UMBC

Mid-Term Study Guide

CMSC 471

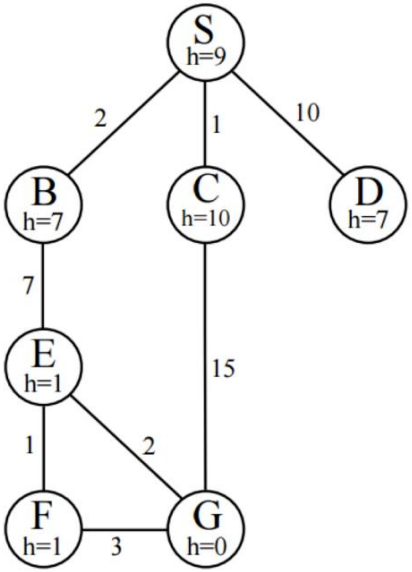
Agents

- How do you design an intelligent agent?
- What are rational agents?
- Agent types
- Properties of Environments: Describe the properties of a given problem space

Search

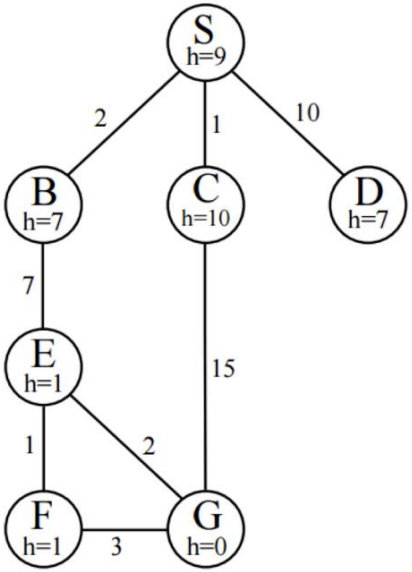
- Represent problem as state, action
- Search Strategies:
  - Uninformed
  - Informed
- Properties of Searching Strategies
- Cost of path found
- Heuristics
- Hill Climbing

Sample Search Question



- For each of the following search strategies, give the list of expanded nodes:
  - DF
  - DFID
- Cost of Path returned
- Branching factor
- Is the heuristic as shown for this graph admissible? Explain why or why not.

Sample Search Question

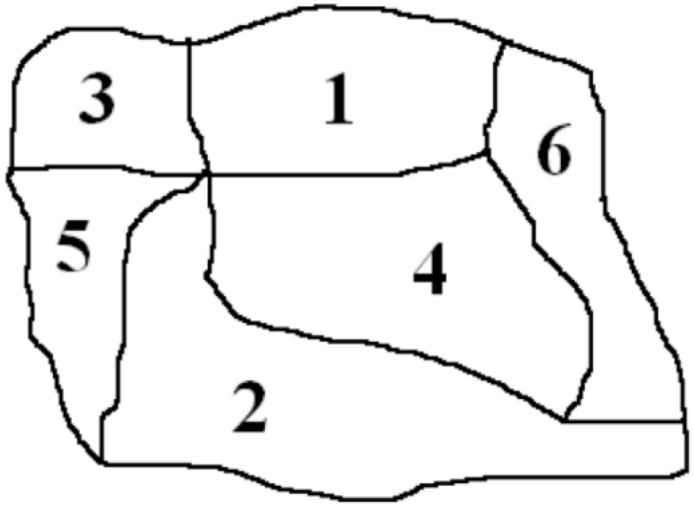


- For each of the following search strategies, give the list of expanded nodes:
  - DF : S-B-E-F-G
  - DFID : S-B-C-D-B-E-C-G
- Cost of Path returned:
  - DF: 13
  - DFID : 16
- Branching factor : 2
- Is the heuristic as shown for this graph admissible? Explain why or why not. : Yes

Constraints

- Problem as Constraint Network
- CSP strategies:
  - Backtracking
  - Forward Checking
  - Arc Consistency
  - Most constraining variable
  - Least constraining value
- Also:
  - Splitting
  - Variable Elimination
  - Local Search
- Pay attention to how these strategies work
- Map Coloring Example

Sample Constraint Questions

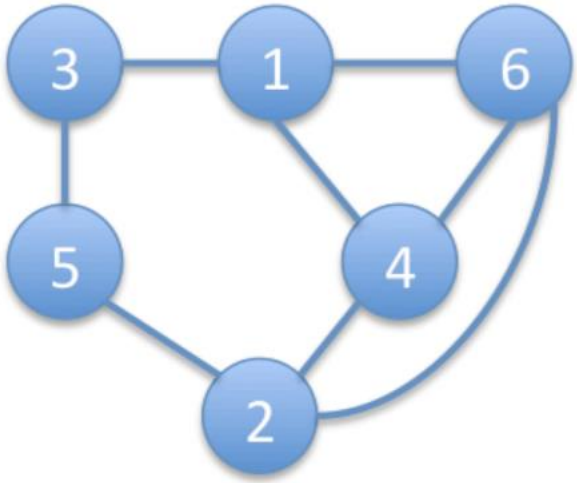


- Identify the variables that should be used to set this up as a CSP problem and the domain of possible values for each variable.
- Draw a constraint graph for this problem.
- Assume the initial domains of the regions in the map above are given as:
  - 1={R,G,B}, 2={R,G}, 3={R,G,B}, 4={R}, 5={R,G,B}, and 6={R}

  What is the result of applying the Arc Consistency algorithm, AC-3?
  Is a solution possible from this state?

Sample Constraint Questions

- There are six variables, which we could name as 1,2,3,4,5,6.
- The domain of each is {R, G, B}.
- There are two possible answers:
  - 1={G, B}, 2={G}, 3={R, G, B}, 4={R}, 5={R, B}, 6={}
  - 1={G, B}, 2={G}, 3={R, G, B}, 4={} 5={R, B}, 6={R}
  - No solution is possible



Logic

- Remember:
  - Knowledge base
  - Entail
  - Model
  - Soundness/Completeness
- Propositional Logic:
  - Syntax
  - Rules of Inference
  - Resolution by Refutation
- FOL
  - Syntax
  - Translating English to FOL