Chapter 3

1 Problem Solving Process

1. Goal forumlation
2. Problem formulation
3. Search
4. Execution

2 Search Problems and Solutions

A search problem can be defined formally as follows:

- A set of **all states**, called the **state space**
- **initial state**
- One or more **goal states**
- The **actions**
  - Given a state s, a function $ACTIONS(s)$ returns a finite set of actions that can be executed in s
- A **transition model**, describes what each action does
  - $RESULT(s, a)$ returns the state that results from doing action a in state s
- An **action cost function**, denoted by $ACTION - COST(s, a, s')$. It gives the numeric cost of applying action a in state s to reach state s'.

A search algorithm can be conducted to find:

- A **solution** is a path of actions sequence from the initial state to the goal state
- An **optimal solution** is the lowest path cost among all students

3 Formulating Problems

- When formulating a problem, we are creating a **model**
- A **model** is an abstract mathematical description and not a real thing
- **Abstraction** is the process of removing details from a presentation
- One issue is finding a suitable **Level of Abstraction**