# COMP7506 Smart Phone Apps Development Assignment 1

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# ConnecFourt: ReadMe

“Connect Four” is a common board game for kids. These days because kids want to play with technology, it makes sense to put the game in a medium they will use.

## Design

Before entering the game board screen there is a main menu screen. This allows the users to select the colour of their game tokens (Red, Green, Blue, or Yellow) and to select which player will go first, or if it will be random. Then the user can select the “New Game” button to start a game and enter the game board screen.

To make the game unique and interesting, I made the board look like a castle (playing on the words Four + Fort = Fourt). The six rows and seven columns are stored in a GridLayout, to ensure equal column width. The ImageViews are given IDs referencing their row and column location for easy access later in the game. There is also a blank row to indicate the current column selected, its use will be described in more detail in the implementation. Tokens are placed by touching the desired column (anywhere in the column) and players can watch the tokens fall to the right position.

Once you’re in the game there are some ImageButton options for control:

* + New Game: Start a new game at any time.
  + Undo: Undo last move. This can be used multiple times, if there are no tokens left, it returns to the main screen. The user can also use their phone’s “back” button to call this feature.
  + Statistics: Dialog box pops up with games won statistics.
  + Settings: Dialog box which allows uses to change their token colour at any time.

Dialog boxes are used for both statistics and settings because the allow for the quick display of information and small changes to the interface which don’t require a full activity.

The package was designed specifically for the Nexus S with resolution 800x480, when run on devices with a different resolution, the board and buttons will look slightly different. This will be discussed in more detail in the section on Targets for Future Versions.

## Implementation & Game Flow

### Setup

The game begins when the players have picked their colours and the starting player and clicked the “New Game” button. This checks to ensures they have selected different colours and then opens the GameBoard activity.

### Playing

When the GameBoard is open, they take it in turns to select a column in which to place their token. This implements an “onTouchListener” to allow them to slide back and forth among the columns to place their token. The active column shows a token at the top, ready to drop down. If the touch is outside the board (left/right/top/bottom) then it will not place the token.

When they release their touch, the token “drops” down by moving 50ms per row until it settles. If the column is already full, a Toast pops up to ask them to choose another column. After the token is placed, the game checks if it has been won, or drawn, otherwise, it is the next player’s turn.

At any time during the game, the players can press “Undo” to step back a move. This can be done up to the start of the game at which point they are taken back to the main screen. Undo cannot be used after a game has already been won or drawn.

When a game is finished, all the tokens of four in a row will be highlighted and players will be able to select the “New Game” button, to start again. Colours can be changed in the settings.

## Additional Features

### Falling tokens

To replicate the experience of places tokens enjoyed by players in the original game, the tokens are not placed directly, but “fall” using a runnable to delay the checking process by 50ms each row.

### Stats

To help users keep track of their games, when a game is won or drawn three bits of information about the game are stored; the time taken, the winner, and who went first. When the players click on the stats button a dialog shows the number of games, they’ve won, lost and drawn. A progress bar graphically displays this information using the original red for Player 1 wins, brown for draws and green for player 2 wins.

Users can also reset their stats if they want to start again from a clean slate.

### Colour Selection

Colour selection was allowed for two reasons. Firstly, to give players the chance to choose their favourite colours, but also for accessibility. Red/Green colour-blindness is the most common form and so this colour scheme is a poor choice. Allowing colour-blind children to choose more distinct colours will enhance their enjoyment of the game and not disadvantage them. The original game used red and black tokens or red and yellow as these are easy to distinguish.

## Targets for Future Versions

As with all apps, there are plenty of ways to upgrade in future releases.

### Stats

The database has already got the information on game length, and who was the first player in each game. The statistics can be further built out to include games won/lost when a player moved first. Also, the average time taken for a win/loss can be added. For further challenge, a time limit on each move, or total game time (similar to chess matches) could be added to speed up players thinking.

### Player Names

Instead of “Player 1” and “Player 2” players could use their own names, this could also be added to the database if you have more than two friends playing on the same device.

### Screen Resolutions

This app was designed for the Nexus S with resolution 800x480. To run on devices with other size screens, the image files will need to be updated and some layout heights adjusted.

## References

This is an original project based off the popular board game Connect Four. All images are original creations or used with permission from the owners. All algorithm, designs, and codes are the original work of the author. Video walkthrough and sourcecode can be found at my github: <https://github.com/barrettjamesr/ConnecFourt>

### IDE

This package was developed in Android Studio v2.2.2 but has been tested on previous builds of Android Studio v2.1.2

### Coding Samples:

Coding for this project was done mostly from my own knowledge of Android Studio gained while writing PHIITnessTimer, a fitness app I released last year. Code for this app can be found on my GitHub: <https://github.com/barrettjamesr/PHIITnessTimer/>

For libraries I hadn’t used before such as GridLayout, I read the source material at <https://developer.android.com> and checked the open source code from [www.stackoverflow.com](http://www.stackoverflow.com) for troubleshooting.

### Icons

The icon for ConnecFourt is my original design and creation. I generated the alternate resolutions using the free online tool provided at <http://romannurik.github.io/AndroidAssetStudio/icons-launcher.html>

Some of the icons used, such as Undo, Settings and Stats were downloaded from <https://www.iconfinder.com/search/?q=download> and used under “fair use” terms for this project.

### Graphics Editing

The png files for red and green and empty tokens were provided for our use in the assignment documentation. Using these as a base I created blue and yellow tokens using the free online software from [www.pixlr.com](http://www.pixlr.com). This tool was used for all other image editing and manipulation.