Coursework: requirements

Goal own max number of boxes on uniform ($n \times n$) grid of dots

Rules
1. *join the dots*
   join adjacent (vertical or horizontal) vertices to form an edge;
2. *play fair*
   each player *must* take turns; player *must* always play on turn;
3. *owning boxes*
   whoever completes the 4th side of a box owns it;
4. $\beta\phi\eta\mu\sigma$
   obligatory (bonus?) move for every box owned;
   double-cross (*i.e.* two boxes) entail only *1* extra move;
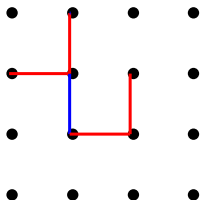5. *total number of boxes*
   is proportionate to ($2 \times n$) + *1* dots.

Coursework: play strategy

Strategies

1. Naive:
   - eagerly attempt to own boxes as opponent makes third move
   - show example on the board

Coursework: play strategy

Strategies

1. Clever:
   - break bonus move by choosing least "ownership" moves
   - avoid double-cross moves
2. Winning (2nd player):
   - 2nd player to force all long chains to go through centre
   - thus, prevent side chains using spoke moves
   - Swastika pattern prevents side chains

How?

- identify long (≥ 3 boxes) chains (*i.e.* box-owning moves)
- 1st player wins, if long-chains are even;
- 2nd player wins, if long-chains are odd;
- with perfect play, long-chain control is not possible;
- strategic player: cut long chains if they could make you loose;
- 2nd player should win in a even-sized (*e.g.* 4x4) grid (*9* boxes)
- key feature on 4×4 grid is a single central box
- move types: