CS 2710 Foundations of AI
Lecture 4

Uninformed search methods (finish)
Informed search methods

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Topics

Uninformed search methods

- Review of uninformed search methods
- **Checking state repeats**
- **Uniform cost search**

Informed search methods

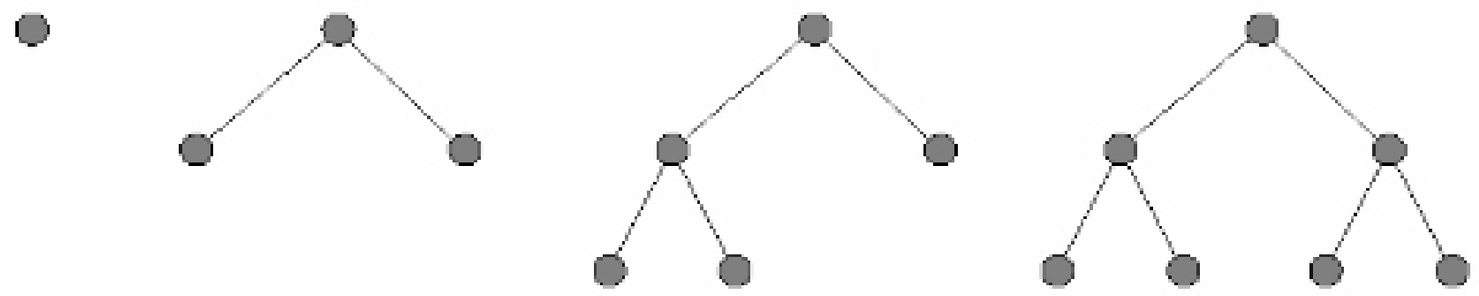
- Incorporating additional information to guide the search
- **Best first search**
  - Greedy methods
  - A* search
  - IDA*
- Heuristics

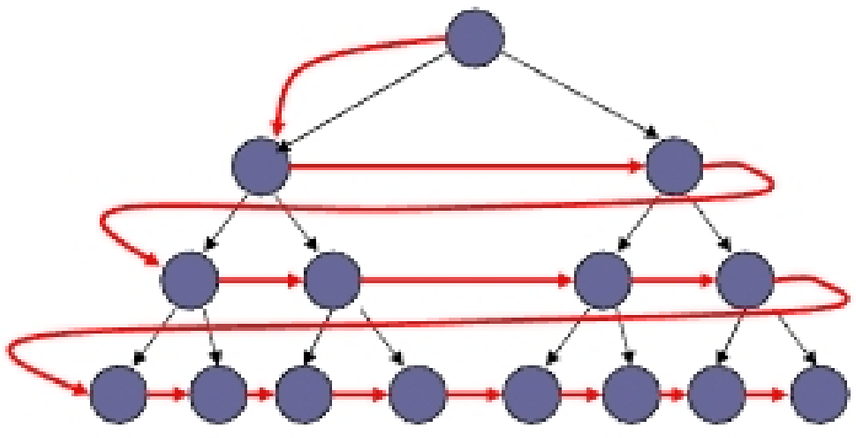
Uninformed methods

- Uninformed search methods use only information available in the problem definition
  - **Breadth-first search (BFS)**
  - **Depth-first search (DFS)**
  - **Iterative deepening (IDA)**
  - **Bi-directional search**
- **For the minimum cost path problem:**
  - **Uniform cost search**

Breadth first search (BFS)

- The shallowest node is expanded first





Properties of breadth-first search

- **Completeness:** **Yes.** The solution is reached if it exists.
- **Optimality:** **Yes**, for the shortest path.
- **Time complexity:**

$$1 + b + b^2 + \ldots + b^d = O(b^d)$$

exponential in the depth of the solution *d*

- **Memory (space) complexity:**

$$O(b^d)$$

same as time - every node is kept in the memory

Depth-first search (DFS)

- The deepest node is expanded first
- Backtrack when the path cannot be further expanded