Capítulo: Projeto Sistema de Jogo de Xadrez

Creating project and git repository

Checklist:

- Github: create a new project ○ NOTE: choose **`.gitignore`** type as Java
- Open a terminal in project folder, and perform the following commands:

```
git init git remote add origin https://github.com/acenelio/chess-
system-java.git git pull origin master git add .
git commit -m "Project created"
git push -u origin master
```

First class: Position

Checklist:

- Class Position [public]
- OOP Topics:
  - Encapsulation ○ Constructors
  - ToString (Object / overriding)

Starting to implement Board and Piece

Checklist:

- Classes Piece, Board [public]
- OOP Topics:
  - Associations ○ Encapsulation / Access Modifiers

  Data Structures Topics:
  - Matrix

Chess layer and printing the board

```
8 - - - - - - - -
7 - - - - - - - -
6 - - - - - - - -
5 - - - - - - - -
4 - - - - - - - -
3 - - - - - - - -
2 - - - - - - - -
1 - - - - - - - -
  a b c d e f g h
```

Checklist:

- Methods: Board.Piece(row, column) and Board.Piece(position)
- Enum Chess.Color
- Class Chess.ChessPiece [public]
- Class Chess.ChessMatch [public] Class ChessConsole.UI OOP Topics:
    - Enumerations ○ Encapsulation / Access Modifiers ○ Inheritance ○ Downcasting ○ Static members ○ Layers pattern
- Data Structures Topics:
    - Matrix

Placing pieces on the board

Checklist:

- Method: Board.PlacePiece(piece, position)
- Classes: Rook, King [public] Method: ChessMatch.InitialSetup OOP Topics: ○ Inheritance ○ Overriding ○ Polymorphism (ToString)

BoardException and defensive programming

Checklist:

- Class BoardException [public]
- Methods: Board.PositionExists, Board.ThereIsAPiece Implement defensive programming in Board methods OOP Topics:
    - Exceptions
    - Constructors (a string must be informed to the exception)

ChessException and ChessPosition

Checklist:

- Class ChessException [public]
- Class ChessPosition [public] Refactor ChessMatch.InitialSetup OOP Topics: ○ Exceptions ○ Encapsulation
    - Constructors (a string must be informed to the exception)
    - Overriding ○ Static members
    - Layers pattern

Little improvement in board printing

Color in terminal:

- Windows: Git Bash
- Mac: Google "osx terminal color"

Checklist:

- Place more pieces on the board
- Distinguish piece colors in UI.PrintPiece method

Moving pieces

Checklist:

- Method Board.RemovePiece
- Method UI.ReadChessPosition
- Method ChessMatch.PerformChessMove ○ Method ChessMatch.MakeMove ○ Method ChessMatch.ValidadeSourcePosition Write basic logic on Program.cs OOP Topics: ○ Exceptions ○ Encapsulation

Handling exceptions and clearing screen

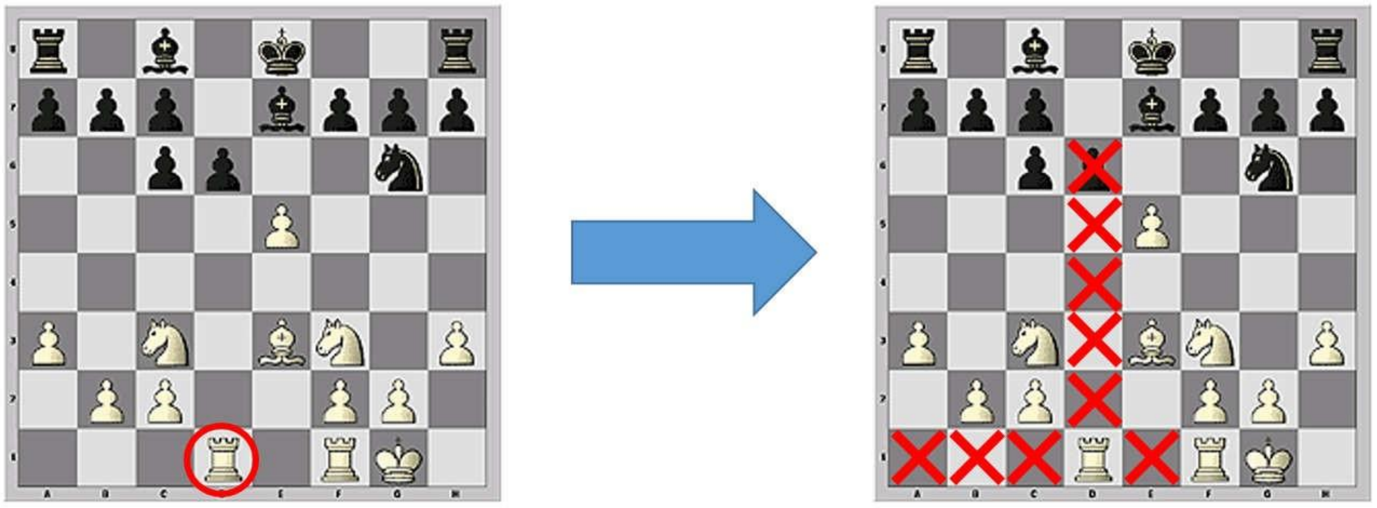
Clear screen using Java:

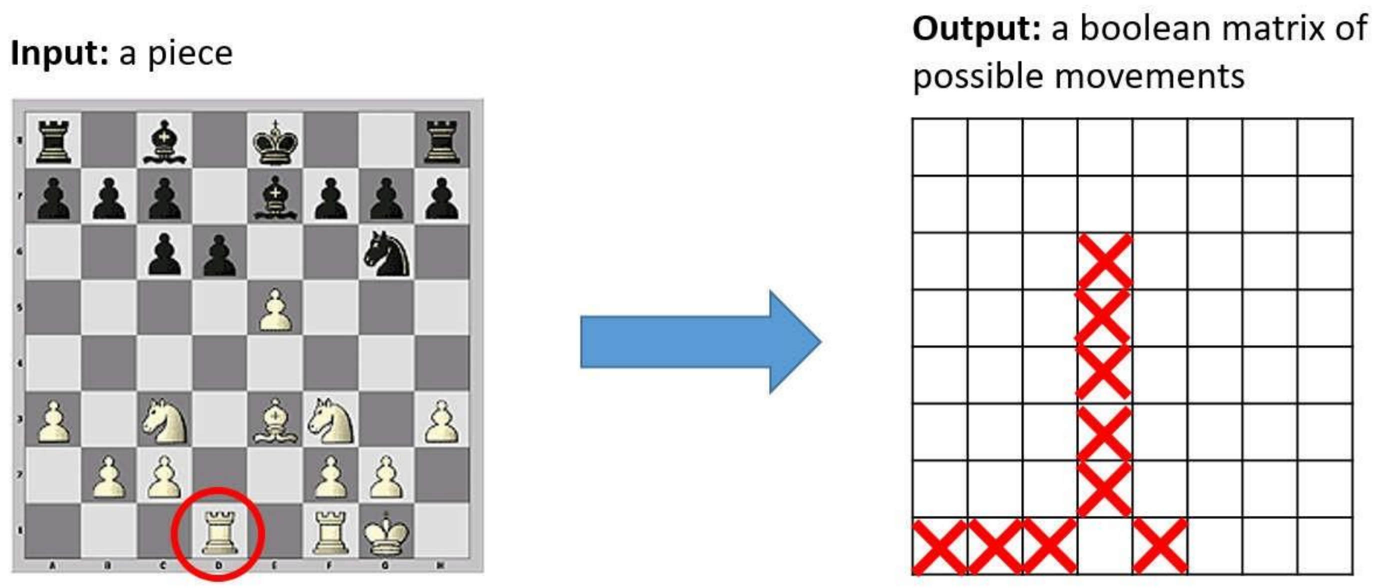
```
// https://stackoverflow.com/questions/2979383/java-clear-the-console
public static void clearScreen() {
System.out.print("\033[H\033[2J");       System.out.flush();
}
```

Checklist:

- ChessException
- InputMismatchException

Possible moves of a piece





Checklist:

- Methods in Piece:
  - PossibleMoves [abstract]
  - PossibleMove o IsThereAnyPossibleMove
- Basic PossibleMove implementation for Rook and King
- Update ChessMatch.ValidadeSourcePosition

- OOP Topics:
  - Abstract method / class o Exceptions

Implementing possible moves of Rook

Checklist:

- Method ChessPiece.IsThereOpponentPiece(position) [protected]
- Implement Rook.PossibleMoves Method ChessMatch.ValidateTargetPosition OOP Topics:
  - Polymorphism
  - Encapsulation / access modifiers [protected]
  - Exceptions

Printing possible moves

Checklist:

- Method ChessMatch.PossibleMoves
- Method UI.PrintBoard [overload]
- Refactor main program logic OOP Topics:
  - Overloading

Implementing possible moves of King

Checklist:

- Method King.CanMove(position) [private]
- Implement King.PossibleMoves OOP Topics: ○ Encapsulation ○ Polymorphism

Switching player each turn

Checklist:

- Class ChessMatch:
    - ○ Properties Turn, CurrentPlayer [private set]
    - ○ Method NextTurn [private] ○ Update PerformChessMove ○ Update ValidadeSourcePosition Method UI.PrintMatch OOP Topics: ○ Encapsulation ○ Exceptions

Handling captured pieces

Checklist:

- Method UI.PrintCapturedPieces
- Update UI.PrintMatch
- Update Program logic
- Lists in ChessMatch: _piecesOnTheBoard, _capturedPieces ○ Update constructor ○ Update PlaceNewPiece ○ Update MakeMove OOP Topics: ○ Encapsulation ○ Constructors
- Data Structures Topics:
    - ○ List

Check logic

Rules:

- Check means your king is under threat by at least one opponent piece
- You can't put yourself in check

Checklist:

- Property ChessPiece.ChessPosition [get] Class ChessMatch:
    - ○ Method UndoMove

○ Property Check [private set] ○ Method Opponent [private] ○ Method King(color) [private] ○ Method TestCheck ○ Update PerformChessMove

• Update UI.PrintMatch

Checkmate logic

Checklist:

• Class ChessMatch:
  ○ Property Checkmate [private set] ○ Method TestCheckmate [private] ○ Update PerformChessMove
• Update UI.PrintMatch
• Update Program logic

Piece move count

Checklist:

 Class ChessPiece:
○ Property MoveCount [private set] ○ Method IncreaseMoveCount [internal] ○ Method DecreaseMoveCount [internal] Class ChessMatch: ○ Update MakeMove ○ Update UndoMove OOP Topics:
○ Encapsulation

Pawn

Checklist:

• Class Pawn
• Update ChessMatch.InitialSetup OOP Topics: ○ Encapsulation ○ Inheritance ○ Polymorphism

Bishop

Checklist:

• Class Bishop
• Update ChessMatch.InitialSetup OOP Topics: ○ Encapsulation ○ Inheritance

- Polymorphism

Knight

Checklist:

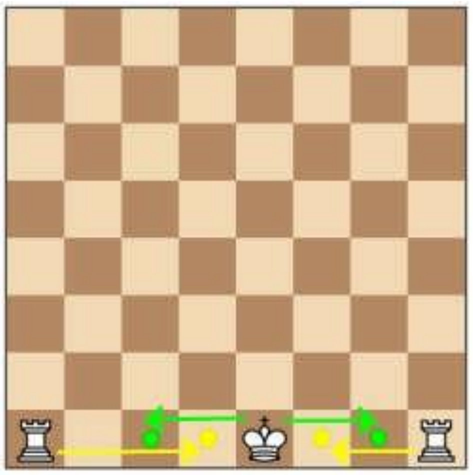
- Class Knight
- Update ChessMatch.InitialSetup OOP Topics: ○ Encapsulation ○ Inheritance
    - Polymorphism

Queen

Checklist:

- Class Queen
- Update ChessMatch.InitialSetup OOP Topics: ○ Encapsulation ○ Inheritance ○ Polymorphism

Special move - Castling

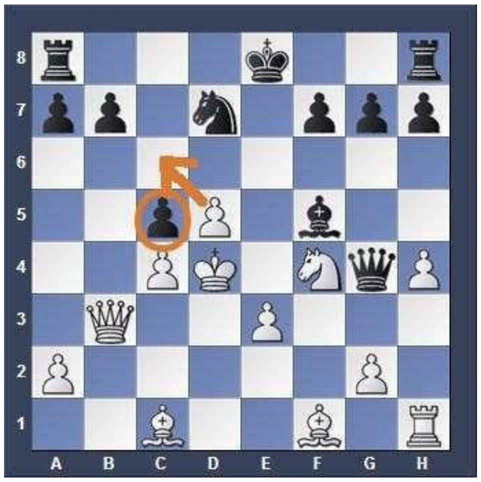


Checklist:

- Update King
- Update ChessMatch.MakeMove

- Update ChessMatch.UndoMove

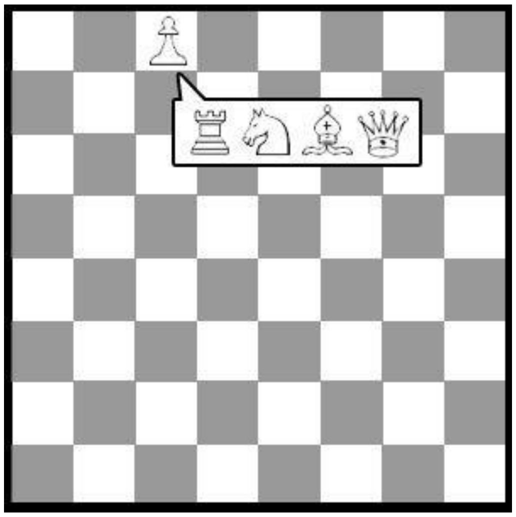
Special move - En Passant



Checklist:

- Register a pawn which can be captured by en passant on next turn ○ Property ChessMatch.EnPassantVulnerable ○ Update ChessMatch.PerformChessMove
- Update Pawn.PossibleMoves
- Update ChessMatch.MakeMove
- Update ChessMatch.UndoMove
- Update ChessMatch.InitialSetup

Special move - Promotion



Checklist:

- Property ChessMatch.Promoted
- Update ChessMatch.PerformChessMove
- Method ChessMatch.ReplacePromotedPiece
- Update Program logic