

CS 2710 Foundations of AI Lecture 3

Uninformed search methods

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Announcements

- **Homework 1**
 - Access through the course web page
<http://www.cs.pitt.edu/~milos/courses/cs2710/>
 - Two things to download:
 - Problem statement
 - C/C++ programs you will need for the assignment
- **Due date:** September 14, 2005 before the lecture
- **Submission:**
 - **Reports:** on the paper at the lecture
 - **Programs:** electronic submissionsSubmission guidelines:
<http://www.cs.pitt.edu/~milos/courses/cs2710/program-submissions.html>

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Formulating a search problem

Many challenging problems in practice require search

- **Search (process)**
 - The process of exploration of the search space
- **Search space:**
 - alternatives (objects) among which we search for the solution
- **The efficiency of the search depends on:**
 - The search space and its size
 - Method used to explore (traverse) the search space
 - Condition to test the satisfaction of the search objective (what it takes to determine I found the desired goal object)
- **Think twice before solving the problem by search:**
 - Choose the search space and the exploration policy

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Problem-solving as search

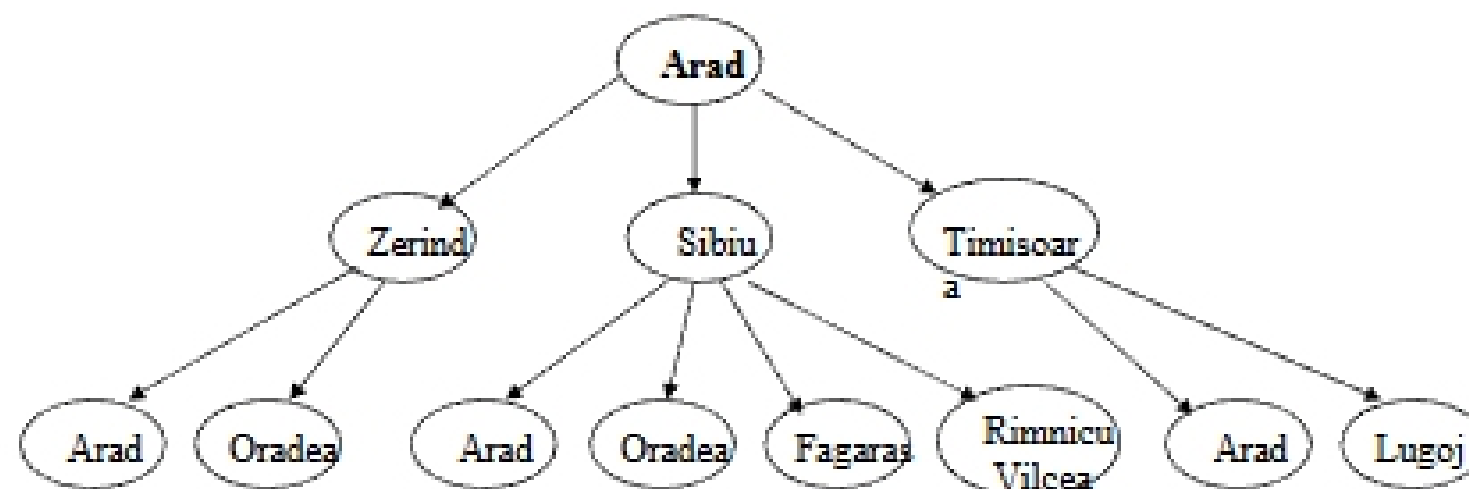
- Many search problems can be converted to graph search problems
- **A graph search problem can be described in terms of:**
 - **A set of states** representing different world situations
 - **Initial state**
 - **Goal condition**
 - **Operators** defining valid moves between states
- **Two types of search:**
 - **Path search:** solution is a **path** to a goal state
 - **Configuration search:** solution is a **state** satisfying the goal condition
- **Optimal solution** = a solution with the optimal value
 - shortest path between the two cities, or
 - a desired n-queen configuration

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Searching for the solution

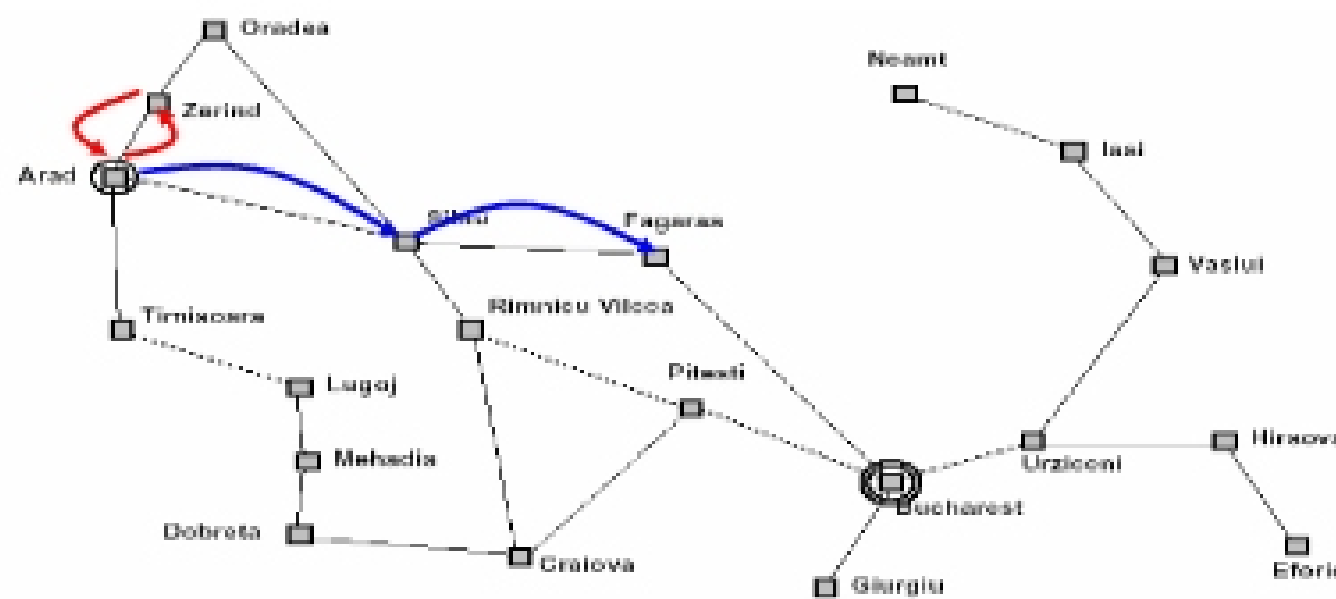
Search: exploration of the state space through successive application of operators from the initial state and goal testing

Search tree: represents a trace of the search process and its exploration fringe, branches of the tree correspond to paths from the initial state that has been explored so far

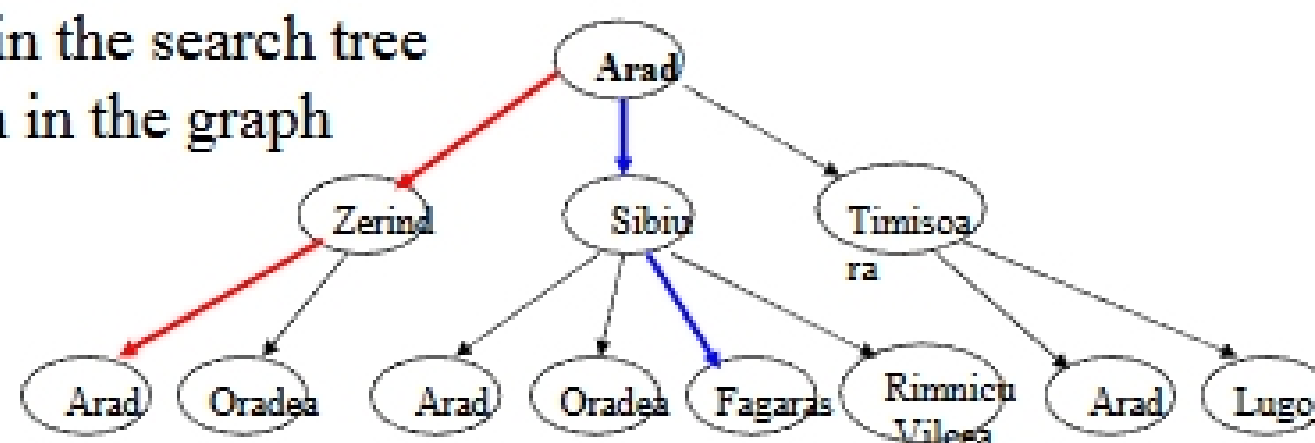


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Search tree



A branch in the search tree
= a path in the graph



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