Adversarial Search
or how to avoid losing

MinMax Search

Alpha beta pruning

Russell, Stuart J and Norvig, Peter (2016): "Artificial intelligence: a modern approach" page 164
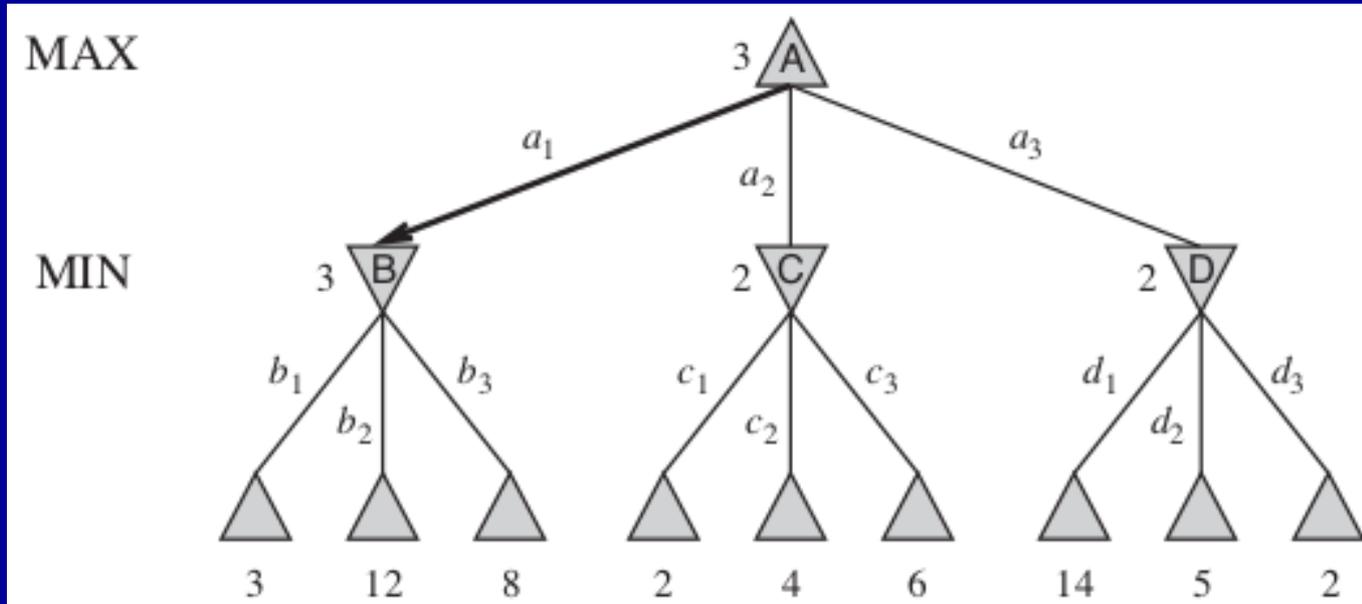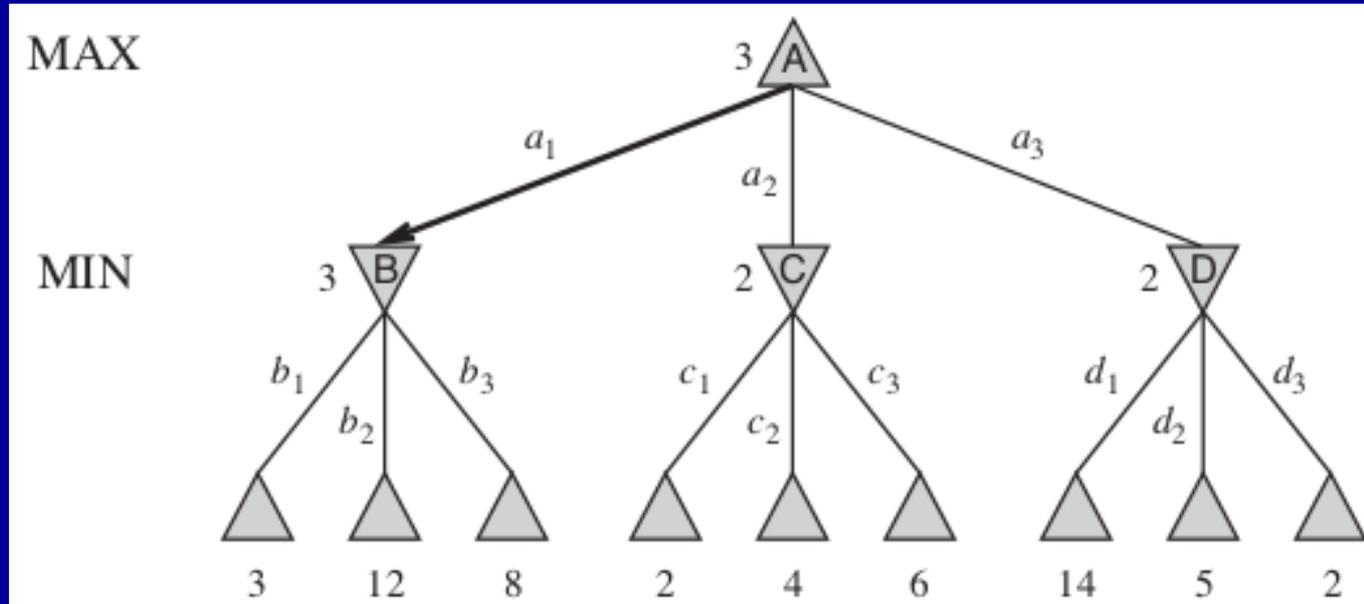
Evaluation functions

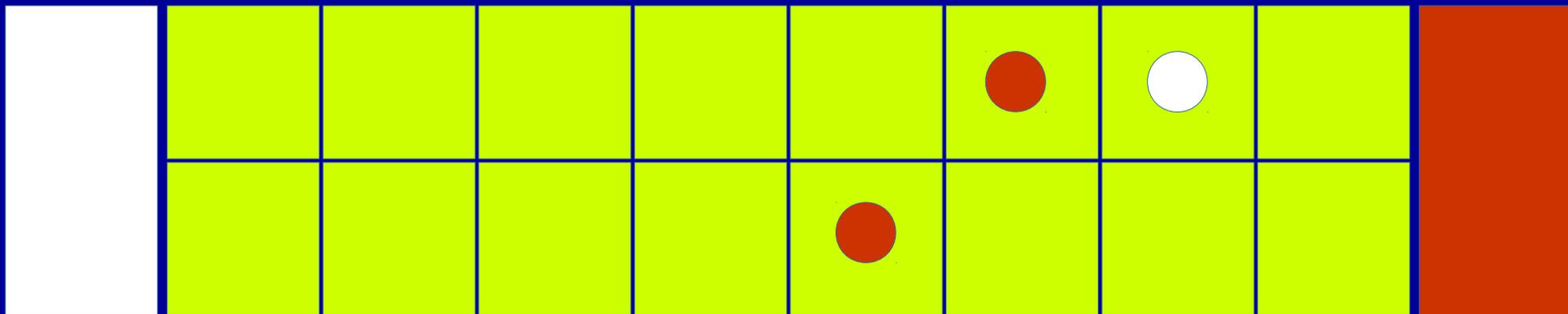- Use features of the game

Evaluation functions

- Use features of the game

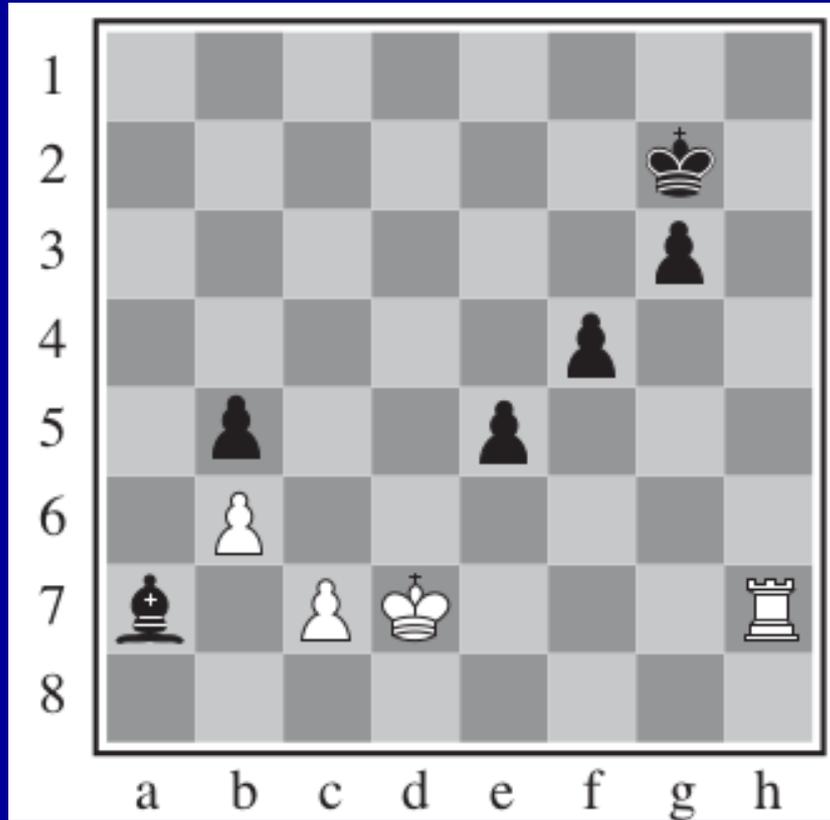- What if the next move changes everything?

Forward pruning

- Use evaluation function to prune

- What if the next move changes everything?

- Horizon effect

Horizon Effect
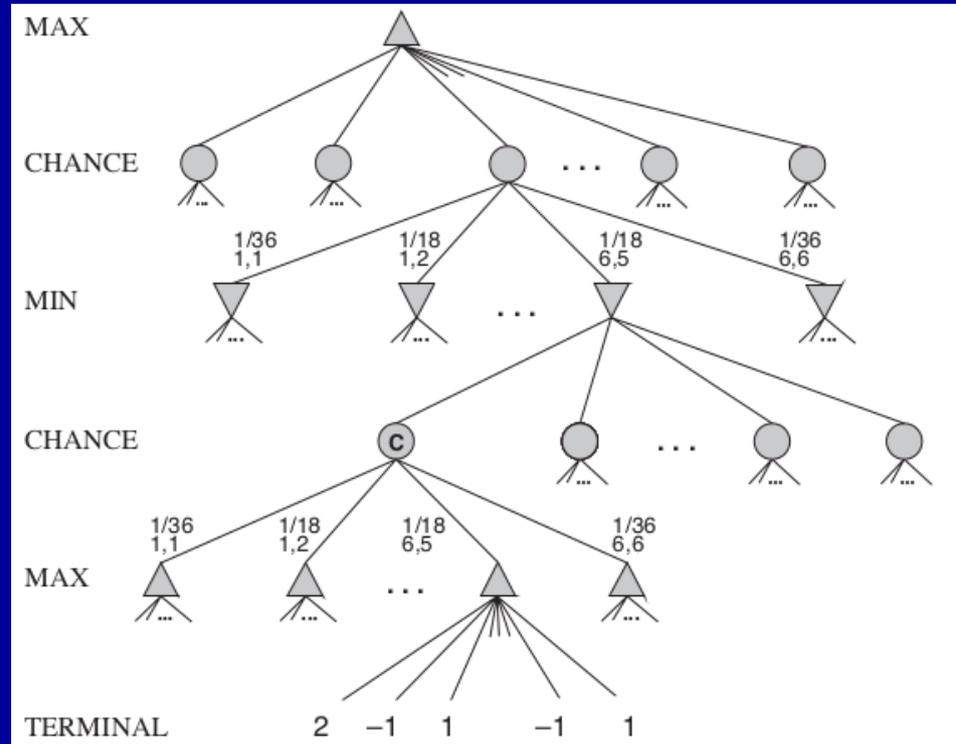
Horizon Effect

Evaluation functions

- Use features of the game

- What if the next move changes everything?

- Horizon effect

- Forward pruning

Lookup and search

- Small numbers of end states

  => Pre-calculate and solve this states in advance

Chances

Russell, Stuart J and Norvig, Peter (2016): "Artificial intelligence: a modern approach" page 178

Incomplete information

- Belief states expand the tree considerably

Incomplete information

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- We can figure out what our enemy did

Incomplete information

- Belief states expand the tree considerably

- We can figure out what our enemy did

- Optimal play does makes use predictable

Conclusion

- Adversarial search needs small trees

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- => Complete information

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- => Small branching

Conclusion

- Adversarial search needs small trees
- => Complete information
- => Small branching
- => An good Evaluation function