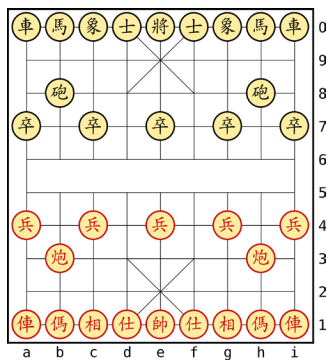


RULES OF CHINESE CHESS

The rules below form a general basis for your coursework implementation of Chinese chess (Xiangqi).¹ Please note that some more detailed technical requirements can be found in the the marking criteria for the assignment.

The chessboard and notation

Chinese chess is played on a board 9 vertical lines and 10 horizontal lines. All the pieces are placed on the intersection points of the lines (see the figure below for the initial position). In between the 5th and the 6th horizontal lines is a “river” (a rectangle formed by 1x8 blocks), and each side has a special 3x3 square (“palace”) marked by diagonal lines.

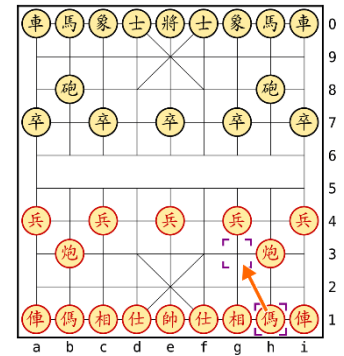


Chinese chess is a game for two players. By convention, the red side moves first, and then the two sides take turns to move their pieces, one at a time. Each move can be specified by one source point, one target point, and a route (i.e. a sequence of intersection points) between them. Except for the Cannons' capturing move, no other piece can be on the route of a move when it occurs. We may record the moves of a game with various notation systems. Here

we adopt a simple system: the letter “a” to “i” marks the vertical lines from left to right, and the numbers “1” to “0” marks the horizontal lines from the bottom to the top.² We denote any move by a 4-character string:

[source-x][source-y][target-x][target-y]

For example, a move for the red side's Horse (馬) on the right may be h1g3 (see the figure on the right).



¹ The explanations in this document are adapted from <https://en.wikipedia.org/wiki/Xiangqi> and <https://www.cccs.org.tw/Message/MessageView?itemid=57&mid=32&page=0&GroupName=%E7%84%A1%E5%88%86%E9%A1%9E>.

² For a detailed discussion on various notation systems, see https://www.xqinenglish.com/index.php?option=com_content&view=article&id=1058:a-detailed-introduction-to-the-notation-system-in-xiangqi-chinese-chess&catid=110&Itemid=504&lang=en.

The goal of the game

Each side has the following pieces:

- One King (帥/將);
- Two Chariots (俥/車);
- Two Horses (傌/馬);
- Two Cannons (炮/砲);
- Five Pawns (兵/卒);
- Two Advisors (仕/士);
- Two Elephants (相/象).

Capture happens when an opponent's piece is on a move's target (note that one cannot capture their own pieces). When a King can be captured by the opponent's next move, that King is said to be *in check* (將). The side whose King is in check should respond (應將) by either moving the King away, blocking the imminent attack by another piece, or capturing the piece that threatens the King. If none of these are possible, the King is *checkmated* (將死) and the opponent wins the game. If it is a side's turn but there are no possible further moves, or any further move puts their King in check, then the King is in *stalemate* (困斃) and the opponent wins the game. To ease the implementation, we adopt the following simplified rules in the coursework:³

- The goal of the game is to capture the opponent's King.
- All the valid moves are always allowed, including those not responding to the own King being in check, putting the own King in check, or actually capturing the opponent's King.
- The game ends when either of the Kings is captured (the side that captures the opponent's King wins), or it is a side's turn but there are no possible further moves (the other side wins).
- The game ends in draw if 50 moves are taken.

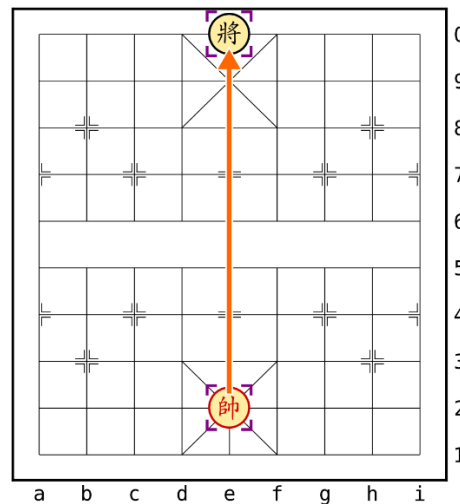
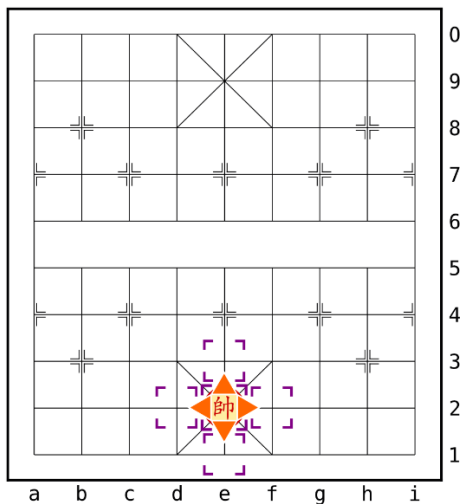
³ The official rules are more complicated and have finer terms on these matters, e.g., "suicidal" moves are disallowed. See <https://www.xqipu.com/node/94985> for details.

The moves of the pieces

We briefly describe the valid moves of the pieces below.

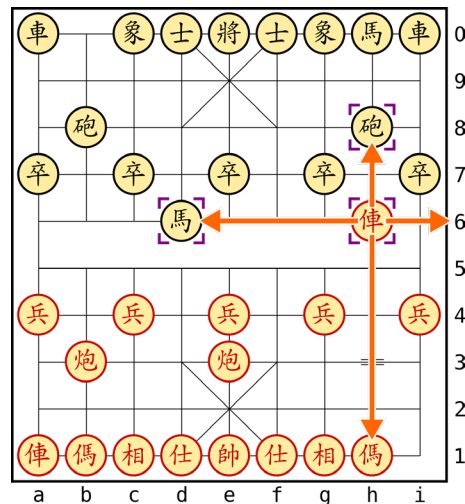
Kings

A King can move (and capture) either vertically or horizontally within its 3x3 palace, one block at a time. It also has a special capturing move: if a king is facing the opponent's King (i.e. on the same vertical line), then it can capture the opponent's King directly.



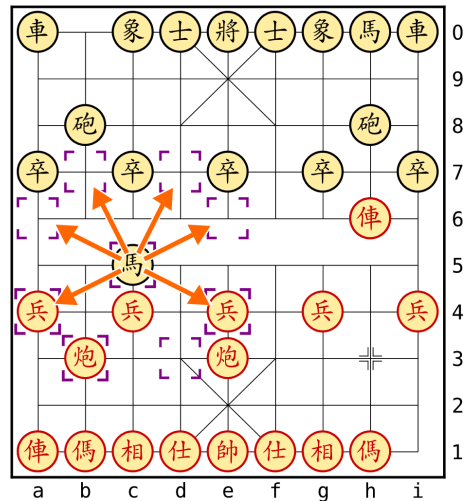
Chariots

A Chariot can move and capture either vertically or horizontally by any number of blocks, and it can capture the opponent's pieces in this way too.



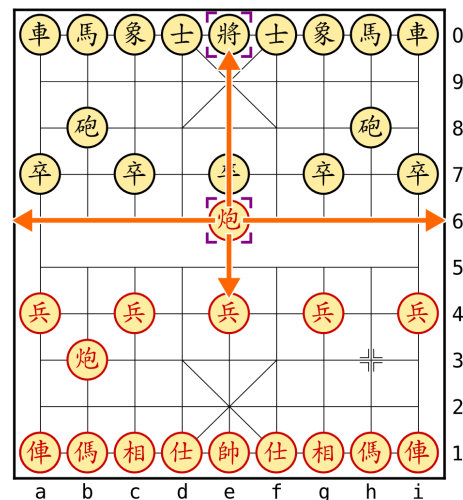
Horses

A Horse moves to the opposite corner of a rectangle formed by 1x2 blocks (i.e. it goes forward for one block, and then go across a diagonal of another block); it can capture the opponent's pieces in this way too. A move is not possible if there is a piece on the point in between; for example, in the figure below c5b3 is not a valid move, but c5e4 is.



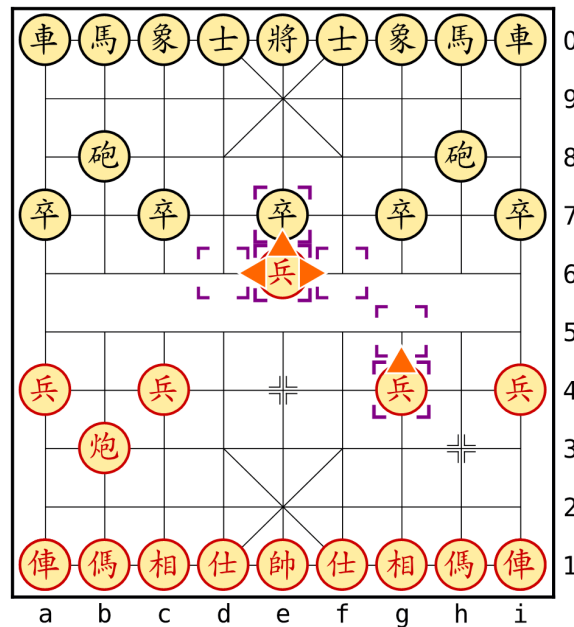
Cannons

A Cannon can move either vertically or horizontally by any number of blocks, just like a Chariot. To capture an opponent's piece, however, it needs (exactly) one intermittent piece between the source and the target.



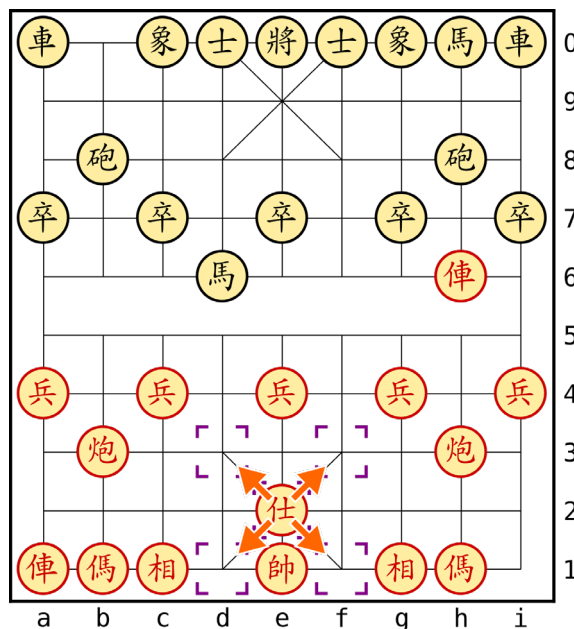
Pawns

A Pawn can only move forward by a single block, but it will get “promoted” and acquire the capability to move sideways (by a single block) if it goes across the river; the same for its capturing moves too.



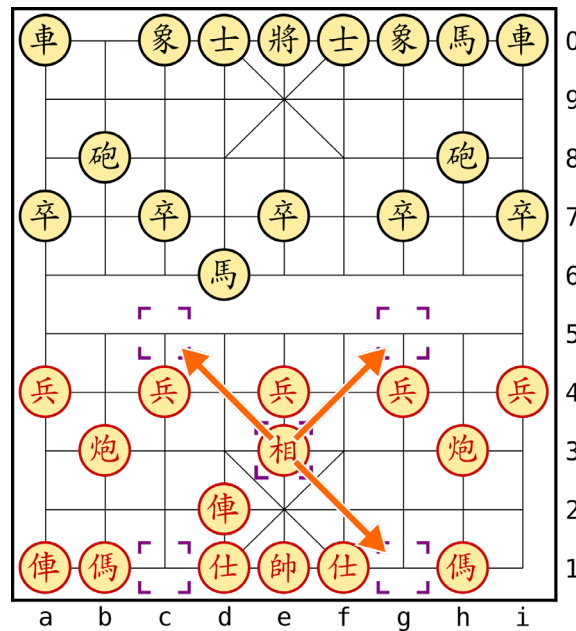
Advisors

An Advisor can only move (and capture) diagonally by a block in the 3x3 palace.



Elephants

An elephant moves to the opposite corner of a square formed by 2x2 blocks, but it cannot go across the river; it can capture the opponent's pieces in this way too. A move is not possible if there is a piece on the point in between; for example, in the figure below e3c1 is not a valid move, but e3g1 is.



Further readings (optional)

<https://www.xqbase.com/computer.htm> [Chess programming techniques]

<https://github.com/official-pikafish/Pikafish> [A modern AI engine for Chinese chess]