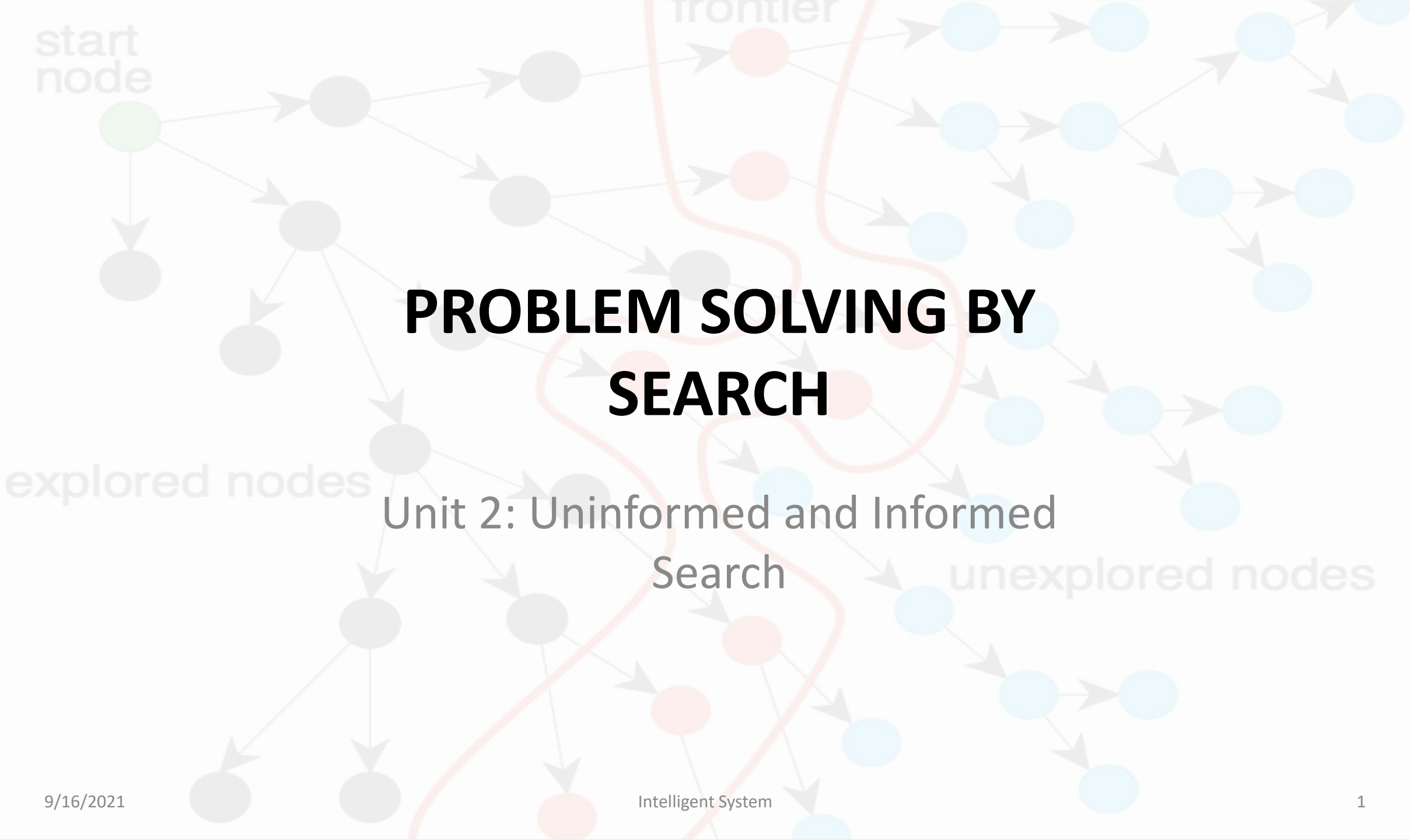


PROBLEM SOLVING BY SEARCH

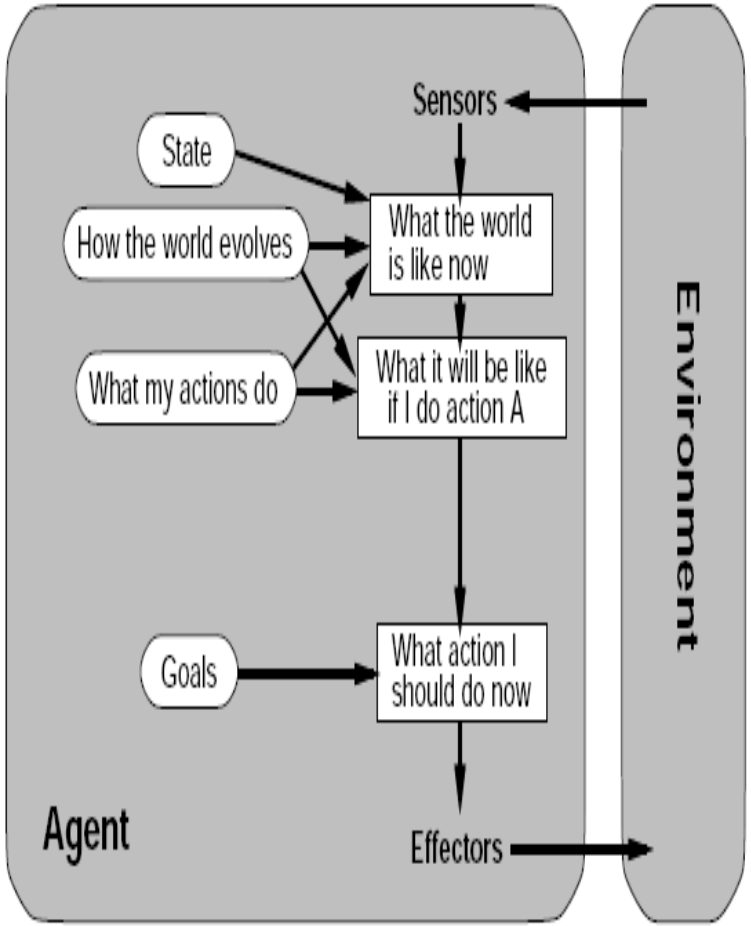
Unit 2: Uninformed and Informed Search

Table of Content

- Goal Based Agent
- Problem Solving Search Agent
- Problem Formulation
  - 8-Puzzle problem
  - N-queen problem
- Search problem
- Searching Process

Goal Based Agent

- Needs to achieve certain goals
- Select an action based on the goal it has
- Represented as a set of states and set of rules for transforming one state to another.



Problem Solving Search Agent

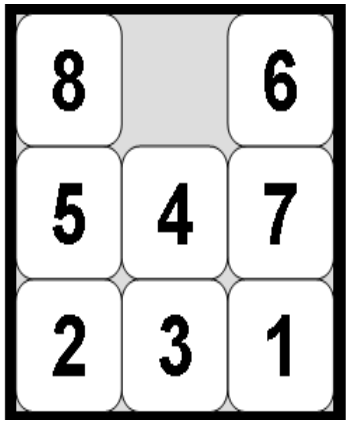
- Goal based agent
- Act by finding sequences of actions that lead to desirable states
- Goal selection is the initial actions
- Find out the sequence of actions which may lead to goal
- Agent's performance measure is also important.

Problem Formulation

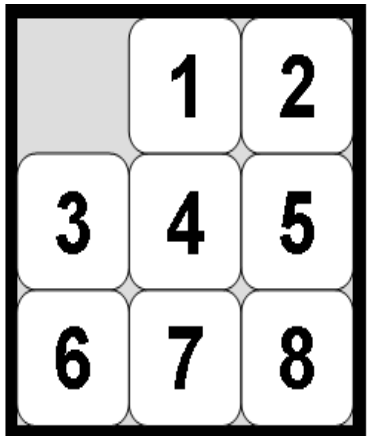
- State: specification of the values of all attributes of interest
- Initial State: Description of starting configuration of the agent
- Successor function: An action which takes the agent from one state to another.
- Goal State: Desirable configuration of the agent.
- Path Cost: the cost of sequence of actions.

8-Puzzle Problem

- States: A state description specifies the location of each of the eight titles
- Initial States: State *I*
- Successor Function: Blank moves *left, right, up and down*
- Goal State: State *G*
- Path Cost: Each step costs 1, path cost is the number of steps in the path.



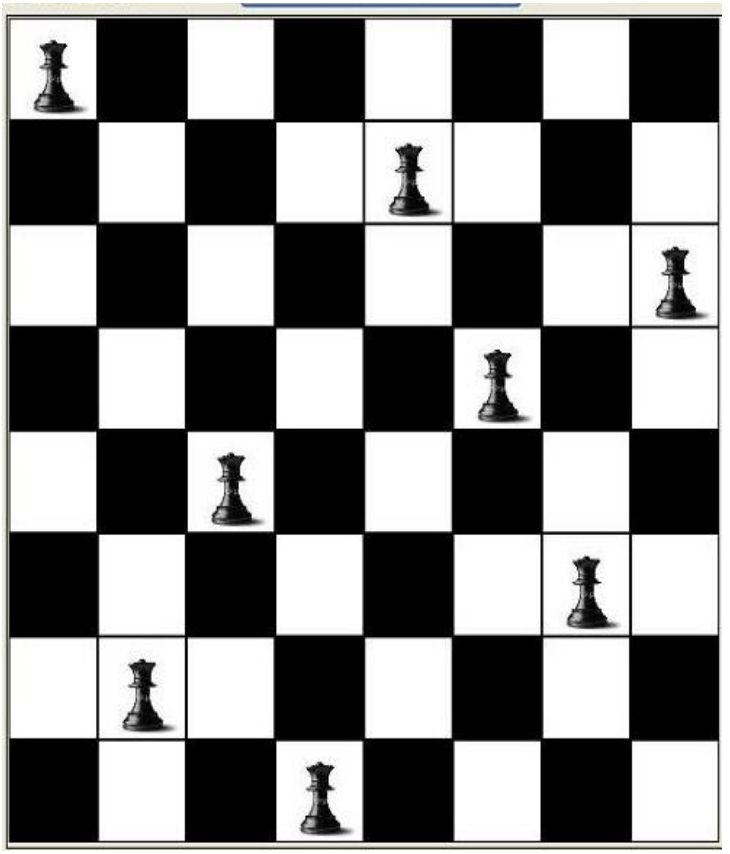
Initial state: *I*



Goal state: *G*

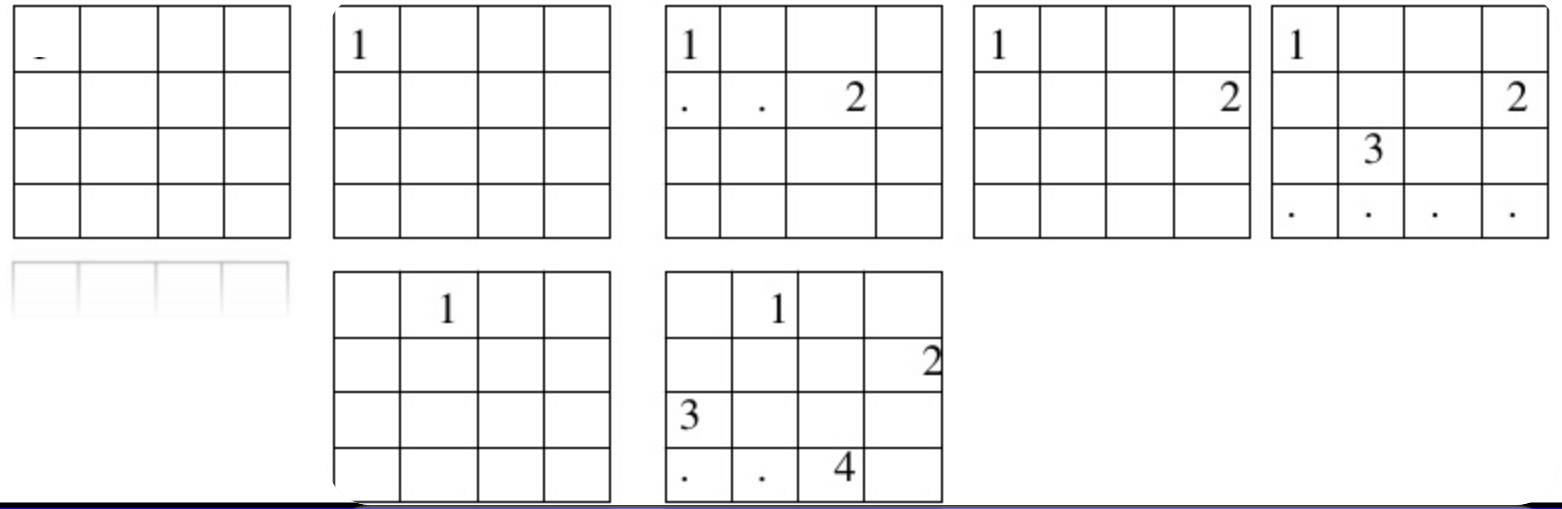
8-Queen Problem

- Place 8 queen on a chessboard in non attacker mode
- A queen attacks any piece in the same row, column and diagonal
- Involves deciding the representation of states, selecting initial state, state representation, operators and the successor states.



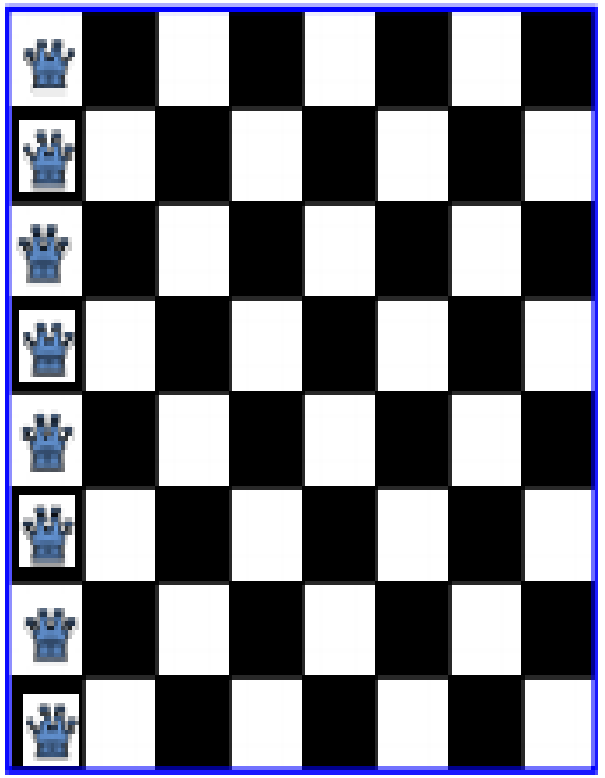
N-queen Problem Formulation 1

- States: Any arrangement of 0 to N queen on the board
- Initial State: 0 queens on the board
- Successor function: Add a queen in any square
- Goal State: N queen on the board, none are attacked.



N-queen Problem Formulation 2

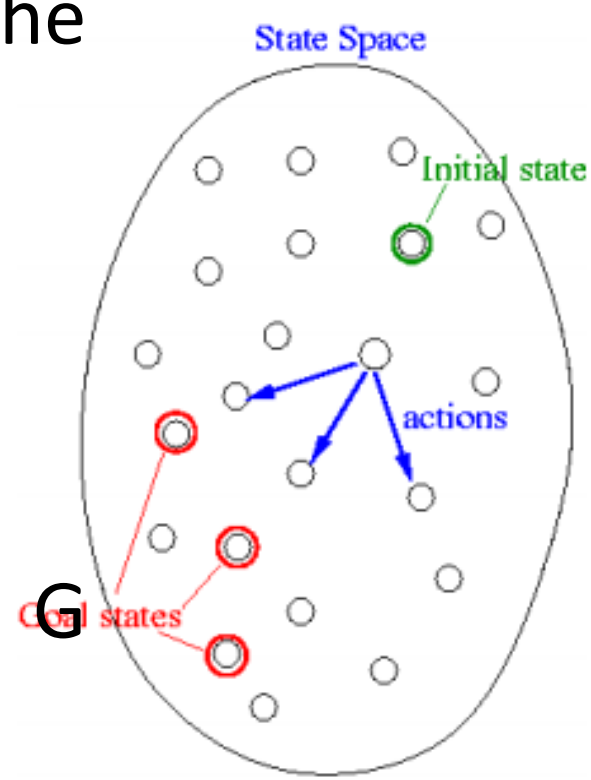
- States: Any arrangement of 0 to N queen on the board
- Initial State: All queen are at column 1
- Successor function: Change the position of any queen.
- Goal State: N queen on the board, none are attacked.



Search Problem

A search problem consists of the following:

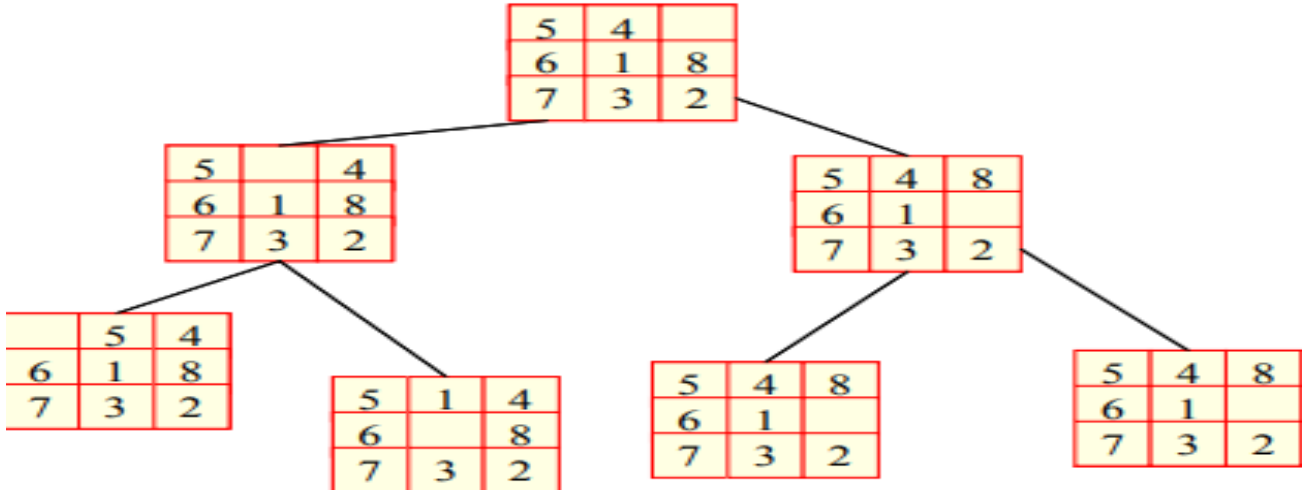
- S: the full set of state
- s0: the initial state
- A: A set of operators
- G is the set of final state. G is a subset of S



Representation of Search Problem

A search problem is represented using a directed graph.

- The states are represented as nodes
- The allowed actions are represented as edges



Searching Process

Do until a solution is found or state space is exhausted

1. Check the current state.
2. Execute allowable actions to find the successor states.
3. Pick one of the new states.
4. Check if new state is a solution state. If it is not, the new state become the current state.

Thank you