Test Project

Module A2 - Functionality

Mobile Applications Development

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Introduction

This development task focuses on the creation of a casual strategy trading game set against the backdrop of Silk Road commerce and travel. Centering on the gameplay of cross-city business trading along the ancient Silk Road, the application is developed and adapted for tablet devices. Based on the provided material and data files, the application covers four core pages and implements key functions including Silk Road map movement, cross-city trading, persistent game data storage and sound effect controls. Prioritizing usability and gameplay integrity, this project serves as a functional development assessment.

All requirement stories, images, and other materials in this Test Project are fictional, for competition use only, and have no real-world counterpart.

The Product Manager has provided you with product wireframes. As a Mobile Application Developer, your task is to develop corresponding apps based on the given wireframes according to the specific development requirements.

Description of project and tasks

You do not need to consider the program interface's aesthetics and the elements' position. The work may differ from the given wireframes; however, you need to consider the ease of use. The development task is divided into two parts based on the target devices.

	PART	NAME	COMPETITION TIME	MARKING DEVICES
	MA1	Functionality (phone)	2.5 hours	Emulator: Pixel 2 or iPhone 14
√	MA2	Functionality (tablet)	2.5 hours	Galaxy Tab S10 Lite or iPad Air (M3)

Below is an overview of the wireframes. Please check the media-files for details.

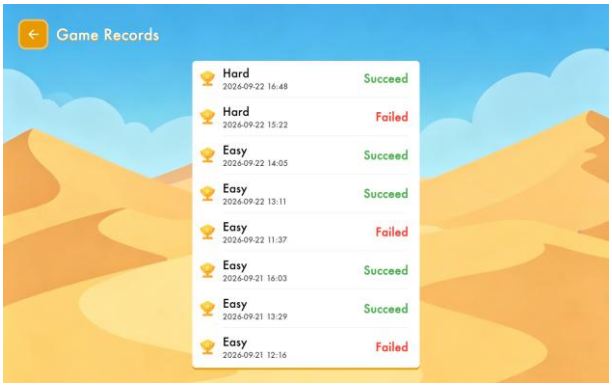


Home Page

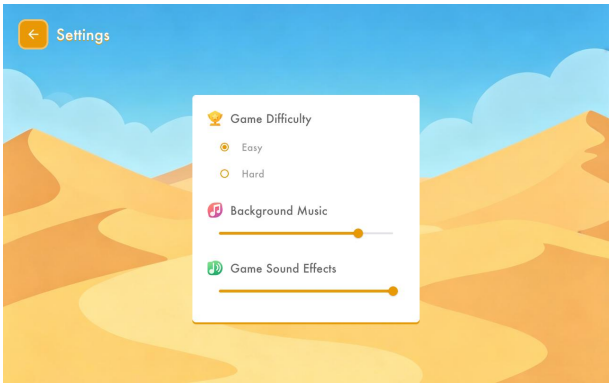


Game Page

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Records Page



Settings Page

General Demands

1. All application functions should be fully implemented in accordance with all listed requirements.

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Pages Demands

1. Home Page



Elements include

1. Logo
2. Background image
3. "Continue" button (when there is an unfinished game)
4. "Start Game" button
5. "Records" button
6. "Settings" button

Functional requirements

1. The Logo and background image are sourced from the provided image materials;
2. The "Continue" button should be displayed on the **Home Page** if there is an unfinished game;
3. Tap the "Continue" button to navigate to the **Game Page** and resume the unfinished game;
4. The unfinished game state should be stored persistently, allowing the "Continue" button to remain functional after the application is restarted;
5. Tap the "Start Game" button to navigate to the **Game Page** and start a new game;
6. Tap the "Records" button to navigate to the **Records Page**;
7. Tap the "Settings" button to navigate to the **Settings Page**.

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2. Game Page



Elements include

1. Logo
2. Difficulty
3. Remaining days
4. Coins
5. Undo icon button
6. Tips icon button
7. Current goods list
8. Target goods list
9. Each good includes: icon, name, quantity
10. The map:
    (a) Hexagonal grid map
    (b) Mountains
    (c) Seas
    (d) City list, where each city includes: image and name
11. Trading panel (triggered when the player enters a city):
    (a) Buying price list, where each good includes: icon, name, coin cost, and "Buy" button
    a) Selling price list, where each good includes: icon, name, coin cost, and "Sell" button
    b) Close icon button

Functional requirements

1. If the **Game Page** is entered via the "Start Game" button:
    (a) The game difficulty should match the difficulty selected on the **Settings Page**;

(b) The initial game data (remaining days, coin balance, target goods list) is sourced from *data/difficulties.json*;

2. If the **Game Page** is entered via the "Continue" button:

   (a) The game difficulty, remaining days, coin balance, and goods list should be restored to the state when the game was last left;
   (b) Undo operations should still be available;

3. Map rendering:

   (a) Correctly render the map based on the data file provided in *data/map.json*;
   (b) Mountain terrains use the correct images;
   (c) Sea terrains use the correct color;
   (d) Each city uses the correct image;

4. Onboarding guide:

   (a) When the player plays the game for the first time, an onboarding guide is shown;
   (b) Step one: Highlight the current goods list and target goods list;
   (c) Step two: Highlight the player's current position and the adjacent hexagonal grids available for movement;
   (d) Step three: Pop up the trading panel and highlight it;
   (e) Each step shows a step number (e.g., Step one) and a Next button;
   (f) Tap the "Next" button to proceed to the next step;
   (g) Cover the non-highlighted areas with a semi-transparent black overlay;

5. Movement:
   a) The hexagonal grids adjacent to the player's current position should stay highlighted during gameplay;
   b) The player taps any highlighted adjacent hexagonal grid to move;
   c) Under Hard difficulty, movement to mountain or sea terrain grids should be blocked;
   d) The player's movement should be animated with a smooth transition to the target hexagonal grid;
   e) Each movement consumes one day;
   f) The trading panel pops up if the player arrives at a city after moving;
   g) Movement actions should be disabled when zero days remain;
6. Undo:

   (a) Each time the Undo icon button is tapped, the player's most recent movement should be undone;
   (b) The undone movement shall be animated with a smooth transition back to the previous hexagonal grid;
   (c) The trading state reverts to the state before the movement (i.e., the current goods list and target goods list);
   (d) Each undo should restore one remaining days;

7. Trading system:

   (a) Each city displays a buying price list and a selling price list, sourced from *data/trades.json*;
   (b) A purchase can only be made when the player's coin balance is greater than or equal to the buying price of the selected item;
   (c) A sale can only be made when the player possesses at least one unit of the selected good;
   (d) When the player performs a purchase/sell operation, the coin balance and current goods list should be updated in real time;
   (e) Tap the Close icon button to close the trading panel;
   (f) After the Trading Panel is closed, it can be reopened by tapping the current city node before the player moves away from this city;

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8. Hints:

   (a) Tap the hints icon button to display the optimal global trading solution for the current difficulty;
   (b) Trading solution includes: which city to go to, which goods to buy or sell, and the corresponding quantities;
   (c) The proposed solution is feasible, ensuring that it cannot fail due to insufficient remaining days or insufficient coins for trading;
   (d) The solution satisfies the target goods and quantity requirements for the difficulty;
   (e) The solution's core objective is to maximize the remaining coin balance;

9. Game sound effect:

   (a) Background music loops continuously during gameplay;
   (b) A movement sound effect plays once when the player completes a movement operation;
   (c) A purchase sound effect plays once when the player completes a purchase operation;
   (d) A sell sound effect plays once when the player completes a sell operation;
   (e) Background music volume matches the setting on the **Settings Page**;
   (f) Game sound effect volume matches the setting on the **Settings Page**;

10. Victory condition:

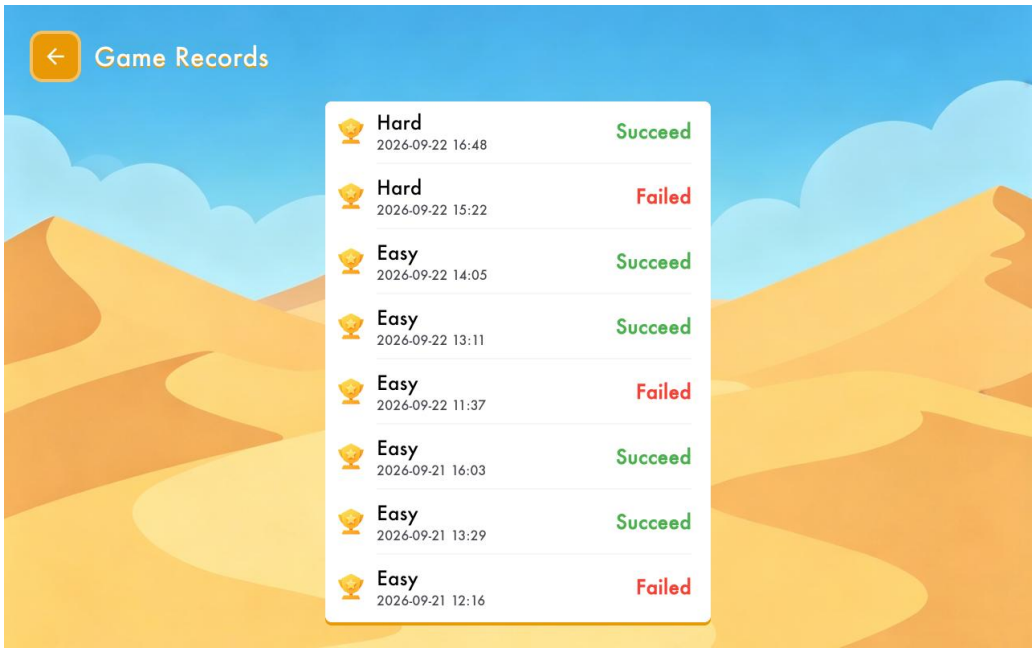
   (a) The game marks victory once the player reaches Roma (the destination city) and holds all target goods with required quantities in the current goods list;
   (b) All movement, trading and undo operations are no longer accepted after the victory;
   (c) A victory pop-up window appears with the prompt text "You have completed the mission!";
   (d) A "Next Level" button is provided if the current difficulty is not "Hard"; tap this button to launch a new game with one higher difficulty;
   (e) Tap the "Return to Main Menu" button on the pop-up to navigate back to the **Home Page**;

11. Defeat condition:

   (a) The game marks defeat if zero days remain and the destination city has not been reached;
   (b) The game marks defeat if the player reaches Roma but fails to hold all target goods with required quantities in the current goods list;
   (c) All movement, trading and undo operations are no longer accepted after the defeat;
   (d) A defeat pop-up window appears with the prompt text "You failed to finish the mission...";
   (e) Tap the "Retry" button to launch a new game with the same difficulty;
   (f) A "Lower Difficulty" button is provided if the current difficulty is not "Easy"; tap this button to launch a new game with one lower difficulty.

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3. Records Page



Elements include

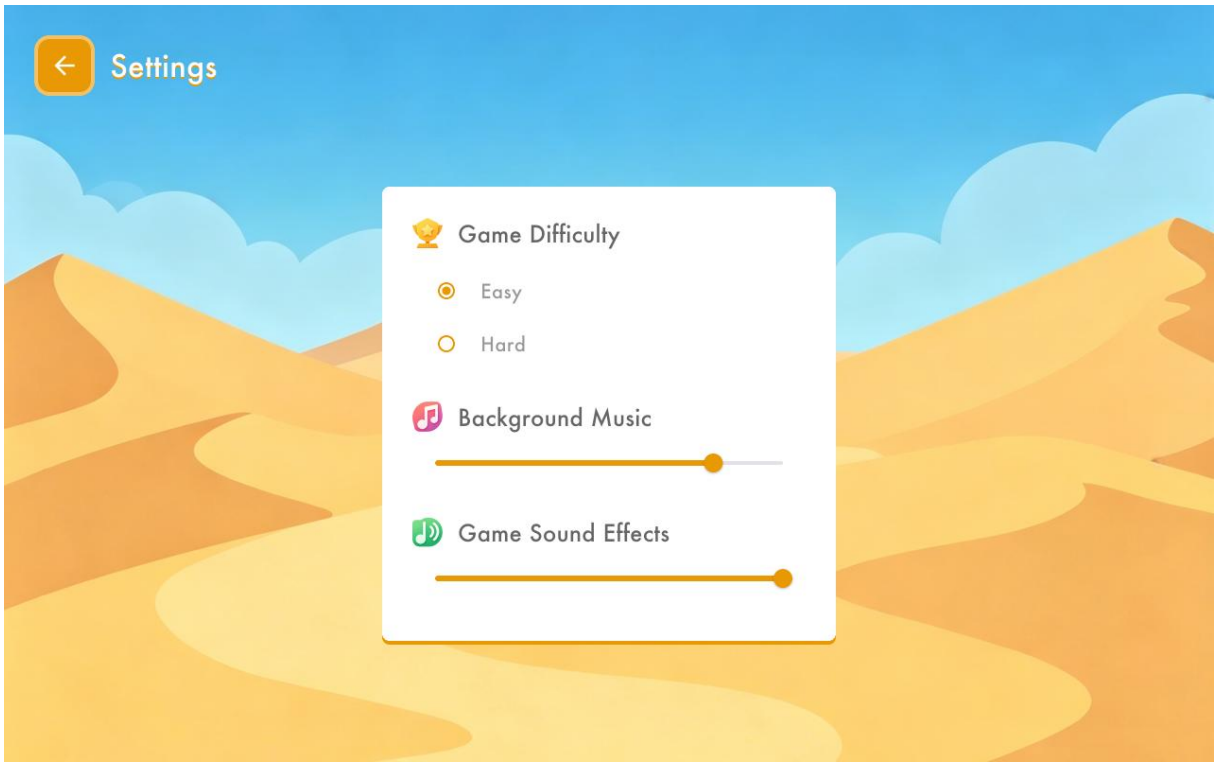
1. Title "Game Records"
2. Back icon button
3. Game record list, where each record includes:
   (a) Game difficulty (Easy / Hard)
   (b) Game result (Succeed / Failed)
   (c) End time
4. Game record detail (triggered by tapping a game record list item):
   (a) Used days
   (b) Coins
   (c) Transaction list, where each transaction includes:
      (i) Transaction city
      (ii) Sold goods list, where each good includes: icon, name and quantity
      (iii) Purchased goods list, where each good includes: icon, name and quantity
   (d) Final goods list, where each good includes: icon name and quantity

Functional requirements

1. Tap the Back icon button to return to the previous page;
2. Display a proper empty state prompt when the game record list is empty;
3. Game record list data is sourced from actual gameplay records;
4. "Used days" and "Coins" in the game records should be be calculated and displayed accurately;
5. The most recently finished game record appears at the top of the list;
6. Tap any game record to open its detail view;
7. Transaction list and Final goods list in detail view are correctly sourced from the player's trading data during that game round;
8. All game record data is persistently stored.

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4. Settings Page



Elements include

1. Title "Settings"
2. Back icon button
3. Game difficulty setting, including: Easy, Hard
4. Background music volume slider
5. Game sound effects volume slider

Functional requirements

1. Tap the Back icon button to return to the previous page;
2. Provide two difficulties for the player to select: Easy, Hard;
3. Volume preview:

   (a) Play the preview audio instantly when the user starts dragging the slider;
   (b) If it is background music, play it directly; otherwise, select one of the sound effects and play it in a loop;
   (c) The preview audio volume changes in real time as the user drags the slider;
   (d) Stop the preview audio playback one second after the user stops dragging;

4. Game settings are persistently stored.

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Instructions to the Competitor

1. Please create the project with the correct package name (Android)/Organization Identifier (iOS). The naming convention is edu.ws2026.ma2XX.pm
2. You should save the project in the folder XX_MA2
3. You should rename the generated apk (Android) / app (iOS) file as XX_MA2.apk (Android) / XX_MA2.app (iOS) and save it in the root of the XX_MA2 folder
4. The whole XX_MA2 folder should be pushed to the provided remote Git repository in time
5. Note: "XX" is your workstation code

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