MACHINE INTELLIGENCE
SEARCH STRATEGIES

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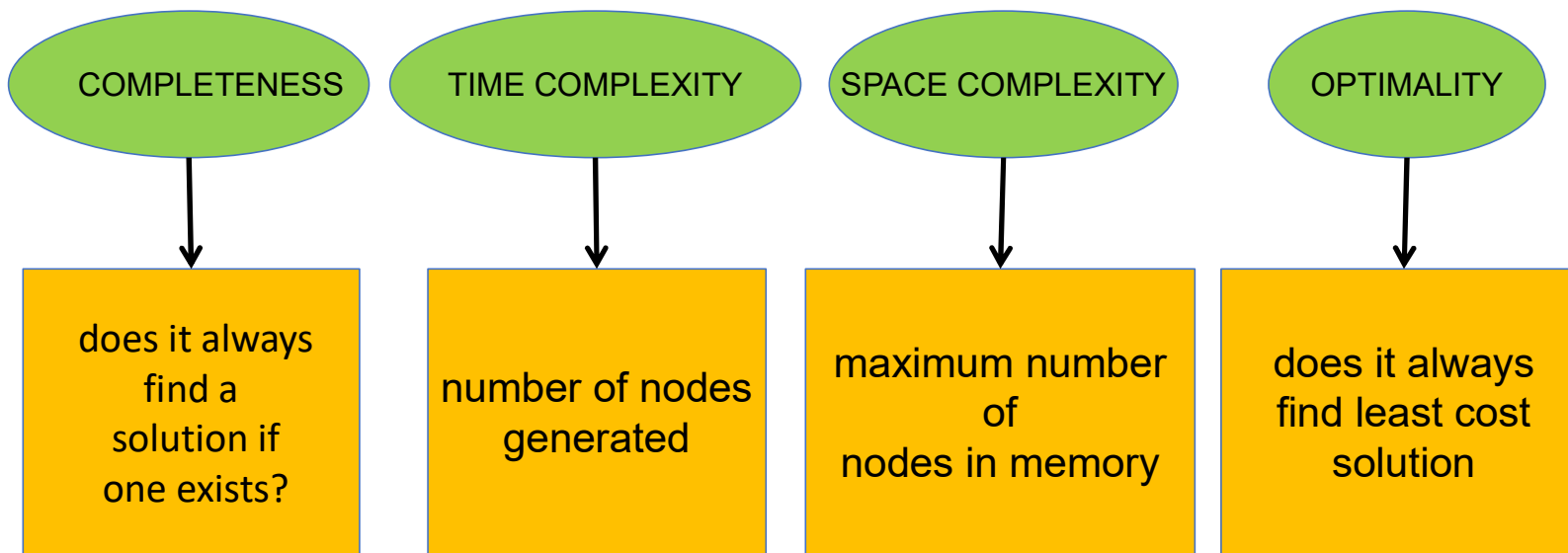Associate Professor, Department of Computer Science

What is a search strategy?

- Whenever you are given a search field problem you are provided with graph and the goal but not the path to select from the frontier.

- This is the job of search strategy.

- A search strategy is defined by picking the order of node expansion.

- Are all strategy equally good?

- what are the testing parameter?

Parameters to define a good strategy

- The goodness of your strategy is subjected to following criteria

COMPLETENESS

TIME COMPLEXITY

SPACE COMPLEXITY

OPTIMALITY

does it always find a solution if one exists?

number of nodes generated

maximum number of nodes in memory

does it always find least cost solution

These two criteria are measured in terms of

- b: maximum branching factor of the search tree
- d: depth of the least-cost solution
- m: maximum depth of the state space (may be ∞)
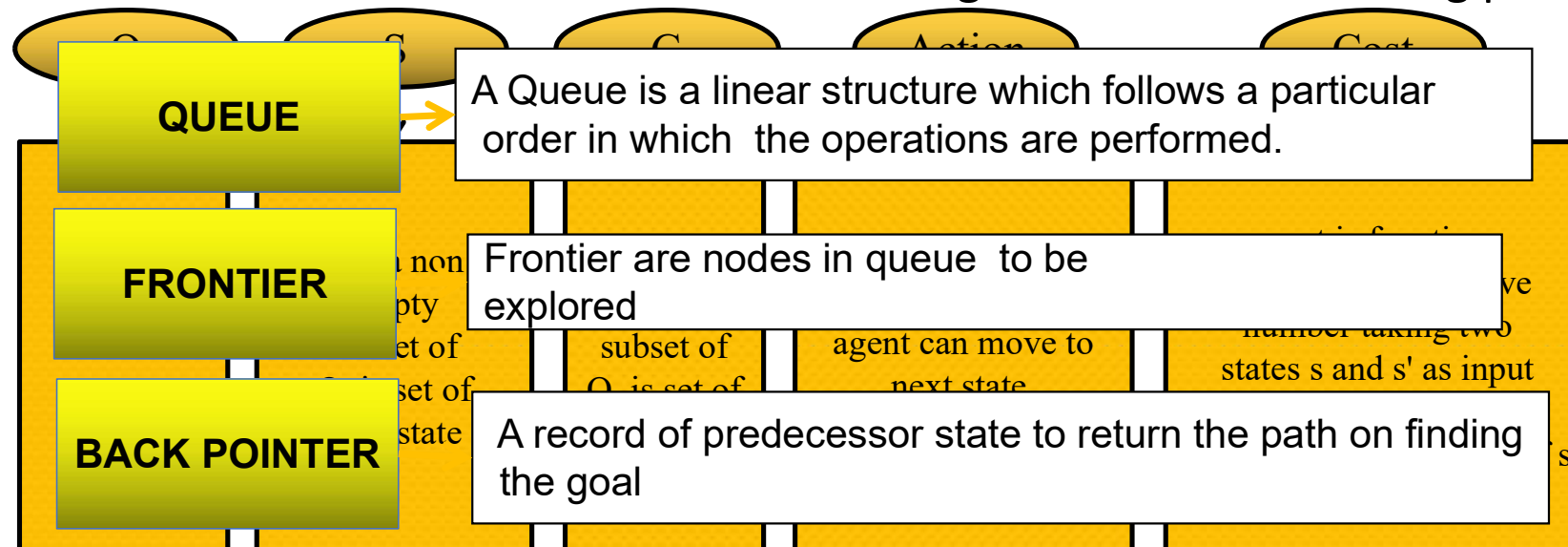
A simple search strategy

- Define initial state

- Find all possible actions from the state

- Take some step(defined) by the algorithm

- Get to the new state

- Test if the new state is goal

- Repeat this iteratively

- The problem is in defining the state which is absurdly complex in the real world
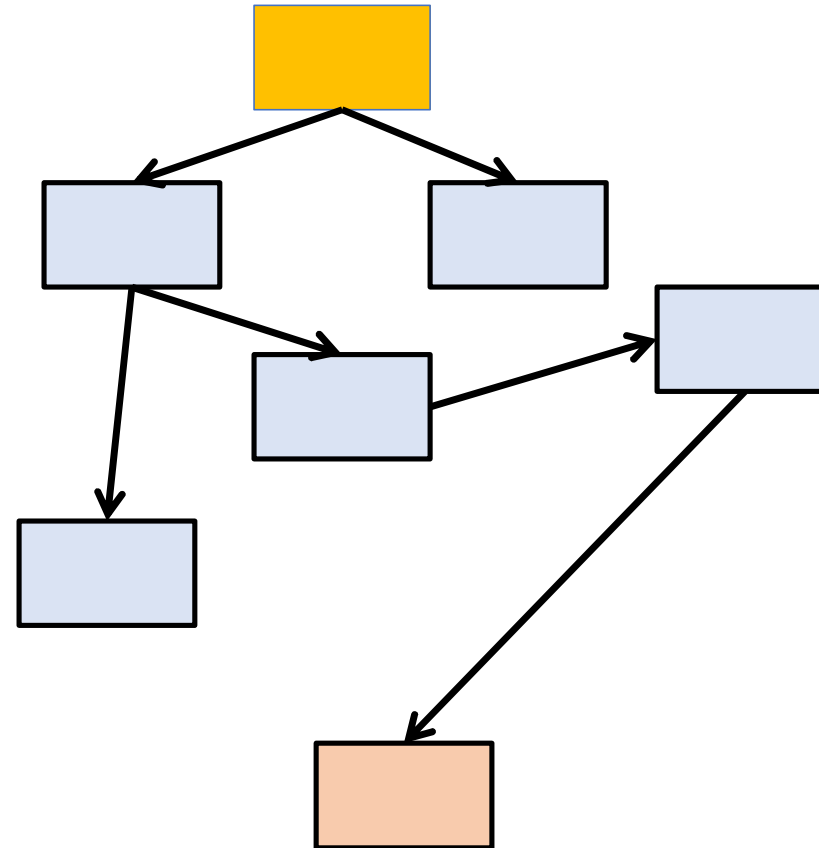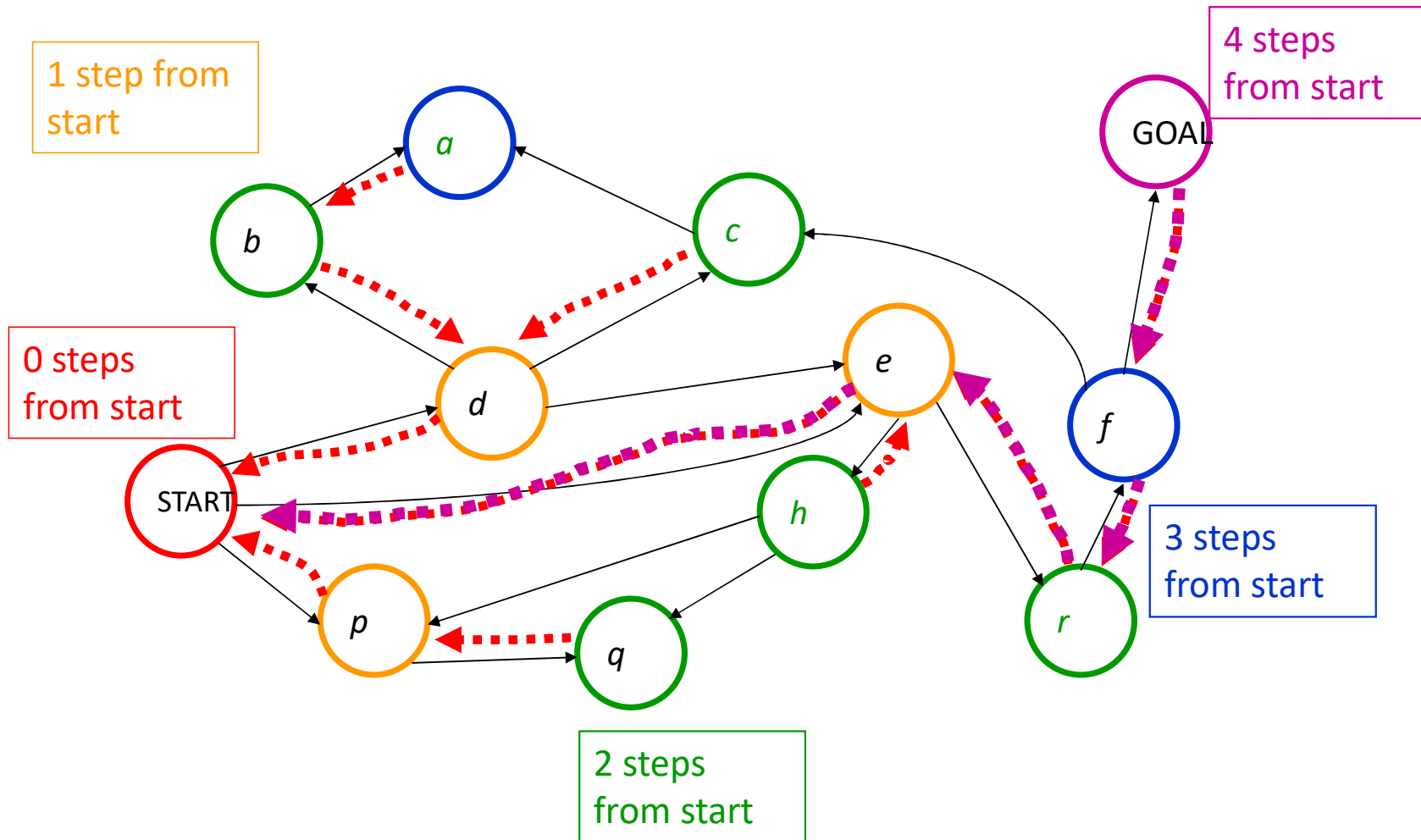
Formalizing a search problem

- Before we move on to how to solve our search problem using different search strategy ,let us see how do we prepare our set up to solve the search problem.

- we begin with defining basic components

- A search problem has 5 basic components

- some more definition that we will be using to solve our searching problem

QUEUE

A Queue is a linear structure which follows a particular order in which the operations are performed.

FRONTIER

Frontier are nodes in queue to be explored

BACK POINTER

A record of predecessor state to return the path on finding the goal

Tracking with back pointers

Now that we have learned how to formalize our problem let us try to formalize this problem

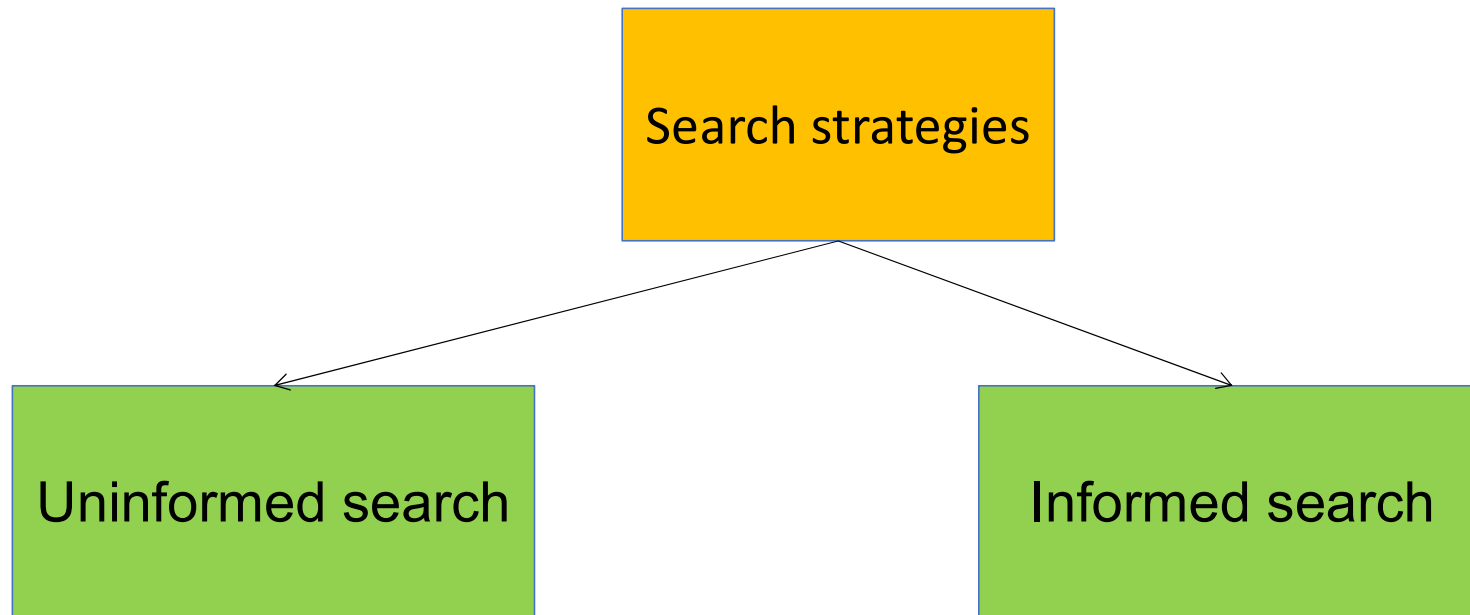| shop 16	15	14	13
9	10	shop 11	12
8	7	6	5
1Home	2	3	4

The women needs to go to shop from her home .Formalize the shop search problem defining all the 5 components

states:	all the 16 locations (boxes)
start_state:	home
actions:	up left down right
end state:	either of the shops
cost:	1 per move

THANK YOU

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