

ReadMe

COMP 7506 Smart Phone Apps Development, Assignment 1

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CARD24 GAME

Introduction

Card24 is an arithmetical card game in which the objective is to find a way to manipulate the numbers of four poker cards so that the end result is 24. Addition, subtraction, multiplication, or division, and sometimes other operations, may be used to make four numbers (from 1 to 13, where Ace, Jack, Queen, King represents 1, 11, 12, 13, respectively) equal 24.

Development Platform

Android Studio(Beta) 0.8.14

Bulid Tool Version: 19.1.0

Compile Sdk Version: API 17

Test Resolution: 4.7" 768 x 1280: xhdpi(Nexus 4)

Do not promote layout correction on device with other resolution.

Game Version: 0.3d

Main Screen

Upon Opening the application, the Main Activity will show a menu which include:

- **Start Game** - Click to go on with a game mode selection menu.
- **Statistics** - Show all user's previous game achievement.
- **About** - Show a information page about the developer.

Mode Selection

The game offers three mode for user to play, which is Practise, Challenge and Time Race.

- **Practise Mode** is for players who need to improve/enjoy the skill of Card24 Game. During this mode, only the round player played would be recorded by the application.
- **Challenge Mode** encourage player to win as much as possible games. Once player fail, the high score of his winning count will be recorded after total game round.
- **Time Race Mode** give player 300 seconds and player need to solve as much 24 problems as he/she can to earn a high score record after total game round.

General Game Flow

Once Upon player entering the main game screen, 4 hidden card icons and 9 buttons including arithmetic and function manner will be set over 80% of the screen. A mode declaration icon will be shown above the bottom border with a cycle icon, which is multi-functional. All three modes are subject to a game prototype and the general game procedures are similar:

- The original state is called **State 0 "Prepare State"**. In state 0, all of the functional and arithmetic buttons will stay un-clickable. State 0, however, will only appear in the Practise Mode.
 - Click any of the card icon to open up the card and go on to the **State 1**, which is solving state for player. During this state, all the buttons can be clicked. But only legal action can be done to the formula and any
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Fig1. The statuses of Card24 games. On the left hand side is the State 0 when player first enters the game screen and begins a game. Figure on the middle show another status for user to solve the 24 problem ongoing (Status 1). After clicked "=", Status 2 will be shown to the user like figure on right hand side.

illegal action would be stopped automatically by the system formula checker like empty bucket and non-sense player input. Nevertheless, problem of "divided by 0" will not be checked explicitly by formula checker. Checking of this problem will be further responded by formula calculator. If this problem appeared, it will be reported during the State 2.

- Player is allowed to use 4 arithmetic symbols in the formula, including add "+", subtract "-", multiply "x", and divide "÷". Player can also use the open bracket "(" and close bracket ")" to specify the order of calculation.
- Player is allowed to use 2 functional symbols during the solving state, which is "REC" and "CLR". "REC" can be used for returning back to a step before, while "CLR" will clear the whole formula input and return the game state to the beginning of State 1.
- The button "=" can be clicked only if the following requests is all satisfied:
 - Current game state is State 1 "Solving State".
 - Formula is ended with ")" or number.
 - All the four cards is clicked for building the evaluated formula.
- Once player click "=", the formula solver will automatically calculate the result of the formula player designed and overwrite the text of formula with the final result. Upon this procedure finished, game of this round will finished and enter the **State 2 "Result State"**, in which all the buttons and card icons will return un-clickable and stay for the beginning of next new game. It will also be counted into the total round player played separated by mode. If the result of the formula is equal to 24, the recycle icon on the left & bottom border will become an icon of "tick" and win counter will be added with 1. Otherwise a "wrong" icon will appear instead. The player win the current round if and only if:
 - There is no unknown error in the formula.

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- All four cards are selected and selected only once.
- The result of the formula is strictly equals 24.
- During the solving procedure, the icon “**cycle**” is clickable for player to re-random 4 cards and begin a new round of game if player cannot solve current 24 problem. But this function is ONLY support in the Practise Mode. Game in ALL other game mode is not allowed to renew another 4 cards because of the modes’ challenging mechanism. However, the game PROMOTE that all 4 card pairs produced by itself is finite solvable(have one or more formulas that can use these 4 number to calculate for a result of 24).
- **NOTE: To begin a new game after getting a result in State 2, click the icon “tick” or “wrong”.**

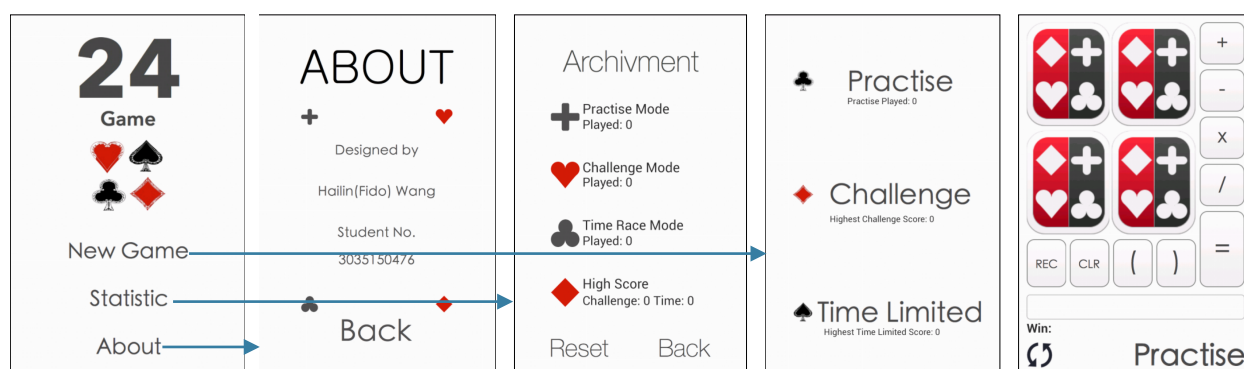


Fig2. Five activities of Card24 games. From left to right, these Activities are: MainScreenActivity, About, Summary, StartList, PractiseModeActivity(Arrows stand for activities jump. →)

Design

This application mainly includes 9 classes in whole.

- **About** - “About” page activity class;
- **AssestProperty** - class used for property reading;
- **Card** - data structure that store the card info, subset of formularElem;
- **FormularElem** - formula is managed by an array list consisting of all element of formula, this data structure defines the basic data element structure of formula;
- **MainScreenActivity** - Activity manages the main menu screen of Card24;
- **PracticeModeActivity** - Activity manages the main game procedure included in all kinds of game mode;
- **StartList** - Activity manages the mode choice menu;
- **Status** - class defines the data structure that record user action & whether it is clickable for every button;
- **Summary** - Activity manages the “Statistics” or “Achievement” page.

Test Trick

To test the application, there comes a **trick mode** that can be used for tester in Practise Mode. To enter the test mode, tester need to enter the **Practise Mode** and click “**Practice**” text icon **5 times** until there appears a “**test**” Text among **cycle icon**. After entering trick mode, the only one pairs of 4 card that will appear is “**4,5,9,10**” until the tester exit main game activity. During text procedure, all the game that played will not be counted as recorded game that played.

Statistics

Some of the record during playing is recorded and can be seen in the “Achievement” page.

- Round: round of games that player played from record point in each mode.
- High Score: the highest score the player got from record point in each mode.
- Reset: a “Reset” icon is supplied in this page for players to clean their record before and renew a new board of game record from a current record point.

About

Information about the author including university number and name can be found in “About” page for further evaluation and reference.

This project can be also checked on Github: https://github.com/popfido/Card_Game_24
