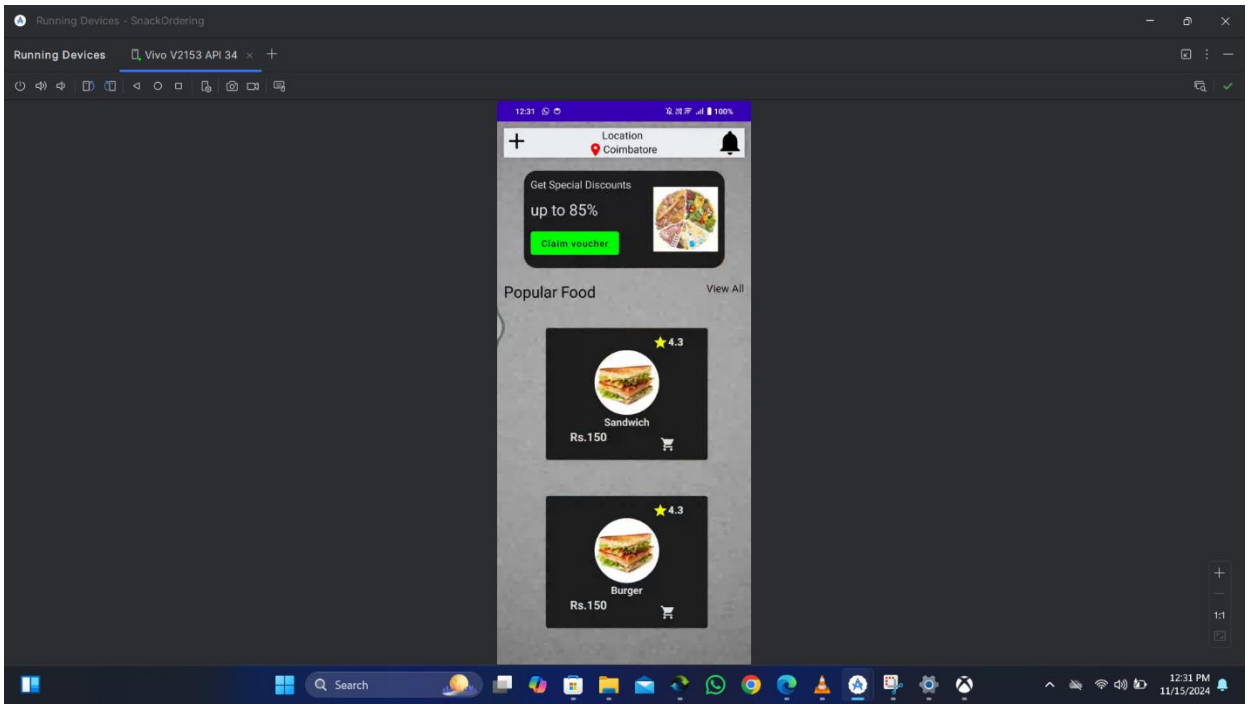
```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools">
    <application
        android:allowBackup="true"
        android:dataExtractionRules="@xml/data_extraction_rules"
        android:fullBackupContent="@xml/backup_rules"
        android:icon="@drawable/fast_food"
        android:label="@string/app_name"
        android:supportsRtl="true"
        android:theme="@style/Theme.SnackOrdering"
        <activity
            android:name=".AdminActivity"
            android:theme="@style/Theme.SnackOrdering" />
        <activity
            android:name=".LoginActivity"
            android:exported="true"
            android:label="SnackSquad"
```

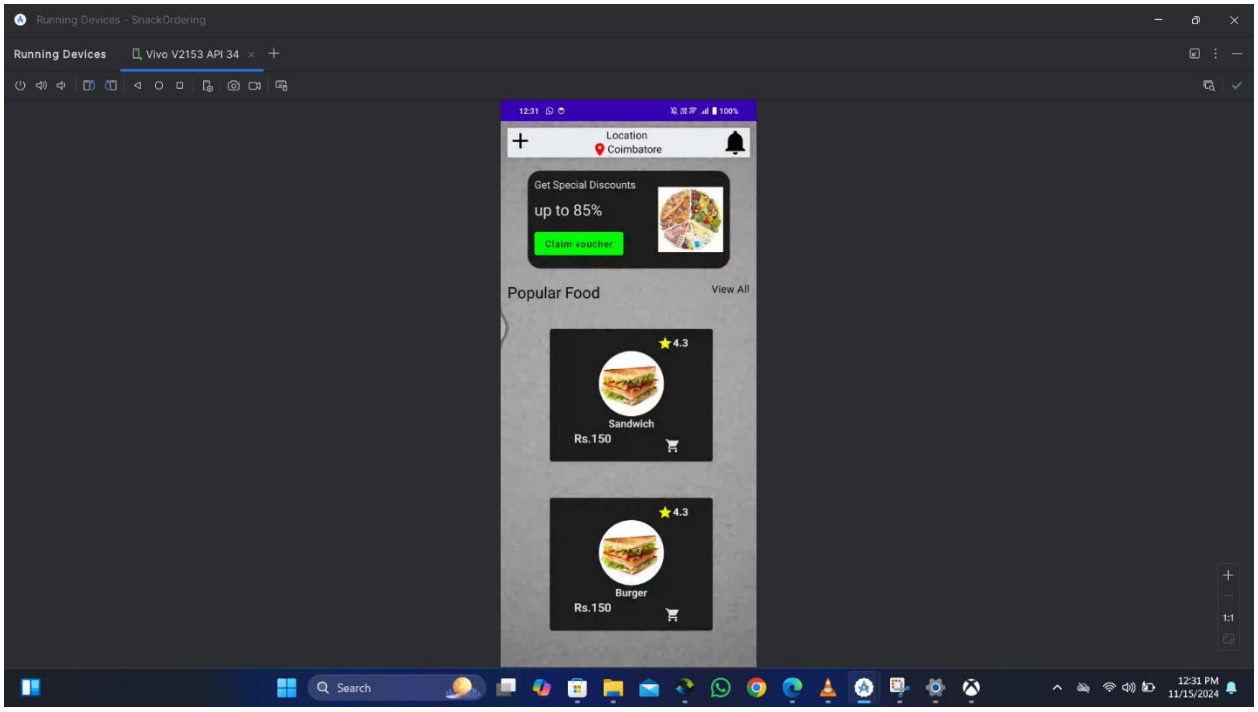
```
        android:theme="@style/Theme.SnackOrdering">
            <category
android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
    </activity>
    <activity
        android:name=".TargetActivity"
        android:label="@string/title_activity_target"
        android:theme="@style/Theme.SnackOrdering" />
    <activity
        android:name=".MainPage"
        android:exported="false"
        android:label="@string/title_activity_main_page"
        android:theme="@style/Theme.SnackOrdering" />
    <activity
        android:name=".MainActivity"
        android:exported="false"
        android:label="MainActivity"
        android:theme="@style/Theme.SnackOrdering" />
  </application>
</manifest>
```

OUTPUT :


Running Devices - SnackOrdering
Running Devices
Vivo V2153 API 34
12:32
Register
Username
AppDeveloper
Email
appdevelopers@gmail.com
Password
12345
Register
Have an account? Log in
Search
12:32 PM
11/15/2024


Running Devices - SnackOrdering
Running Devices
Vivo V2153 API 34
12:33
Login
Username
AppDeveloper
Password
12345
Login
Sign up
Forget password?
Search
12:33 PM
11/15/2024


Running Devices - SnackOrdering
Running Devices
Vivo V2153 API 34
12:31
100%
Location
Coimbatore
Get Special Discounts
up to 85%
Claim voucher
Popular Food
View All
4.3
Sandwich
Rs.150
4.3
Burger
Rs.150
Search
12:31 PM
11/15/2024


Running Devices - SnackOrdering
Running Devices
Vivo V2153 API 34
12:31
100%
Location
Coimbatore
Get Special Discounts
up to 85%
Claim voucher
Popular Food
View All
4.3
Sandwich
Rs.150
4.3
Burger
Rs.150
Search
12:31 PM
11/15/2024

CONCLUSION :

The Snack Squad project successfully demonstrates the capabilities of Android Jetpack Compose and Room Database within a real-world e-commerce application. By creating a customizable snack ordering platform, this project highlights the essential elements of Android development, from user authentication to database management and UI design. The app achieves its primary goals of providing a smooth, intuitive snack shopping experience for users, coupled with a simple order management interface for admins.

This project also serves as an educational tool for developers, offering practical experience with Android's latest tools and libraries. Snack Squad sets a strong foundation for future Android applications, with potential enhancements including order tracking, payment integration, and personalized recommendations. Through this project, developers gain essential skills in UI design, database management, and user flow control, equipping them for advanced projects in Android app development.