1 Artificial Intelligence

- An **agent** is an entity that can perceive and act. This course is about designing rational agents.
- Rational behavior: doing the right thing.
- Environment Types: Fully observable; Deterministic; Episodic; Static, Discrete; Single-agent. The counter part: partially observable; stochastic; sequential; dynamic; continuous; multi-agent.
- An agent is anything that can be viewed as perceiving its environment through sensors and acting upon that environment through actuators.

2 Problem Solving

- A search problem consists of
  - a state space
  - a successor function (namely **update function** in data mining algorithm series)
  - a start state (**initial value**), goal test (**terminating value**) and path cost function (**we say weights in Graph Theory**)
- Problems are often modelled as a state space, a set of states that a problem can be in. The set of states forms a graph where two states are **connected** if there is an operation that can be performed to transform the first state into the second.
- A solution is a sequence of actions (a plan) which transforms the start state to a goal state.
- **State space graph**: A mathematical representation of a search problem.
- **Search Trees**
  - This is a what if tree of plans and outcomes
  - For most problems, we can never actually build the whole tree
- **General Tree Search** Frontier; Expansion; Exploration Strategy.
- **States vs. Nodes** Nodes in state space graphs are problem states; Nodes in search trees are plans. The same problem state may be achieved by multiple search tree nodes.