MACoursework Stage 2 Design Report Group 1

Tran Duy Anh - 23085483
Nguyen Duc Trung - 23085492
Nguyen Nhat Minh - 23085487

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1 Requirements

1.1 Context / High Concept

A mobile shopping software that lets users browse goods from online vendors, search and filter products based on price and category, see product details, and place purchases. The software is made to give customers a quick, easy, and convenient mobile shopping experience, enabling them to locate and buy goods at any time and from any location.

1.2 Target Users

The app is designed for young adults and adults aged 18–45 who regularly use smartphones for online shopping. The primary users include students, working professionals, and busy individuals who value convenience, speed, and ease of use when purchasing products on mobile devices.
The app targets users who frequently browse online stores, and prefer shopping anytime and anywhere rather than visiting physical shops. It is especially suitable for users looking for a simple, and efficient mobile shopping experience, regardless of their technical background.

1.3 User Stories

User stories are used to describe how users interact with the mobile shopping application in real-world scenarios. They help to capture functional requirements from the user's perspective and provide context for system behaviour.

- **User Authentication and Onboarding**
  - As a new user, I want to sign up for an account from the Welcome screen, so that I can access personalised shopping features.
  - As a returning user, I want to log in securely and be taken directly to the Home screen, so that I can continue shopping without unnecessary steps.
  - As a logged-in user, I want the application to remember my authentication state, so that I do not need to log in every time I launch the app.
- **Product Browsing**
  - As a shopper, I want to browse featured products and categories on the Home screen, so that I can easily discover available items.
  - As a shopper, I want to view detailed product information including images, prices, descriptions, and ratings, so that I can make informed purchasing decisions.
- **Search and Filtering**

  - As a user, I want to search for products using keywords, so that I can quickly find specific items.
  - As a user, I want to filter and sort search results by criteria such as price, so that I can narrow down results efficiently.

- **Shopping Cart**
  - As a shopper, I want to add products to my shopping cart, so that I can purchase multiple items in a single order.
  - As a shopper, I want to update quantities or remove items from my cart, so that I can manage my order before checkout.
  - As a shopper, I want to review a cart summary, so that I can confirm my selections before proceeding.

- **Checkout Process**
  - As a shopper, I want the checkout process to be divided into clear steps, so that I can complete my order with fewer errors.
  - As a shopper, I want to select or manage delivery addresses and payment methods during checkout, so that the transaction is accurate and convenient.
  - As a shopper, I want to receive an order confirmation after successful payment, so that I know my order has been placed.

- **Order Management and Reviews**
  - As a user, I want to view my order history and track order status, so that I can monitor current and past purchases.
  - As a user, I want to submit reviews for completed orders, so that I can share feedback with other users.

- **Profile, Wishlist, and Notifications**
  - As a user, I want to manage my profile information, saved addresses, and payment cards, so that future checkouts are faster.
  - As a user, I want to save products to a wishlist, so that I can purchase them at a later time.
  - As a user, I want to receive in-app notifications about order updates and promotions, so that I stay informed.

- **Chatbot Assistance**
  - As a user, I want to interact with a chatbot, so that I can receive product recommendations and assistance with shopping-related questions.

1.4 Initial Research

Mobile shopping applications such as Temu, Alibaba, and Shopee provide valuable insights into effective online shop design. These platforms emphasize intuitive navigation, efficient product browsing, advanced search and filtering, and streamlined checkout processes. Features such as wishlists, order tracking, notifications, and digital payments are widely used to improve user convenience and engagement. For example, Shopee's filtering and sorting options help users quickly locate relevant products, while detailed product pages with images and reviews build user trust.

Inspiration can also be drawn from applications outside the shopping domain. Food delivery apps such as GrabFood demonstrate clear order tracking and status updates, which can be adapted for delivery monitoring. Mobile banking apps provide best practices for secure authentication and payment flows. These insights inform the design of a user-friendly, efficient, and trustworthy mobile shopping application.

1.5 Functional / Non-functional Requirements

1.5.1 Functional Requirements

Functional requirements describe what the system should do and the features it must provide to users. Based on the project scope, the mobile shopping application must support the following functions:

- **User Management**: The system shall allow users to create accounts, log in securely, log out, and manage personal profile information.
- **Product Browsing**: The system shall display products organised by categories and allow users to view product images, prices, descriptions, and ratings.
- **Search and Filtering**: The system shall enable users to search for products using keywords and apply filters such as price range and sorting options.
- **Shopping Cart**: The system shall allow users to add products to a cart, update quantities, remove items, and view the cart summary before checkout.
- **Order Management**: The system shall allow users to place orders, view order details, and track the status of current and past orders.
- **Payment Card Management**: The system shall enable users to add, view, and manage payment cards for use during checkout.
- **Address Management**: The system shall allow users to store, edit, and select delivery addresses during the checkout process.

- **Wishlist**: The system shall allow users to save products to a wishlist for future reference.
- **Voucher System**: The system shall support applying discount vouchers to eligible orders to reduce the total cost.
- **Notifications**: The system shall provide in-app notifications to inform users about order updates, promotions, and other important events.
- **Chatbot Assistance**: The system shall provide a chatbot to assist users with product recommendations and general shopping-related questions.

1.5.2 Non-functional Requirements

Non-functional requirements describe how the system performs its functions and define quality attributes of the application.

- **Usability**: The application shall provide an intuitive and user-friendly interface that is easy to navigate for users with different technical backgrounds.
- **Performance**: The system shall respond to user actions within an acceptable time frame, ensuring smooth navigation and fast loading of product information.
- **Security**: The system shall protect user data, including personal information and payment details, using secure authentication and data handling mechanisms.
- **Reliability**: The application shall operate consistently without crashes and handle errors gracefully to avoid data loss or user frustration.
- **Scalability**: The system shall be designed to support an increasing number of users and products without significant performance degradation.
- **Compatibility**: The application shall be compatible with a wide range of modern Android devices and screen sizes.
- **Maintainability**: The system shall be modular and well-structured to allow future updates, bug fixes, and feature enhancements.

1.6 UI Requirements

The user interface of the mobile shopping application is designed to be clear, consistent, and easy to use on mobile devices. The UI requirements focus on usability, visual consistency, and accessibility to ensure a smooth shopping experience for all users.

- **Consistency**: The application shall maintain consistent layouts, colours, typography, and icon styles across all screens to reduce user confusion and improve learnability.

- **Navigation Clarity**: The UI shall provide clear navigation using a bottom navigation bar for main sections (Home, Search, Cart, Orders, Profile) and visible back buttons for secondary screens.
- **Responsive Layout**: The UI shall adapt to different screen sizes and resolutions while maintaining readability and proper spacing of UI elements.
- **Touch-Friendly Design**: All interactive elements such as buttons, icons, and list items shall be large enough and appropriately spaced to support comfortable touch interaction.
- **Product Presentation**: Product listings shall display key information at a glance, including product image, name, price, and rating. Product detail screens shall show multiple images and detailed descriptions.
- **Search and Filtering UI**: The search interface shall include a clearly visible search bar, filter options, and sorting controls to allow users to refine product results easily.
- **Checkout UI**: The checkout process shall be presented in a step-by-step layout with clear labels for address selection, payment method, order summary, and total price.
- **Feedback and Status**: The UI shall provide visual feedback for user actions, such as loading indicators, confirmation messages, error messages, and order status updates.
- **Accessibility**: The UI shall use readable font sizes, sufficient colour contrast, and clear icons to support accessibility and ensure usability for a wide range of users.
- **Visual Hierarchy**: Important elements such as call-to-action buttons, prices, and order totals shall be visually emphasised to guide user attention effectively.

2 Wireframes

2.1 Technical Diagrams

The mid-fidelity wireframes presented below were developed in Figma and follow the Android Human Interface Guidelines to ensure appropriate layout structure, user flow, and overall usability. These diagrams illustrate the primary screens and their key components, directly informed by the functional and UI requirements outlined earlier (e.g., secure user authentication, intuitive navigation, and touch-friendly interactions). The wireframes are arranged in the sequence they appear in the Figma file, from left to right, beginning with the onboarding and authentication screens, progressing through homepage and discovery features,

search results, product details, shopping cart, checkout process, order management, order details, review interfaces, profile, collections, wishlist, and finally payment, voucher, and address management screens. All elements are designed with adequate spacing and sizing to support comfortable interaction on mobile devices, while incorporating provisions for error states and feedback.

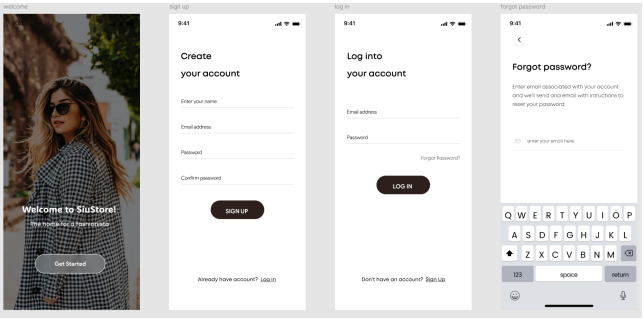

Figure 1: Onboarding and Authentication Flow Wireframes: From left to right – Welcome screen (background image placeholder, greeting text, and prominent 'Get Started' button); Sign Up screen (vertically stacked form fields for name, email, password, and confirmation, with 'SIGN UP' action button); Log In screen (email and password fields, 'LOG IN' button, and supporting links); Forgot Password screen (explanatory text, single email input field, and visible keyboard state).

This sequence prioritises a streamlined onboarding experience. The Welcome screen maintains minimal content to avoid overwhelming new users, focusing attention on the primary call-to-action. The Sign Up and Log In forms employ clear vertical alignment to facilitate efficient data entry on touchscreen devices. The Forgot Password screen provides concise guidance and assumes appropriate validation feedback for incorrect inputs.

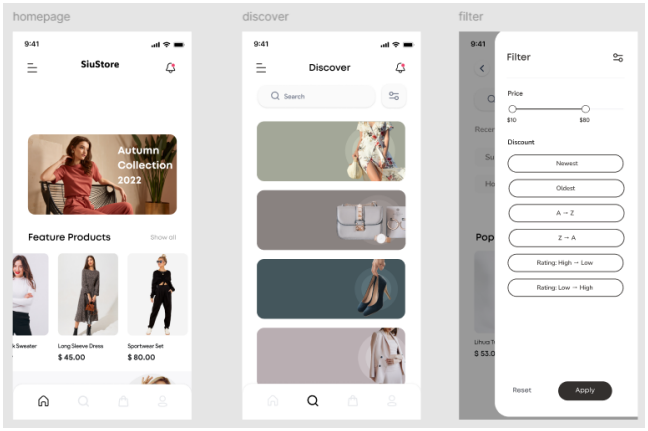

Figure 2: Browsing and Discovery Wireframes: From left to right – Homepage (top bar with logo and notification icon, promotional banner for seasonal collection, featured products section displayed as cards, and persistent bottom navigation); Discover screen (prominent search bar at the top with scrollable product card list below); Filter overlay (price range slider, sorting options for discount, popularity, and rating, with 'Reset' and 'Apply' controls).

These screens support effective product discovery. The Homepage emphasises visual hierarchy through a large banner and curated featured items, while the bottom navigation ensures consistent access to core sections. The Discover screen centres the search functionality, complemented by a vertically scrollable results list. The Filter interface offers refined control via intuitive sliders and dropdowns, enabling users to adjust criteria efficiently.

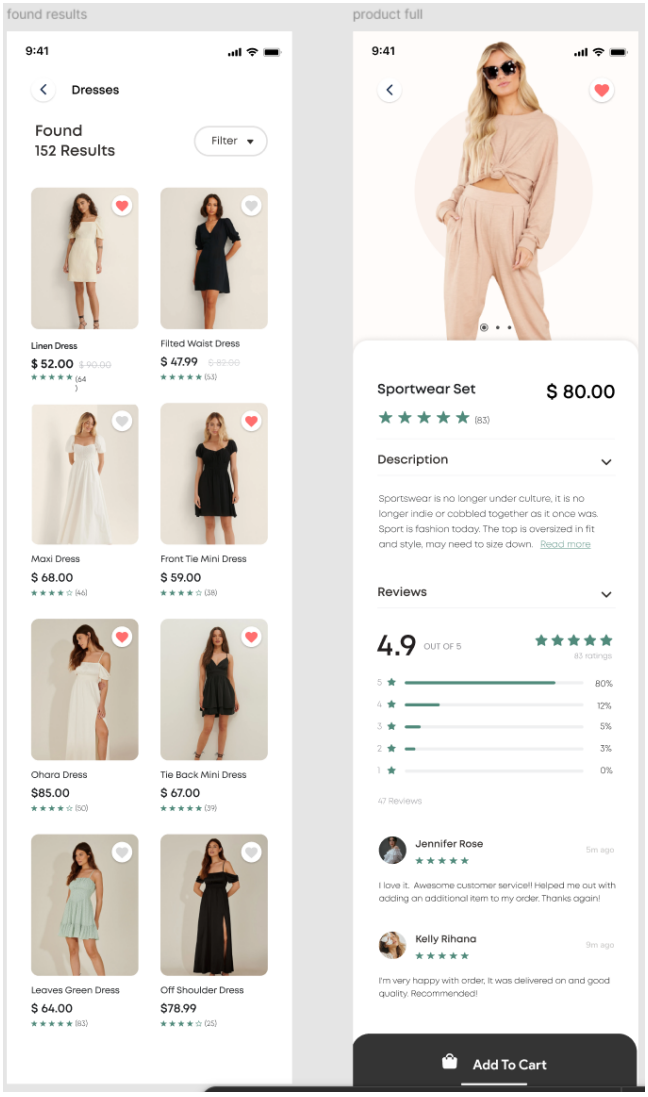

Figure 3: Search Results and Product Detail Wireframes: From left to right – Search Results screen (back navigation to category, result count header, filter access, and grid of product cards with images, titles, prices, ratings, and favourite indicators); Product Detail screen (back navigation, favourite icon, large primary image, product title with price and rating, expandable description and reviews sections including rating distribution chart and user comments, and fixed 'Add to Cart' button).

This pair extends the discovery process into detailed exploration. The Search Results screen presents a dense yet scannable grid layout, allowing rapid eval-

uation of multiple items. The Product Detail screen provides comprehensive information through a scrollable structure, with particular emphasis on social proof via the aggregated rating chart and individual reviews, culminating in a persistent call-to-action for adding the item to the cart.

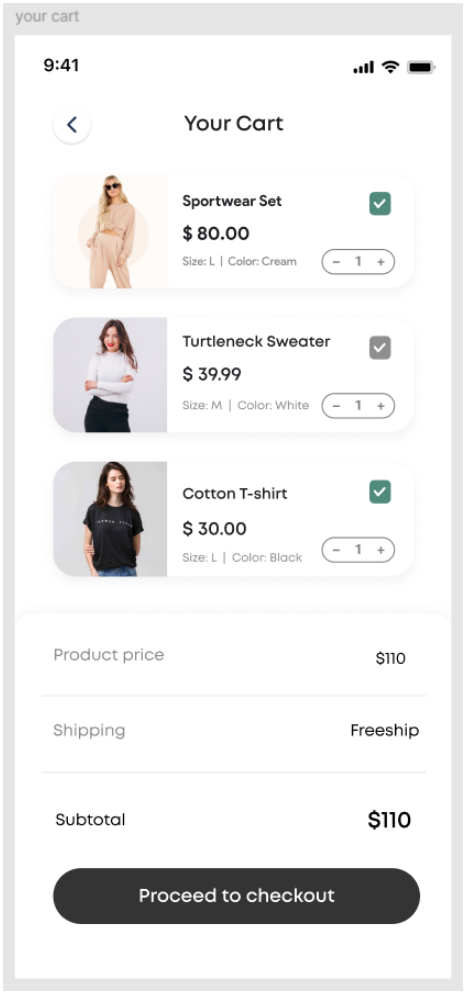

Figure 4: Shopping Cart Wireframe: Header with back navigation and 'Your Cart' title; vertically stacked list of selected items, each showing product image, title, price, selected size/colour, quantity adjustment controls, and selection checkbox; summary section displaying product total, shipping information (freeship), subtotal, and prominent 'Proceed to Checkout' button.

The cart screen facilitates review and modification of selected items prior to purchase. Each entry is clearly structured to display essential details and enable quantity adjustments, while the fixed summary area maintains transparency

regarding costs. The prominent checkout button ensures a clear progression to the next stage of the transaction process.

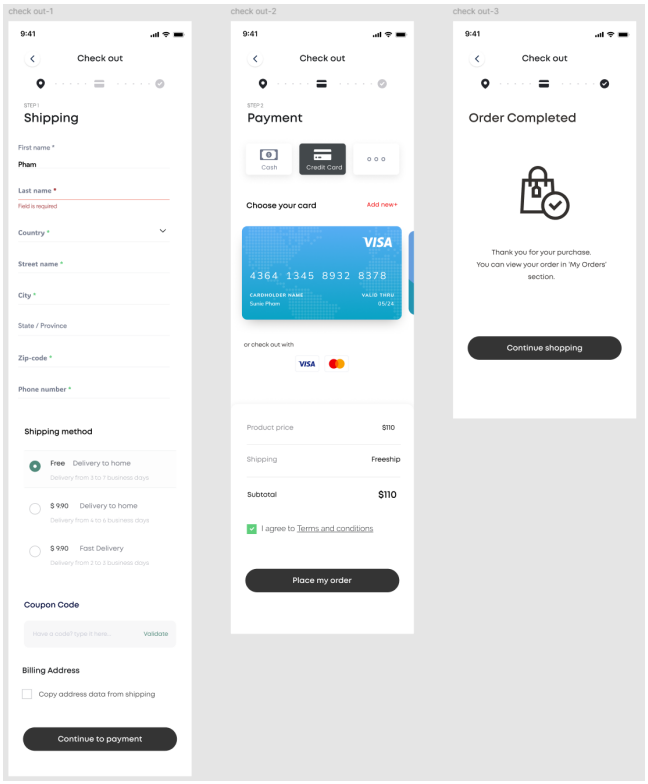

Figure 5: Checkout Process Wireframes: From left to right – Shipping screen (Step 1 header, form fields for personal and address details including name, country, street, city, state, zip code, and phone; shipping method options with costs and delivery times; coupon code input; billing address checkbox; 'Continue to Payment' button); Payment screen (Step 3 header, payment method tabs for cash or credit card, card selection or add new option with sample card display; order summary with product price, shipping, subtotal; terms agreement checkbox; 'Place my order' button); Order Completed screen (confirmation header with success icon, thank you message and link to orders; 'Continue shopping' button).

This multi-step sequence manages the final purchase stages. The Shipping screen organises input fields logically for address entry and includes selectable shipping options to accommodate user preferences. The Payment screen integrates secure method selection with a concise summary for verification. The Order Completed screen provides immediate confirmation and directs users back to browsing or order tracking.

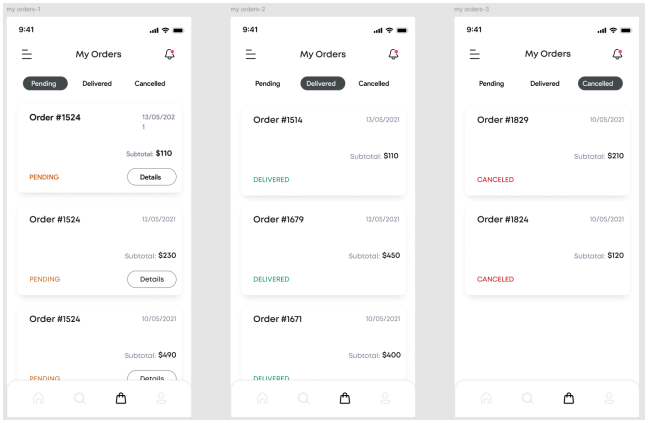

Figure 6: Order Management Wireframes: From left to right – Pending tab (top tabs for Pending/Delivered/Cancelled, list of pending orders with ID, date, subtotal, status indicator, and 'Details' button); Delivered tab (similar list structure for delivered orders with green status labels); Cancelled tab (list of cancelled orders with red status indicators).

The order management screens enable users to track purchase history efficiently. Tabbed navigation allows quick filtering by status, with each order presented as a concise card containing essential information and a details link for further inspection. Status indicators use colour coding for immediate visual distinction between states.

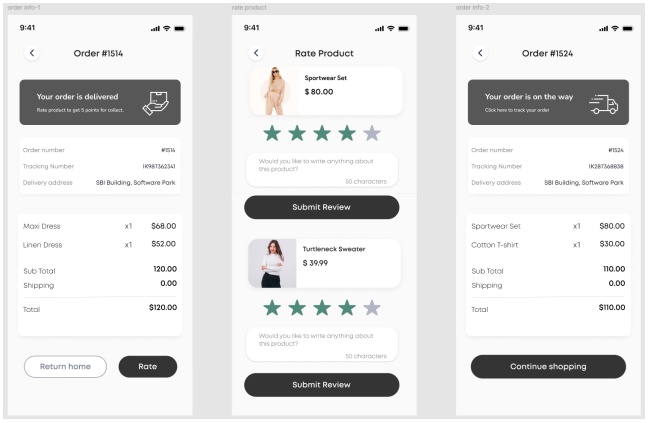

Figure 7: Order Details and Review Wireframes: From left to right – Delivered Order Info screen (status message, order number, tracking number, delivery address, item list with quantities and prices, subtotal/shipping/total summary, 'Return Home' and 'Rate' buttons); Rate Product screen (product image, title, price, star rating selector, review text input with character limit, 'Submit Review' button); On-the-Way Order Info screen (status message with tracking link, similar order details and summary, 'Continue shopping' button).

These screens provide in-depth order tracking and post-purchase engagement. The Order Info screens display comprehensive details including status updates and item breakdowns, with context-specific actions such as rating for delivered orders or tracking for in-transit ones. The Rate Product screen encourages user feedback through simple rating and text input mechanisms, supporting the app's review functionality.

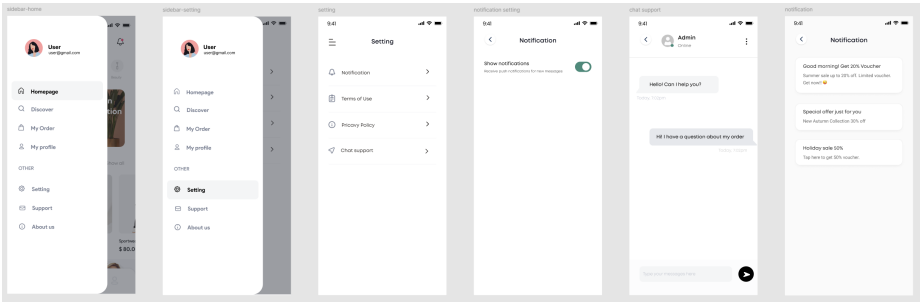

Figure 8: Profile and Settings Wireframes: From left to right – Side-bar menu (user profile header with avatar and email, navigation items including Homepage, Discover, My Order, My Profile, Setting, Support, About us, and wallet balance); Side-bar setting variant (similar menu structure); Settings screen (list items for Notification, Terms of Use, Privacy Policy, Chat Support, About Us); Notification settings (toggle for receiving push notifications); Chat Support screen (conversation interface with admin avatar, sample messages, and input field); Notification screen (scrollable list of in-app notifications with titles and descriptions, such as promotional offers).

The profile and settings screens offer personalised account management and support features. The side-bar provides quick access to main app sections and user-specific information. The Settings screen organises administrative options in a simple list format. Dedicated sub-screens for notifications and chat enable fine-grained control and real-time assistance, with the notification list displaying timely updates in a clear, scrollable layout.

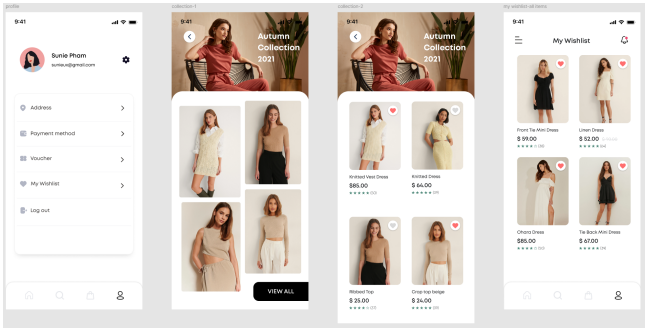

Figure 9: Profile, Collections, and Wishlist Wireframes: From left to right – Profile screen (user avatar, name, email, list items for Address, Payment method, Voucher, My Wishlist, Log out, with persistent bottom navigation); Collection-1 screen (back navigation, 'Autumn Collection 2021' banner, grid of product images); Collection-2 screen (similar collection view with additional products and 'View All' button); My Wishlist screen (header with notification, grid of wishlist items with images, names, prices, ratings, and favourite hearts).

These screens enhance user personalisation and content curation. The Profile screen serves as a central hub for account-related actions through a clean list interface. The Collection screens display themed product groupings in a visually engaging grid, promoting discovery within specific categories. The Wishlist screen organises saved items in a similar grid format, allowing easy review and management of user preferences.

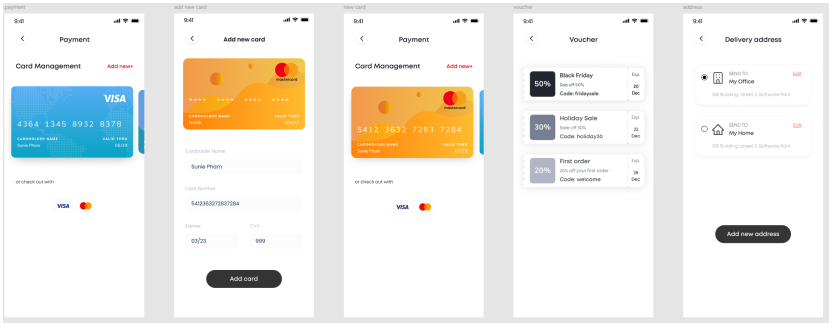

Figure 10: Payment, Voucher, and Address Management Wireframes: From left to right – Payment screen (header 'Card Management' with 'Add new+' link, sample card display with details and checkout option); Add New Card screen (form for card number, holder name, expiry, CVV, 'Add card' button); Payment with multiple cards (list of cards with checkout options); Voucher screen (list of vouchers with percentages, codes, expiry dates); Delivery Address screen (list of saved addresses with edit options, 'Add new address' button).

These screens support essential user management for transactions. The Payment screens allow secure card addition and selection through intuitive forms and lists. The Voucher screen presents available discounts in a scrollable format for easy application. The Delivery Address screen enables maintenance of shipping information, with options for adding or editing entries to streamline the checkout process.

These wireframes collectively establish a coherent and user-centred flow from initial access through to post-purchase management and personalised transaction features, with layouts optimised for varying screen dimensions.

2.2 User Flow / Navigation

The mobile shopping application follows a clear and structured user flow designed to minimise user effort while supporting all core shopping tasks. Navigation is implemented using a central navigation controller that manages screen transitions and preserves user state across the app.

Initial Flow: When the application launches, the system checks the user's authentication state.

- New or logged-out users are directed to the *Welcome* screen, where they

can proceed to log in or sign up.

- Logged-in users are taken directly to the *Home* screen.

Primary Navigation: The main screens of the app (*Home*, *Search*, *Cart*, *Orders*, and *Profile*) are accessible through a persistent bottom navigation bar. This allows users to quickly switch between core sections without losing their current context.

Browsing and Searching Flow: From the *Home* screen, users can browse featured products and categories. Selecting a category or product navigates the user to the *Product Details* screen. The *Search* screen allows users to search for products using keywords, price ranges, and sorting options. Search results are displayed on a dedicated results screen, from which users can access individual product pages.

Product and Cart Flow: On the *Product Details* screen, users can view detailed information such as images, price, description, and reviews. Products can be added to the shopping cart. The *Cart* screen provides an overview of selected items, allowing users to update quantities or proceed to checkout.

Checkout Flow: The checkout process is divided into multiple steps to improve clarity and reduce user errors:

- Checkout summary and order review
- Address selection or management
- Payment method selection
- Order confirmation

Once payment is completed, users are shown a *Checkout Completed* screen confirming the successful order.

Orders and Reviews Flow: Users can access their order history from the *Orders* screen, where orders are grouped by status (e.g. on the way, completed). Selecting an order opens the *Order Information* screen. For completed orders, users can submit product reviews.

Profile and Settings Flow: The *Profile* section provides access to user-related features such as saved addresses, payment methods, vouchers, wishlist, notifications, and app settings. Each option navigates to a dedicated screen, with consistent back navigation to ensure ease of use.

Overall, the navigation structure is designed to be intuitive, consistent, and scalable, ensuring users can complete shopping tasks efficiently while maintaining a smooth and predictable experience throughout the application.

2.3 App Lifecycle

The mobile shopping application is designed to handle different stages of the Android application lifecycle in a way that ensures data consistency, performance, and a smooth user experience. From the programmer's perspective, lifecycle

awareness is essential to manage UI state, user sessions, and system resources effectively.

Application Launch and Initialisation: When the application is launched, essential components such as the navigation controller and session manager are initialised. The app checks whether the user is already authenticated. Based on this state, the user is directed either to the welcome and authentication screens or directly to the home screen. During this stage, only essential data is loaded to reduce startup time.

Foreground (Active) State: While the app is in the foreground, all UI components, ViewModels, and navigation logic remain active. User interactions such as browsing products, searching, adding items to the cart, and managing orders are handled in real time. UI state is managed using lifecycle-aware components, ensuring that screen data is preserved during configuration changes such as screen rotation.

Background State: When the app moves to the background (for example, when the user switches apps or receives a phone call), active UI rendering is paused. Important user data, such as login state, shopping cart contents, selected addresses, and payment preferences, is preserved using local storage and in-memory state management. This allows users to resume their shopping session without losing progress when they return to the app.

Data Persistence: User-related data including authentication status, cart items, addresses, payment cards, wishlist items, and order history is stored using local persistence mechanisms. This ensures that critical information is retained even if the app is temporarily closed or the system reclaims resources.

Handling Configuration Changes: The application handles configuration changes such as device rotation or screen resizing without restarting the entire app. ViewModels are used to retain UI-related data, ensuring that users do not lose their current screen or input during such events.

System Events and Termination: If the operating system terminates the application due to low memory or resource constraints, the app relies on previously saved data to restore the user session when relaunched. Upon reopening, the application reinitialises required components and restores the last known user state where possible.

Overall, the application lifecycle management ensures that user data is protected, system resources are used efficiently, and the shopping experience remains seamless across different states of app execution.

2.4 Scale / Orientation

The app's design incorporates responsive elements to accommodate various device scales and orientations, ensuring a consistent user experience across smartphones in both portrait and landscape modes. This approach is guided by the UI requirements for adaptability, as detailed earlier, and aligns with Android's flexible layout principles to prevent content distortion or usability issues.

To illustrate, the wireframes primarily depict portrait orientation on a standard smartphone screen (e.g., 375x812 pixels), but considerations for landscape

mode involve reorienting key components such as the bottom navigation bar, which remains fixed while allowing horizontal scrolling for grids like product lists or collections. For instance, on the Home screen, the featured products grid would expand horizontally in landscape, utilising the wider space to display more items per row without compromising touch targets. Similarly, the Product Detail screen in landscape could split the layout, placing the main image alongside the description and reviews for improved readability.

Orientation changes are handled gracefully, with the app detecting rotations to adjust flows dynamically, such as reformatting the Cart summary to fit wider views.

These adaptations are communicated to developers through annotated wireframes and notes in the technical diagrams, emphasising the use of ConstraintLayout or Jetpack Compose for implementation. By considering these factors early, the app avoids common pitfalls like clipped content or awkward navigation, ultimately enhancing accessibility for the target audience of mobile shoppers.

This responsive strategy ensures the application remains functional and visually appealing across diverse phone configurations, promoting broader usability and user satisfaction.

3 Composites

The composites section builds upon the wireframes by incorporating aesthetic elements such as colours, typography, and refined visuals to convey the final "look and feel" of the SiuStore app. These designs aim to create an engaging, user-friendly interface that aligns with the target audience's preferences for a modern, fashion-focused shopping experience. The visuals are presented in high-fidelity mock-ups, with considerations for branding, accessibility, and scalability.

3.1 Mock-ups

The mock-ups represent the envisioned final appearance of the app, showing key screens in realistic contexts such as on a smartphone device. These static designs integrate the structural layouts from the wireframes with stylistic enhancements, including images, fonts, and interactive indicators, to help stakeholders visualise the completed product. For example, the Home screen mock-up features a vibrant banner and product grid in a clean, scrollable format, while the Product Detail screen highlights detailed imagery and review sections for informed decision-making. Mock-ups are shown for various modes, such as light theme, and assume dynamic elements like loading states.

These mock-ups ensure the app appears polished and intuitive, with elements like rounded corners and subtle shadows for depth, enhancing the overall shopping journey.

3.2 App Icon

The app icon serves as the primary visual identifier for SiuStore, designed to be simple, memorable, and scalable across device resolutions. It features a stylised shopping cart overflowing with tech and fashion items, symbolising the app's e-commerce focus, enclosed in a circular badge with the text "SIU STORE" below. The design uses a minimalist palette for versatility on device home screens and app stores, with variants for different sizes (e.g., 512x512 for Google Play, smaller for notifications).

Figure 11: App Icon Design: Main variant showing the shopping cart motif, optimised for various device scales and manufacturer requirements.

This icon adheres to Android icon guidelines, ensuring sharp rendering on high-DPI displays and adaptability for round or square shapes on different devices.

3.3 Colour Schemes

The colour scheme for SiuStore focuses on a neutral, minimalist palette of black, white, and gray tones to create a clean, sophisticated look that emphasises content and usability without overwhelming the user. The primary palette includes:

- Primary: #000000 (black for text, icons, and accents, providing strong contrast and readability). - Secondary: #FFFFFF (white for backgrounds and light elements, ensuring a bright, open feel). - Neutral: #808080 (mid-gray for cards, dividers, and subtle highlights), #F5F5F5 (light gray for secondary backgrounds), #212121 (dark gray for shadows and depth).

These colours ensure high contrast ratios (e.g., 4.5:1 for text) to meet accessibility standards, with developers provided hex codes and references for consistent application. The scheme draws from research on competitor apps like Shopee, balancing simplicity with focus on product imagery, reducing visual fatigue during extended browsing.

3.4 UI Asset Scale

UI assets, including icons, images, and buttons, are designed to scale seamlessly across screen densities and sizes, preventing pixelation or misalignment. Assets are created in vector formats (e.g., SVG for icons) or with multiple resolutions (@1x, @2x, @3x) to support devices from low-end phones to high-DPI flagships. For example, product images in grids use adaptive loading to maintain quality, while the app icon includes mipmaps for efficient rendering. This scalability is tested in the mock-ups, ensuring elements like text and touch targets remain legible and interactive, aligning with Android's density-independent pixels (dp) system for a uniform experience.