Ai

#2

Lecture

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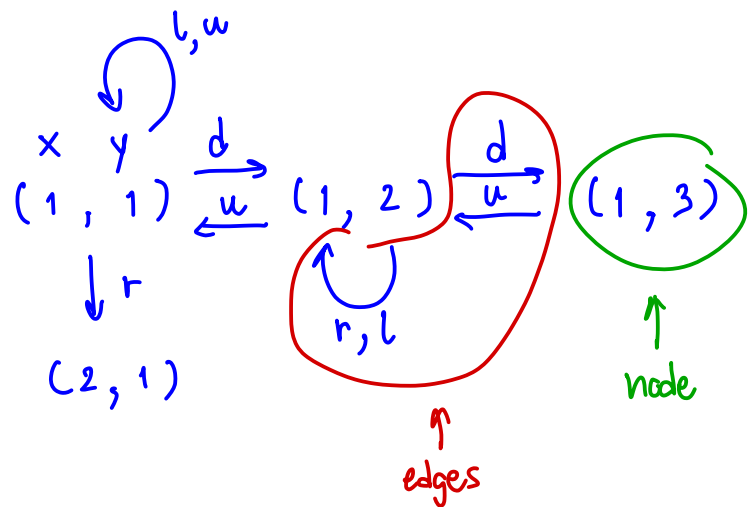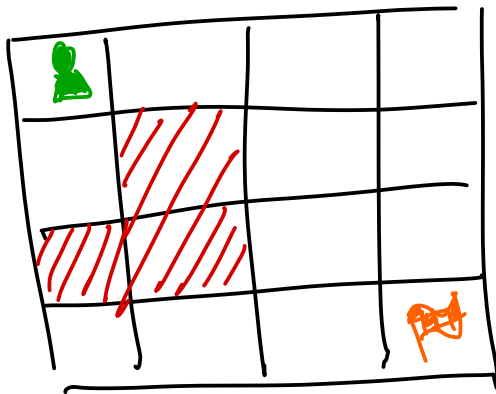
Planning and State-space Exploration

Assumption

1. Fully Observable environment

2. Deterministic environment

3. We have a model (transition func)

Objectives

sequence of actions

- To find (a plan) that take an agent from initial state to goal state

- Using minimum cost / maximize utility

State Space

State Space is a graph

   nodes: State

   edges: Possible actions

Search Algorithm

Search Problem Formulation : ⭐⭐⭐

Formulation

1. Initial State
2. Possible actions
3. Transition function
4. Goal test function
5. Cost function

← Formulate ← Problem

Search Problem →

Agent
Search Algorithm → Plan

* run inside agent
* **no** action committed

Example: Pathfinding

Formulation

1. Initial State : $S_0 = (1, 1)$ (x, y)

2. Action space : $\{ u, d, r, l \}$
   (possible action)

3. Transition function :
   Given input state = (x, y)
   if action == u, return $(x, y-1)$
   if action == D, return $(x, y+1)$

4. Goal test function : $S == (5, 4)$

5. Cost function : if mud, return 6
   if grass, return 3
   ⋮

Example: Abstract State-Space Graph