

Checkers: Two Dimensional Arrays

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Concepts to be applied for the problem:

1. Use of two dimensional arrays.
2. Using object oriented approach to solve problems.

Problem Specification: Checkers

Introduction:

Checkers(American) or draughts (British) is an ancient two-player board game that may be derived directly from Chess. Though it has many variants, for this assignment, we will focus on the basic version. The game is played on an eight by eight squared board (with sixty-four total squares) with twelve pieces on each side. Traditionally the pieces are either black, white, or red, and the board alternates between red and black squares. These pieces may only initially move and capture diagonally forwards.

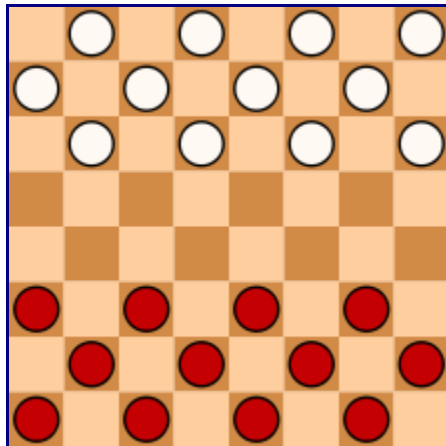


Figure 1: A Checkers board before the start of the game

Game Description:

- **Starting Position** - Each player starts with twelve pieces on the dark spaces of the three rows closest to his own side (as shown in Figure 1). The row closest to each player is called the "crownhead" or "kings row". The player with the darker colored pieces moves first.
- **Pieces** - There are two classes of pieces: "men" and "kings". Kings are differentiated as consisting of two normal pieces of the same color, stacked one on top of the other. If a player's piece moves into the kings row on the opposing player's side of the board, that piece is said to be "kinged", and gains the ability to move both forwards and backwards.
- **How to move** - There are two ways to move a piece:
 - A simple **move** involves sliding a piece one space diagonally forwards (also diagonally backwards in the case of kings) to an adjacent unoccupied dark square.

- A **jump** is a move from a square diagonally adjacent to one of the opponent's pieces to an empty square immediately and directly on the opposite side of the opponent's square, thus "jumping directly over" the square containing the opponent's piece. An uncrowned piece (i.e., *men*) can only jump diagonally forwards, but a *king* can also jump diagonally backwards. A piece that is jumped is captured and removed from the board.
- **How the game ends** - A player wins by capturing all of the opposing player's pieces, or by leaving the opposing player with no legal moves.

Your mission for this assignment:

You are to implement a simple Checkers game with the functionalities described above. The program to be designed using an object oriented approach. The major entities should be represented as separate classes. At a minimum, your program should contain the following classes:

- **Driver:** Contains the main method and should be kept as small as possible.
- **Game:** The class should model a session of games. It should implement methods to carry out various functionalities including handling user input, update the board, determine game status, etc.
- **Board:** The class is to capture the state of the checker board at different phases of the game.
- **Piece:** Each of the instances of this class should represent a piece of the board.
- **Move:** Captures the move to be made by a player.

The program should have the features required in a good software design including:

1. Ability to capture invalid move.
2. Allows user to make up for the mistakes made in providing input. However, the program should also prevent unruly players from ruining the game by repeatedly making invalid moving choices. The easiest way to implement this is allowing a maximum number of mistakes (e.g. 3). The game should be forfeited to the opposition in case of too many mistakes made by a player for a particular move.
3. Provide enough information about the context of the game (a visual representation of the board, move options, etc.).

Submitting your work:

The nice thing about this assignment is, you don't need to submit it. However, you are expected to come up with the design of the solution to the problem, the UML diagram showing different classes and their relationships. One possible design is provided along with the code implementing the game.

Resources for further background information:

1. <http://simple.wikipedia.org/wiki/Checkers>
2. <http://en.wikipedia.org/wiki/English draughts>