COMPSYS302

Project Java

Design Docs

Team 11

Jerry Kim, Rhett Murdoch, Josh Shiu

1. Introduction

Our app, Bounce Bros, is an e-commerce mobile android mobile application that focuses on selling table-tennis gear such as bats/rackets, balls, nets, tables, and other related apparel/gear/accessories. With a focus on this one sport, we will provide:

- A curated catalogue of high-quality table tennis related items
- Comprehensive product details with associated multimedia displayed
- Easy-to-use search functionality and personalized discovery of items
- User-friendly and intuitive UI so anyone can access our app and chosen products with ease

The primary stakeholders for our app include:

- End users: generally, anyone who is interested in table tennis including players (both amateur and professional), clubs, and coaches.
- Product/store owner: the person in charge of managing product catalogue and pricing using Firestore.
- App development team: our team members who are dedicated to implementing the app UI, backend logic, and database integration.

The core use cases of our app will be:

1. Browse product categories and recommended products on launch (MainActivity)
2. Peruse different products according to the selected category, with the ability to view further details about the product (ListActivity)
3. Search, filter and order displayed products (SearchActivity)
4. View product details and related multimedia, with functionality to add product to cart or wishlist (DetailsActivity)
5. Discover related items using the “You might also like” section (DetailsActivity)
6. Manage cart with the ability to increment, decrement, clear items and go through a mock-checkout (CartActivity)
7. Manage wish list that persists across different sessions, with the ability to view or remove wish listed items and add them to cart (WishActivity)
8. Log in and view account wish list and cart quantities that will persist across different sessions with the ability to clear wish list and cart (ProfileActivity).

2. System Modelling

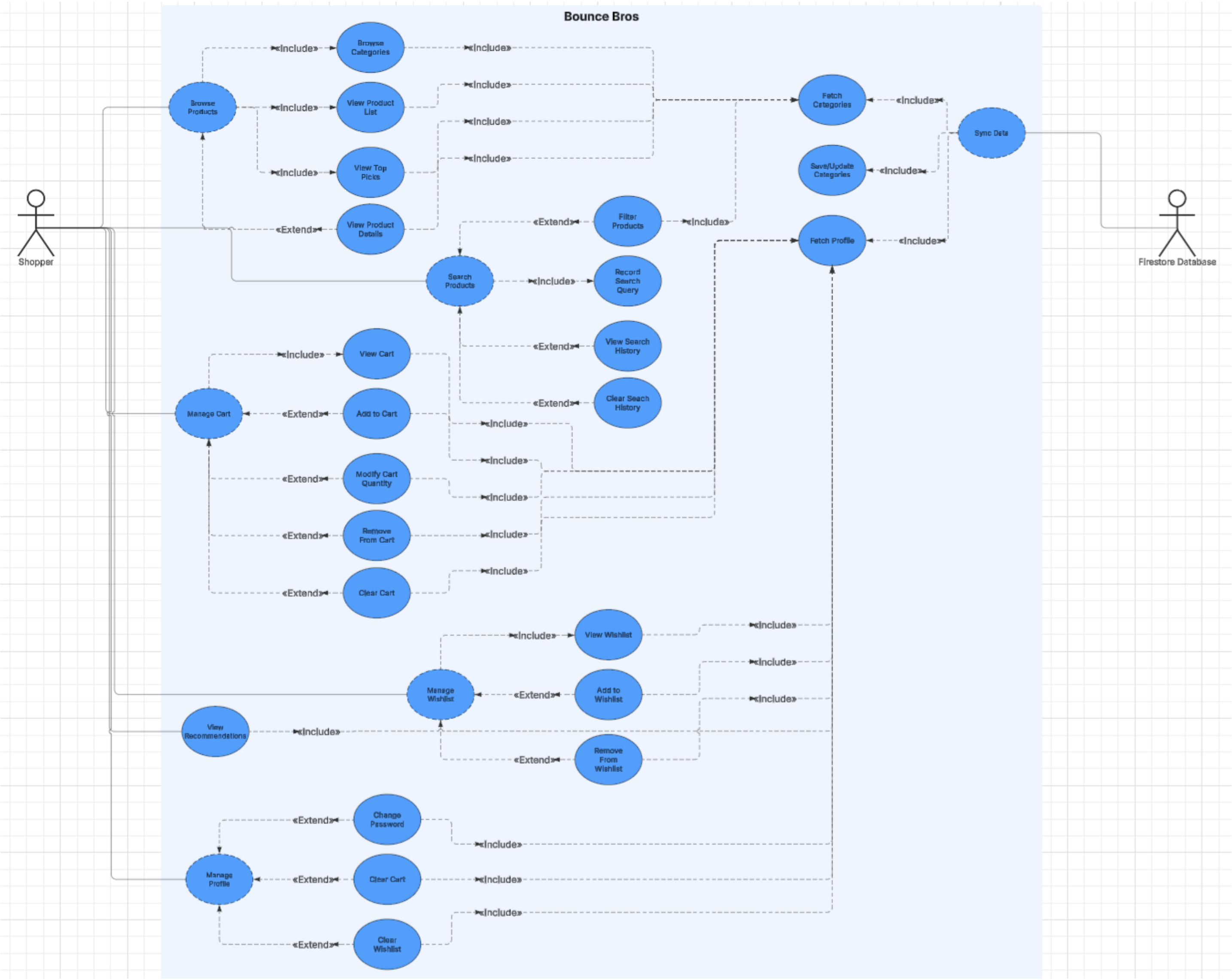
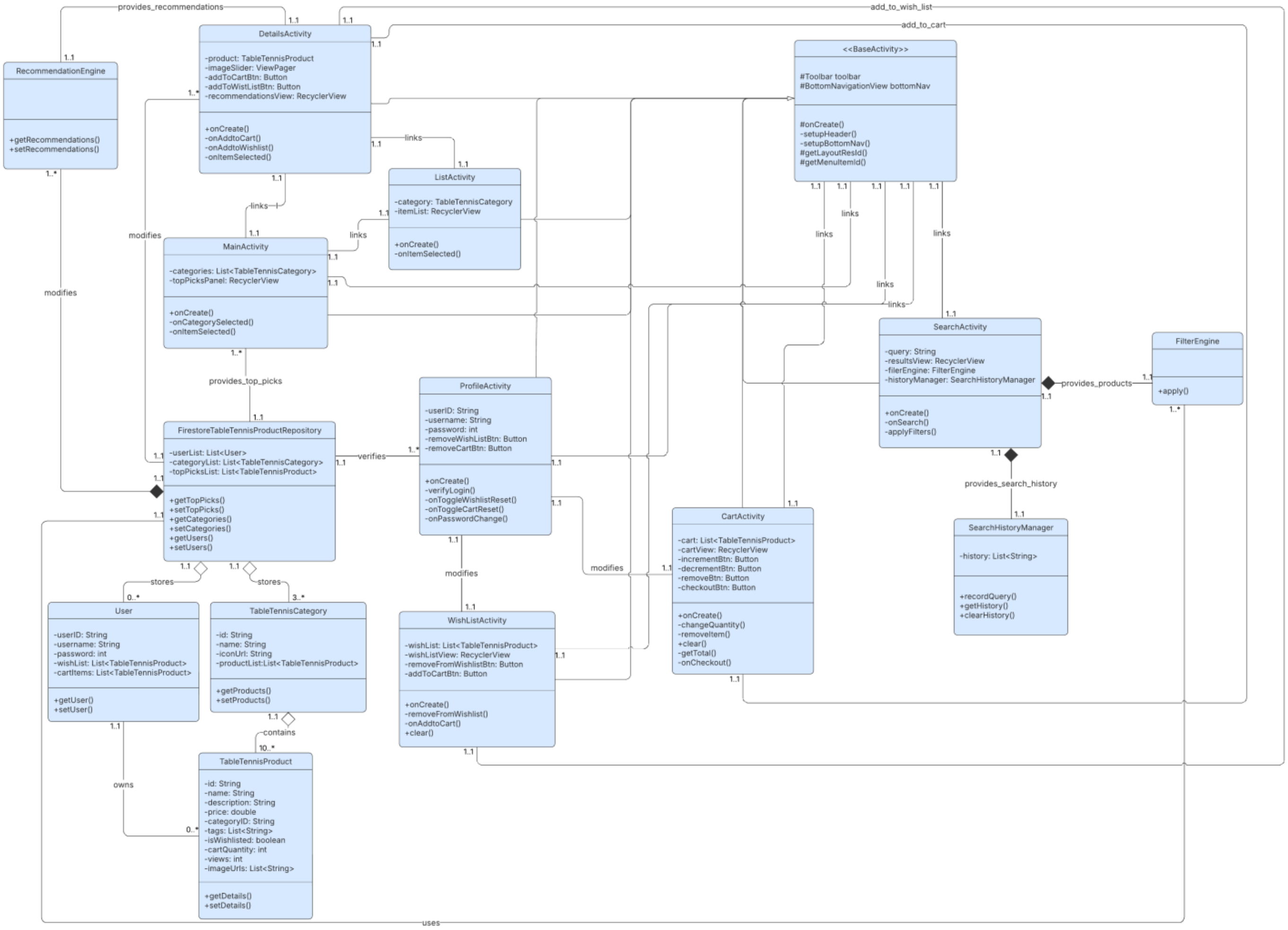


Fig.1. Use Case Diagram

Our use case diagram shows the high-level use-case diagram for **Bounce Bros**. We've identified two actors, **Shopper**, who drives all user-facing flows, and **Firestore Database**, which supplies and persists product and category data. Inside the system boundary we have six primary use cases (Browse Products, Search Products, Manage Cart, Manage Wishlist, View Recommendations, Manage Settings) plus the data-sync flow. Each primary use case group related sub-functions via «include» (for always-run steps) or «extend» (for optional actions). This diagram ensures we cover every class and method in our design while keeping the focus on clear, user-centric goals.

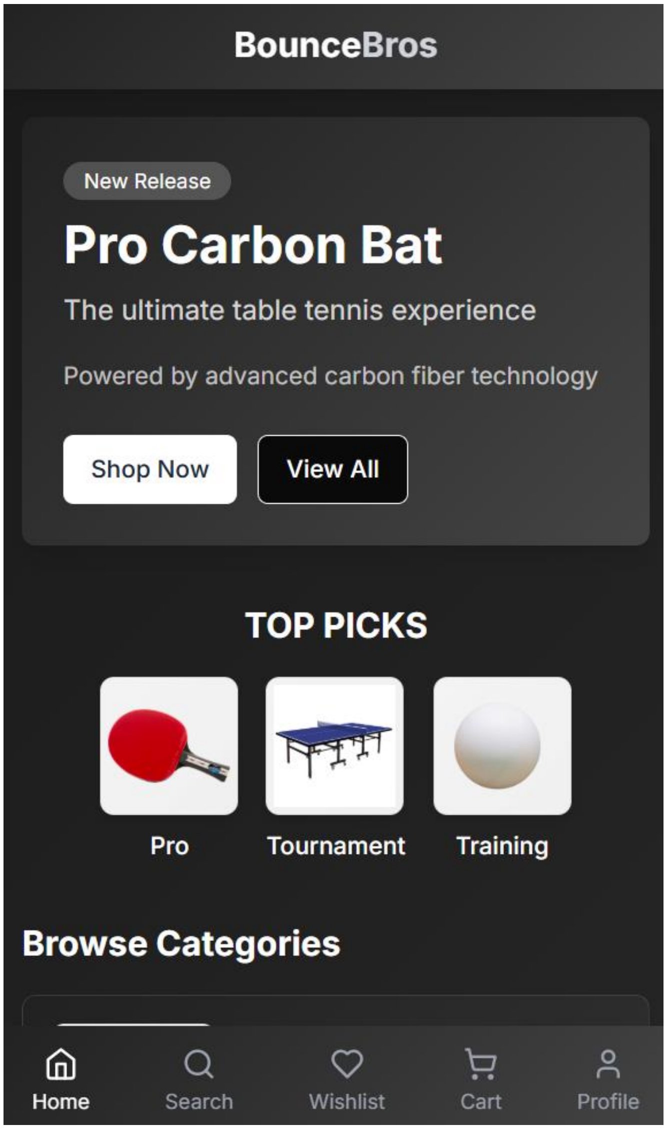
3. System Design



4. GUI Design mocks

MainActivity, which is our home page, which is where the user can click onto the different categories (list view) and the top pick items

Showing the top picks selection (top of page)



BounceBros

New Release

Pro Carbon Bat

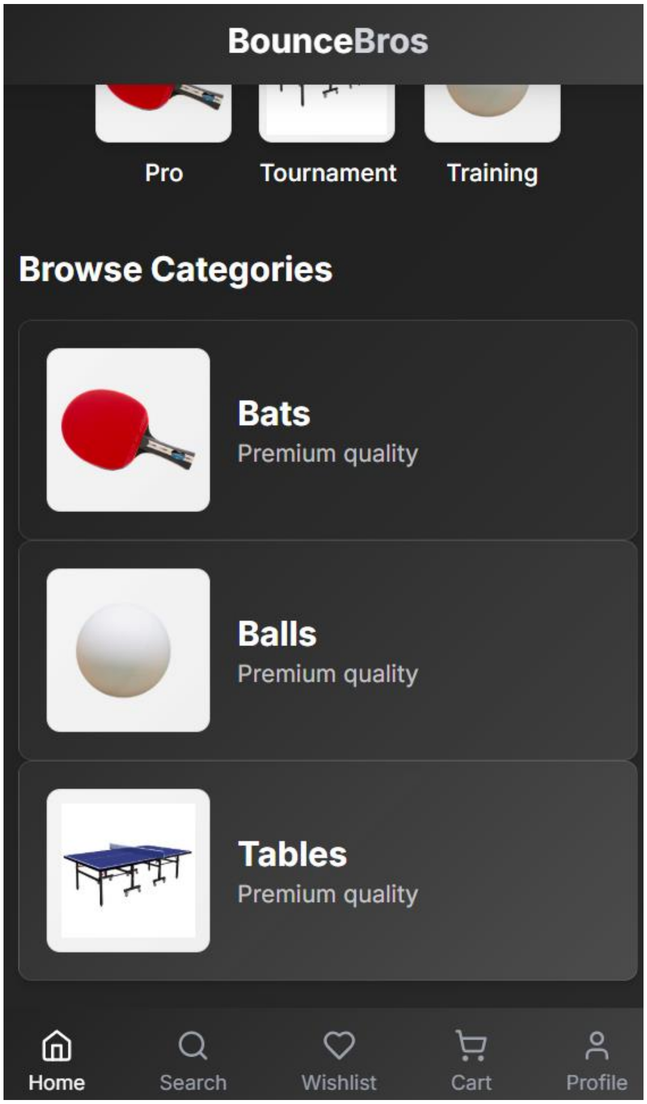
The ultimate table tennis experience

Powered by advanced carbon fiber technology

TOP PICKS

Browse Categories

Showing the category buttons, bottom of UI, if clicked will take the user to list view



BounceBros

Pro

Tournament

Training

Browse Categories

Bats

Premium quality

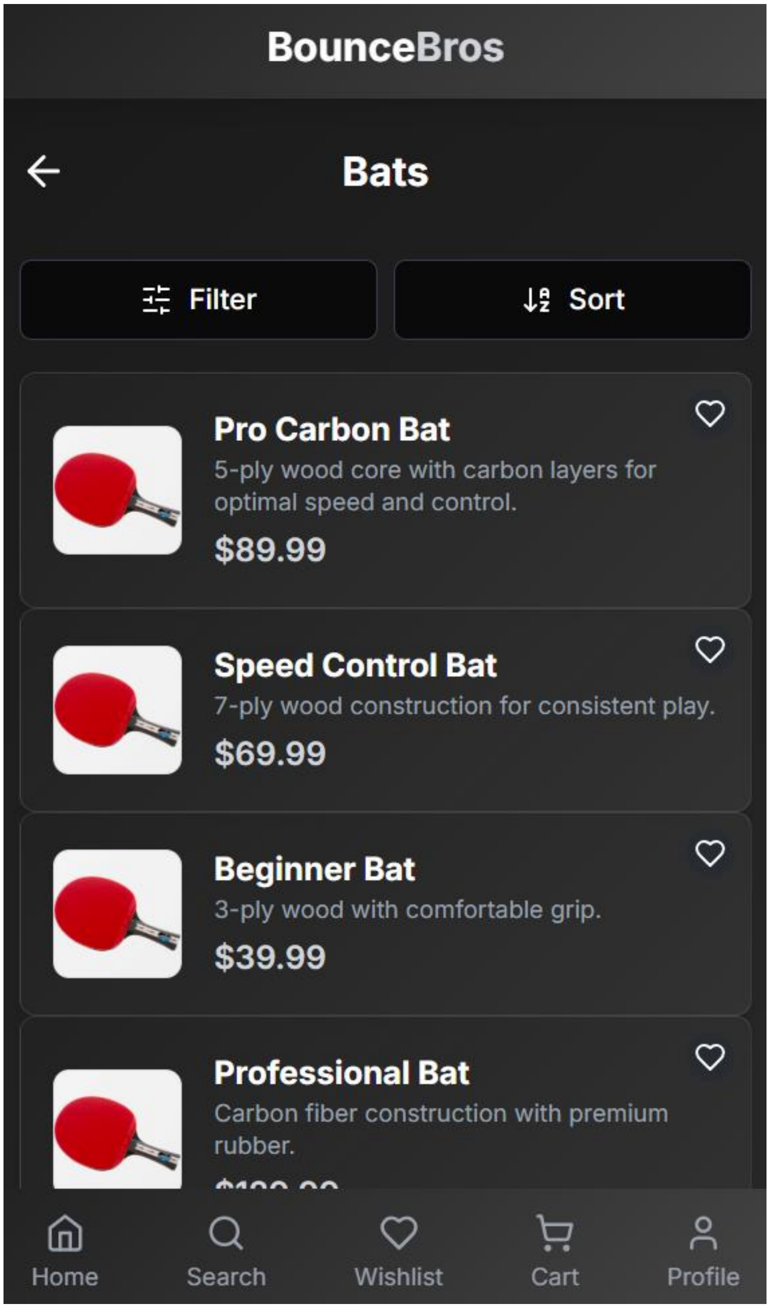
Balls

Premium quality

Tables

Premium quality

ListActivity, this will show a particular category, which has all the items under that category:



Pro Carbon Bat
5-ply wood core with carbon layers for optimal speed and control.
$89.99

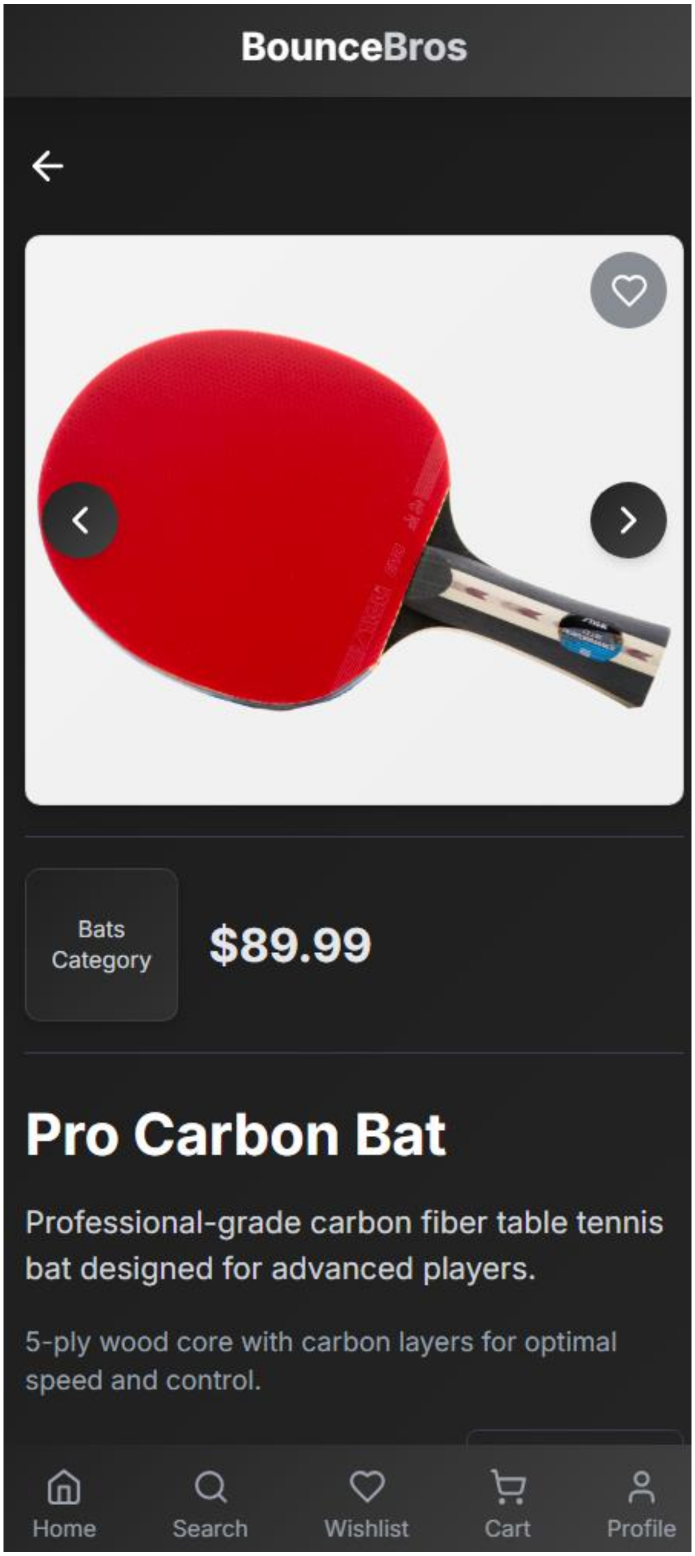
Speed Control Bat
7-ply wood construction for consistent play.
$69.99

Beginner Bat
3-ply wood with comfortable grip.
$39.99

Professional Bat
Carbon fiber construction with premium rubber.

DetailsActivity, this is where the user can click on a particular item and see the details about it, as well as items they may be interested in:

The details of the item:

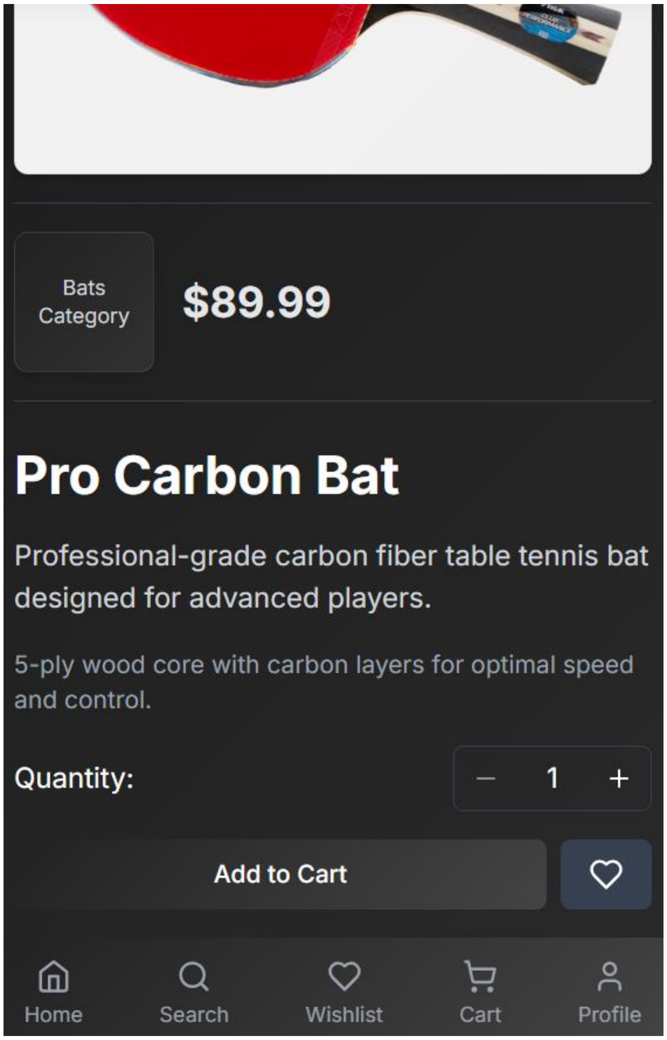


Pro Carbon Bat

Professional-grade carbon fiber table tennis bat designed for advanced players.

5-ply wood core with carbon layers for optimal speed and control.

The possible interactions, adding to the card, and the heart button for Wishlist. Can also add certain quantity to cart.



Bats Category

$89.99

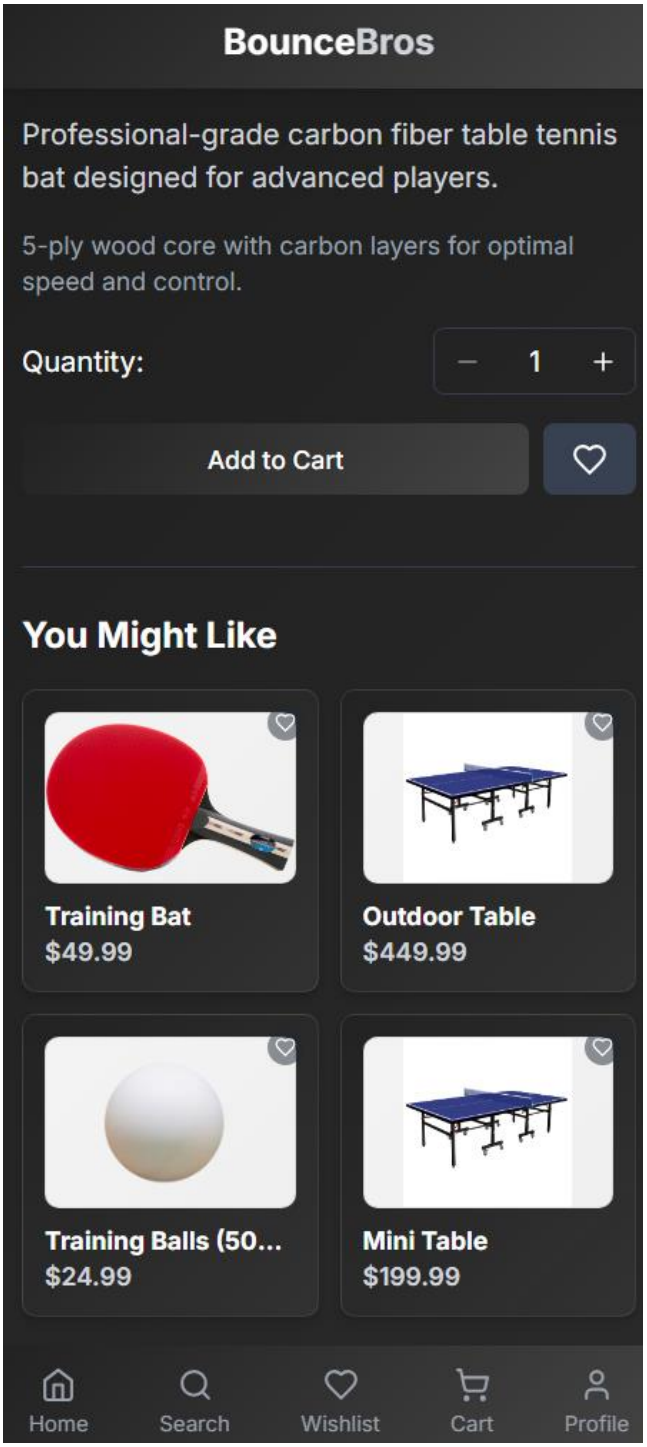
Pro Carbon Bat

Professional-grade carbon fiber table tennis bat designed for advanced players.

5-ply wood core with carbon layers for optimal speed and control.

Quantity: − 1 +

Recommendations at the bottom of UI of DetailsActivity:



BounceBros

Professional-grade carbon fiber table tennis bat designed for advanced players.

5-ply wood core with carbon layers for optimal speed and control.

Quantity: 1

You Might Like

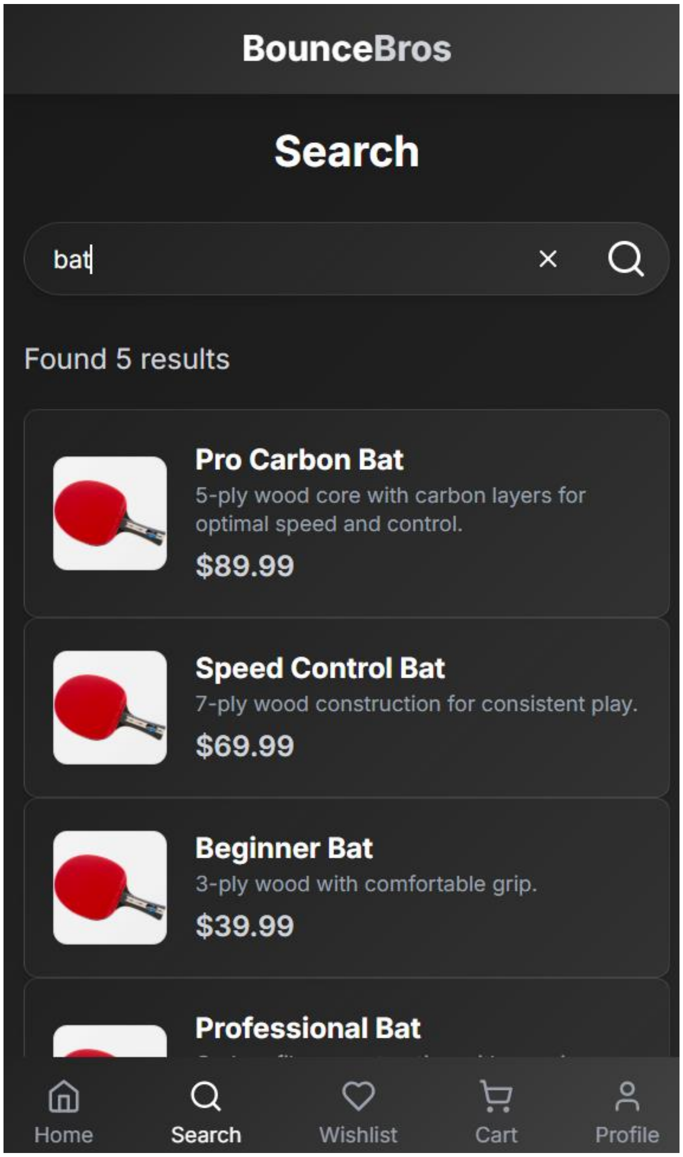
Training Bat
$49.99

Outdoor Table
$449.99

Training Balls (50...
$24.99

Mini Table
$199.99

SearchActivity, this is where a user can search for an item:



BounceBros

Search

bat

Found 5 results

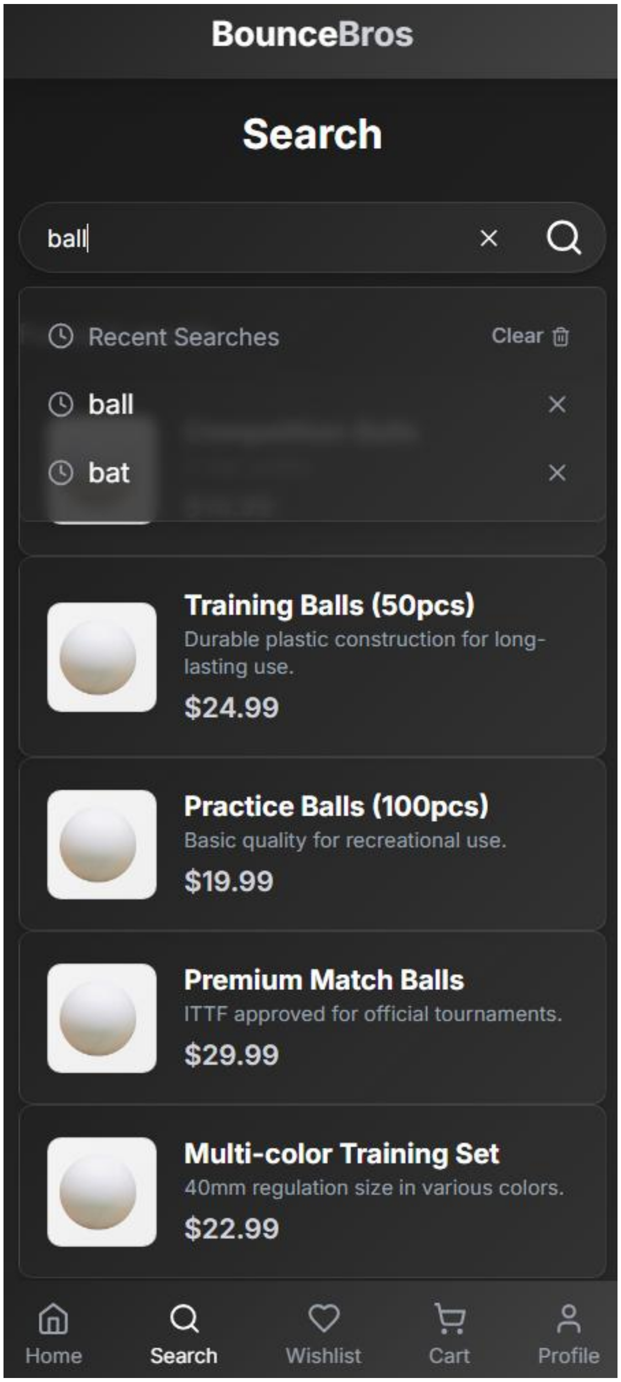
Pro Carbon Bat
5-ply wood core with carbon layers for optimal speed and control.
$89.99

Speed Control Bat
7-ply wood construction for consistent play.
$69.99

Beginner Bat
3-ply wood with comfortable grip.
$39.99

Professional Bat

Can also clear the search history in SearchActivity, as well as seeing previous searches:



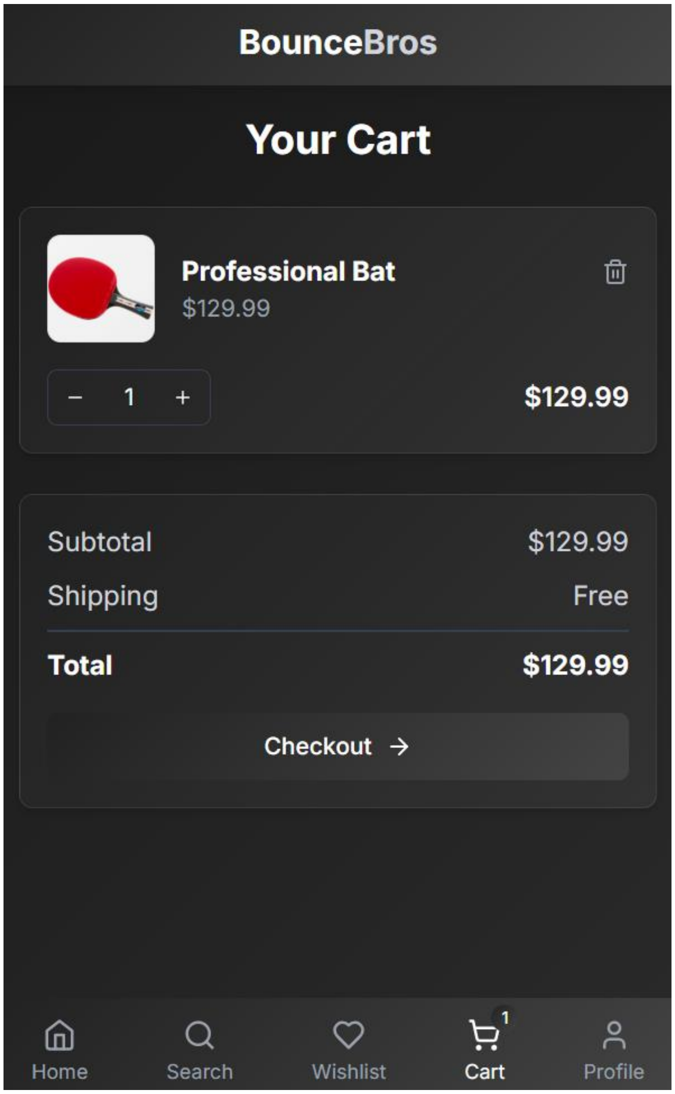
Training Balls (50pcs)
Durable plastic construction for long-lasting use.
$24.99

Practice Balls (100pcs)
Basic quality for recreational use.
$19.99

Premium Match Balls
ITTF approved for official tournaments.
$29.99

Multi-color Training Set
40mm regulation size in various colors.
$22.99

CartActivity, which the user can delete or increase or decrease number of an item:



BounceBros

Your Cart

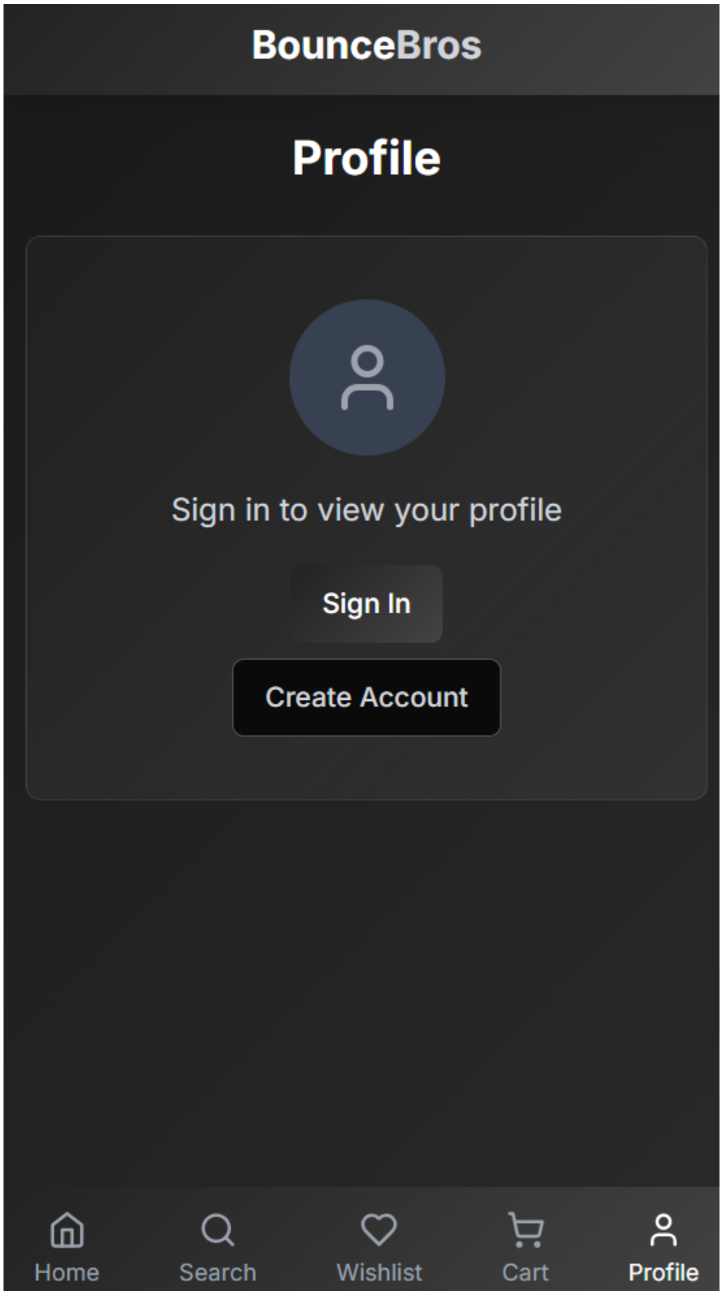
Professional Bat
$129.99

– 1 + $129.99

Subtotal	$129.99
Shipping	Free
Total	**$129.99**

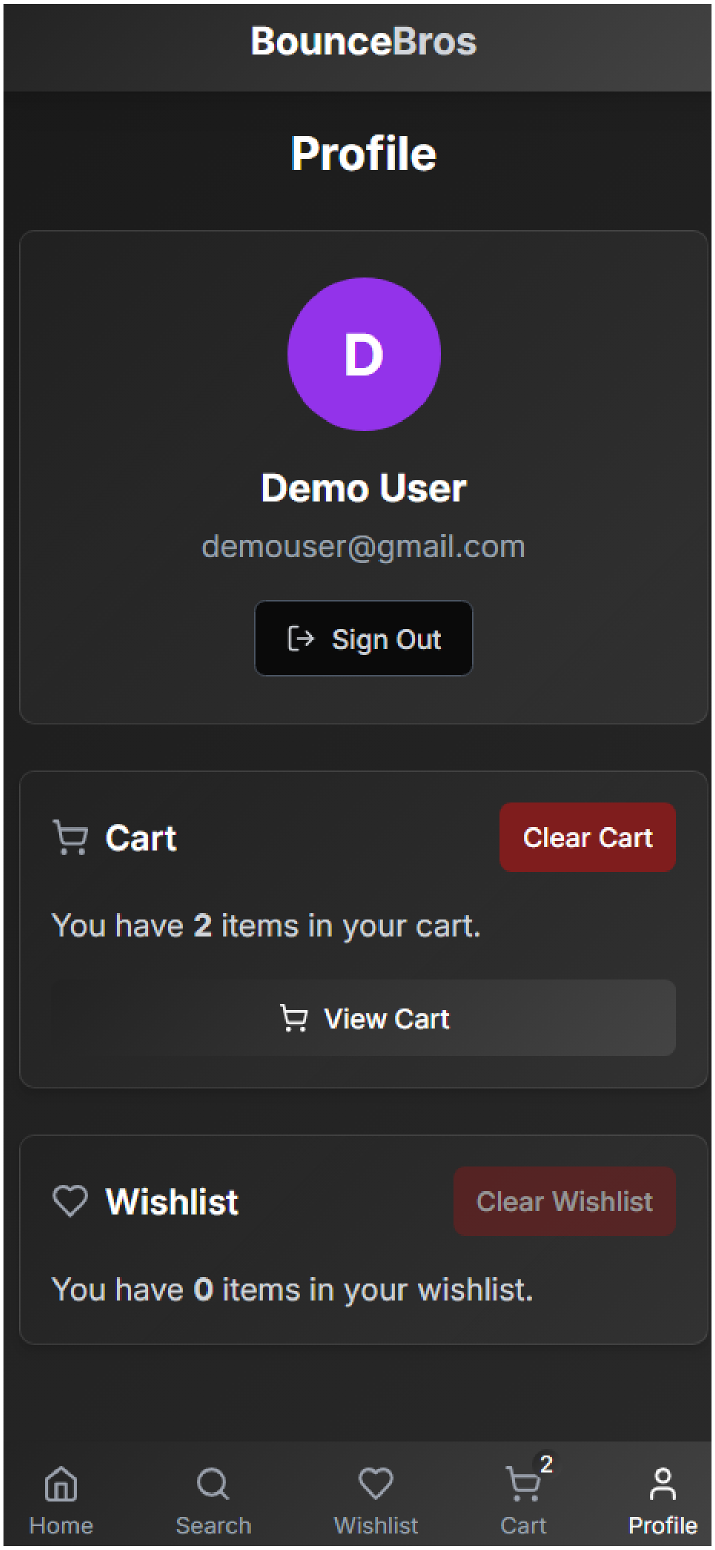
ProfileActivity:

This is when the user is not logged into the app. They can also create an account



Sign in to view your profile

This is when the user is logged into the app. They can clear cart and wishlist or click to see their current cart/wishlist if it is not empty.



Demo User

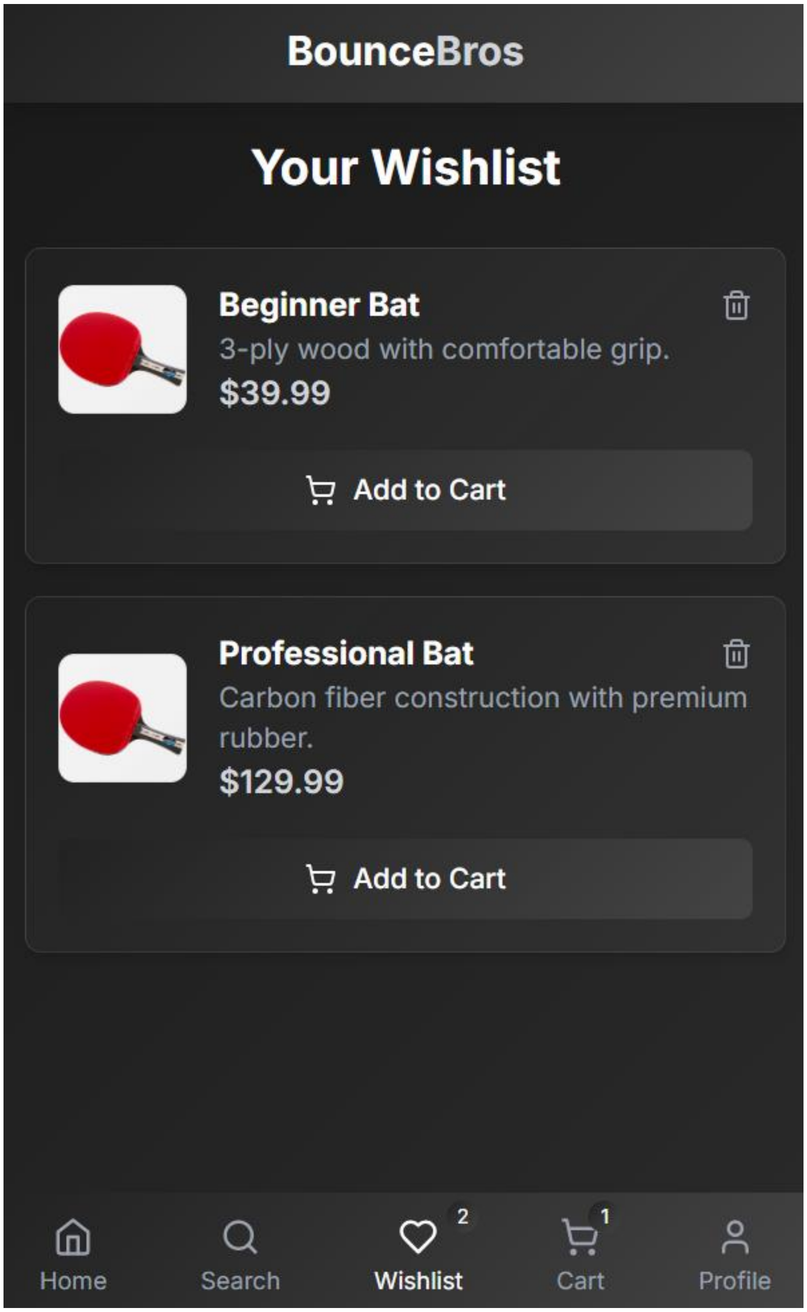
demouser@gmail.com

You have **2** items in your cart.

You have **0** items in your wishlist.

WishlistActivity:

This is for our users to create a wishlist, which will be personal to their account they can add and delete items, put also add them to the cart through the WishlistActivity.



BounceBros

Your Wishlist

Beginner Bat

3-ply wood with comfortable grip.

$39.99

Professional Bat

Carbon fiber construction with premium rubber.

$129.99

5. The Data schemes

Database schema:

Category - this will be for each type of product (bats, balls, tables)

- category_id: string (primary key)
- name: string
- icon_url: string

Product (this falls under each category, so e.g. a variant of a bat)

- product_id: string (primary key)
- name: string
- description: string
- price: double
- category_id: string
  - foreign key from category(category_id)
- tags: string[]
- cart_quantity: number
- image_urls: string[]
- views: number
- wishlist_id: string
- cart_id: string

User (our users will be able to login to store their wishlist and cart)

- user_id: string (primary key)
- username: string
- password: string

Cart - this will be a weak entity on user, as cannot have a cart without a user. The cart depends on the existence of a user.

- cart_id: string (this is the partial key)
- user_id: string
  - foreign key from User(user_id)

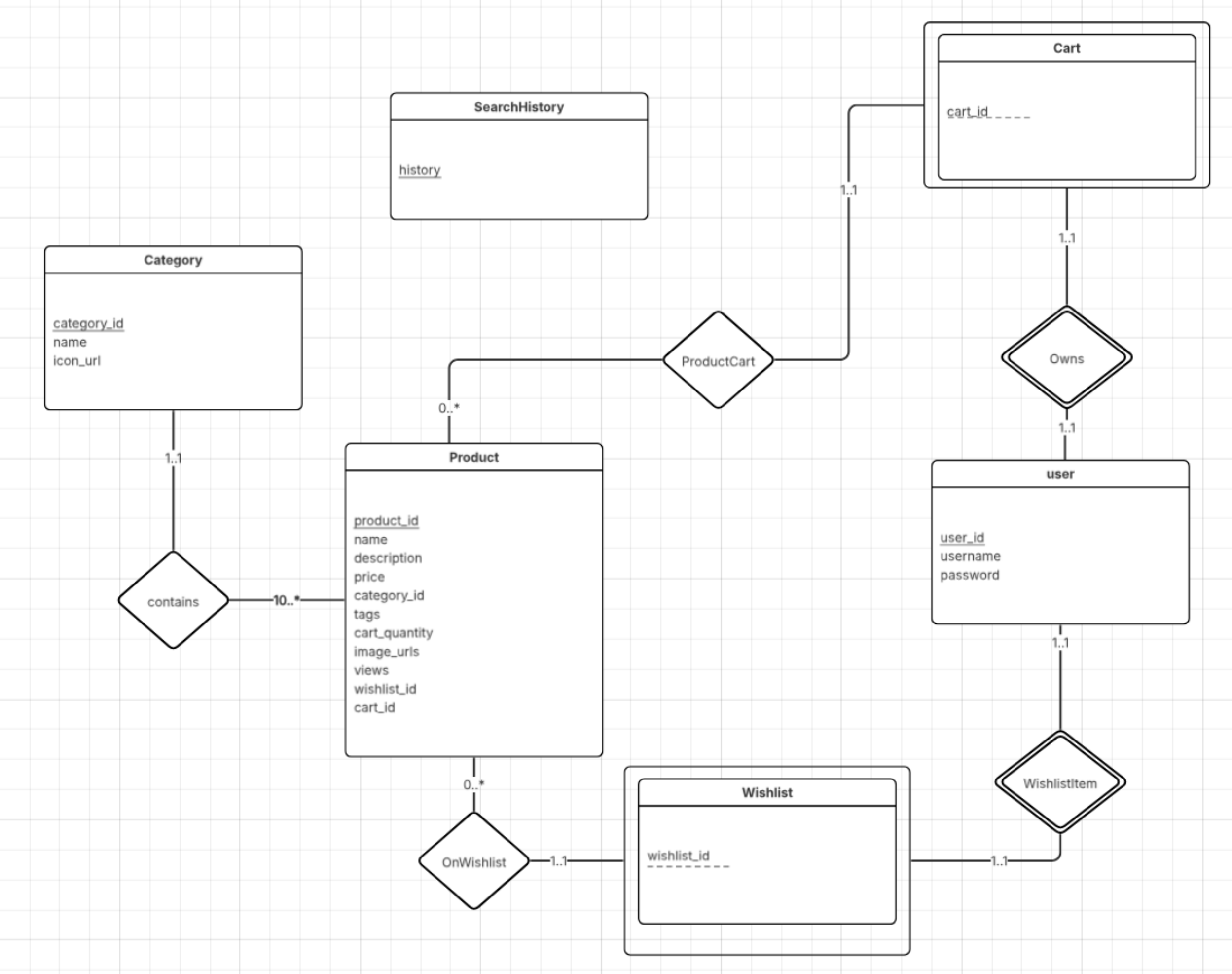
SearchHistory

- history: string[]

Wishlist - this will be a weak entity on user, as it is not possible to have a wishlist without a user. The wishlist depends on the existence of a user.

- wishlist_id: string (this is the partial key)
- user_id: string
  - foreign key from User(user_id)

ER diagram:



6. Project Schedule

Role of each software engineer:

Our team is dividing the design document work based on individual strengths and responsibilities assigned to each developer:

- **Rhett (Developer 1)**: Will be responsible for the **system modelling**, which includes designing the use case diagram and providing clear explanations for each use case. He will also outline the **roles of each software engineer** and create the **project Gantt chart** to organize the schedule and task distribution. Rhett will coordinate the compilation of the full document to ensure consistency and flow across all sections.

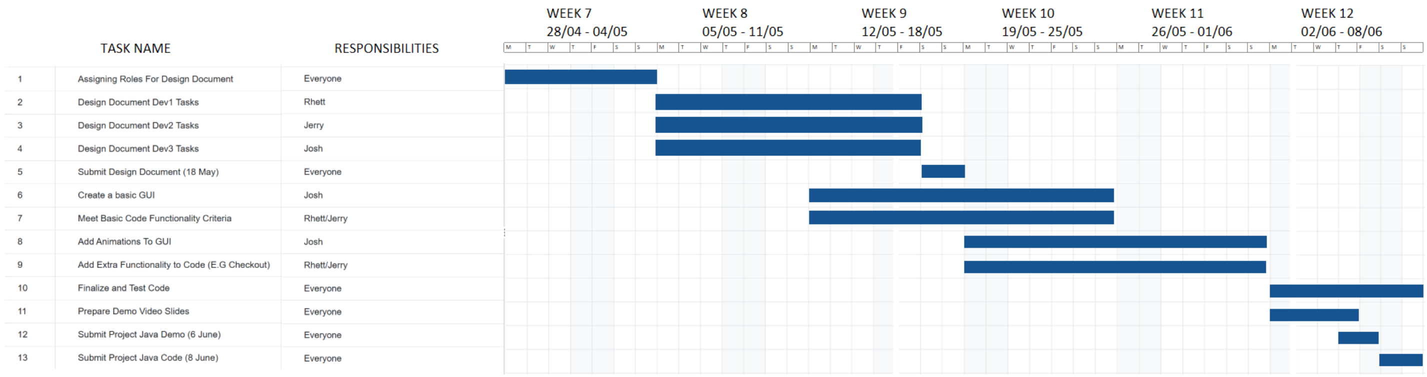
- **Jerry (Developer 2)**: Will write the **introduction** section, defining the context and purpose of the app. He will also design the **conceptual system architecture**, producing a class diagram that details all relevant classes, associations, attributes, and methods. Jerry will ensure that the class diagram aligns with the planned use cases and backend logic.
- **Josh (Developer 3)**: Will be responsible for the **GUI design mocks**, creating visual representations of all core app screens including MainActivity, ListActivity, DetailsActivity, and Search. He will also define the **Firestore data schema**, including collections and documents, to support the app's core functionality. Josh will lead the visual planning in accordance with Material Design guidelines.

Our team is dividing the **implementation work** based on individual strengths and areas of focus during development:

- **Rhett** will primarily focus on **backend development**, including setting up the Firestore database, handling data interactions, and implementing logic to support category browsing, search, and dynamic updates to the "Top Picks" panel. He will also contribute to the front-end when needed, especially around integrating backend logic with the UI.
- **Jerry** will also be working on the **backend**, focusing on building the app's core model classes and ensuring smooth communication between activities and the Firestore database. He will help structure the data layer and implement the logic for handling category-based item loading and item detail retrieval.
- **Josh** will take the lead on the **front-end development**, designing and implementing the user interface across all activities. He will ensure the app follows Material Design principles, looks clean and professional, and functions smoothly across different screen sizes. While he leads UI work, all members will assist with visual implementation where needed.

As a team, we will collaborate to align the system model, database structure, and user interface into a cohesive and functional application design, ensuring all parts of the design document are consistent and reflect the intended implementation.

Gantt Chart



	TASK NAME	RESPONSIBILITIES
1	Assigning Roles For Design Document	Everyone
2	Design Document Dev1 Tasks	Rhett
3	Design Document Dev2 Tasks	Jerry
4	Design Document Dev3 Tasks	Josh
5	Submit Design Document (18 May)	Everyone
6	Create a basic GUI	Josh
7	Meet Basic Code Functionality Criteria	Rhett/Jerry
8	Add Animations To GUI	Josh
9	Add Extra Functionality to Code (E.G Checkout)	Rhett/Jerry
10	Finalize and Test Code	Everyone
11	Prepare Demo Video Slides	Everyone
12	Submit Project Java Demo (6 June)	Everyone
13	Submit Project Java Code (8 June)	Everyone

Fig. 3. Gantt Chart

We are structuring our project using a **phased development approach**, beginning with planning and documentation before transitioning into development and final delivery. This approach allows us to steadily build the app in stages while leveraging each team member's strengths effectively.

- **Week 7** was focused on planning and organization. We assigned roles for the design document, broke down responsibilities, and created the Gantt chart to outline our schedule moving forward.
- **Week 8** is dedicated to completing the design document. Each developer is finalizing their assigned sections — system modelling, class diagram, GUI mocks, and data schema.
- **Week 9** will mark the start of implementation. We will begin coding the basic GUI and backend functionality, including the foundational structure for navigation and data handling. Also, we will finish and submit the full design document on the 18th of May.
- **Week 10** will focus on completing the required base functionality. By this point, the app should meet the minimum criteria for category selection, listing, and item detail viewing. We will also begin integrating animations and additional features like search or extended item actions.
- **Week 11** will be used to wrap up the remaining development work — finalizing animations, polishing extra functionality, and ensuring all interactions feel smooth and consistent.

- **Week 12** is reserved for final testing, code cleanup, and preparing the demo. We will finalize and test the complete app, create the demo video slides, and submit both the demo and project code before the final deadline.

Our Gantt chart reflects this timeline, showing how we structured the project across six weeks. Each phase is assigned based on individual strengths to ensure steady progress and balanced contributions throughout the project.