COMP1021
Introduction to Computer Science

# State Diagrams

David Rossiter and Gibson Lam

---

# Outcomes

- After completing this presentation, you are expected to be able to:

    1. Understand and explain a state diagram

---

# A State Diagram

- The basic idea of a state diagram is that it shows the various stages in a process and what needs to happen to move between those stages
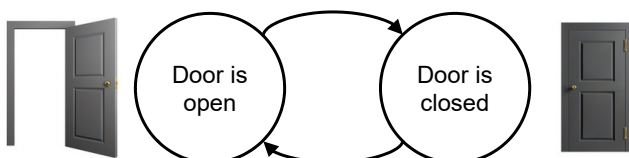
---

# States

- States are commonly represented by circles or rectangles
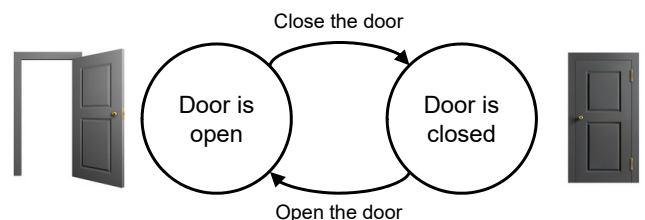- Here are examples showing the states of a door

---
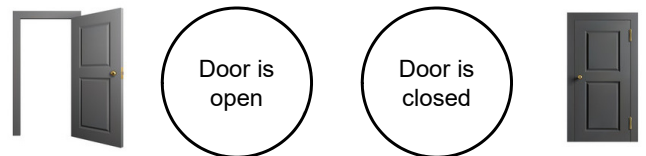
# Transitions

- To show the process of moving from one state to another, an arrow links the states
- We call this a *transition*
- In our door example, the door changes between open and closed

---

# Transition Actions

- Sometimes, an action is associated with a transition
- It needs to occur in order to go from one state to another

# The Starting State

- You may want to indicate the starting state, i.e. the initial state the process is in
- Sometimes the initial state is shown by an incoming arrow with a black circle, like this:
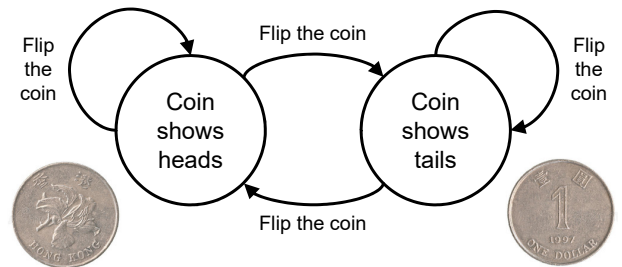
The starting state is 'door is open'

Close the door

Door is open

…

Open the door
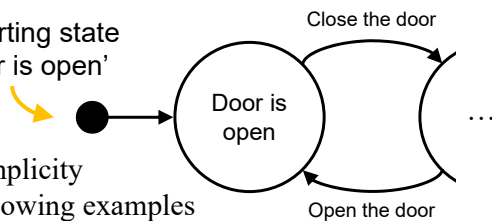
- For simplicity the following examples do not show the starting state

---

# Flipping a Coin

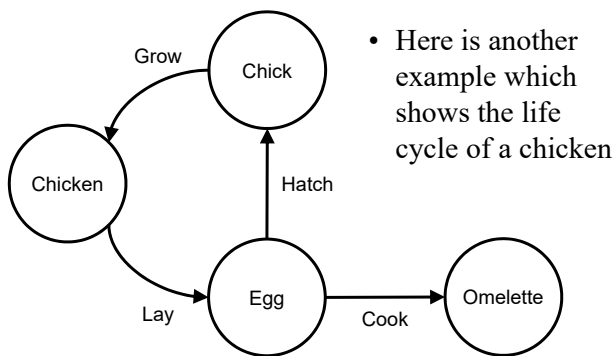- Here is another example in which a coin is continually flipped

Flip the coin

Flip the coin

Flip the coin

Coin shows heads

Coin shows tails

Flip the coin

---

# Life Cycle of a Chicken

Grow

Chick

Chicken

Hatch

Lay

Egg

Cook

Omelette

- Here is another example which shows the life cycle of a chicken
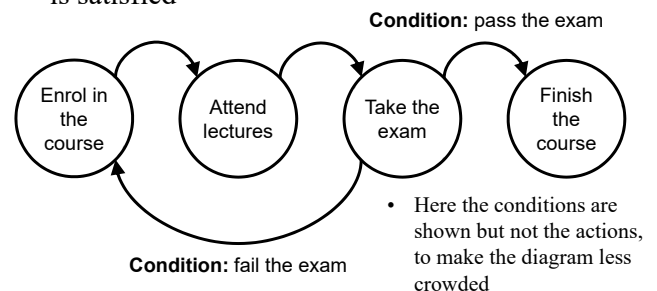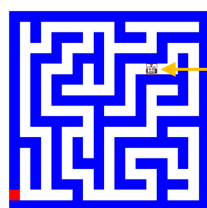
---

# Transition Conditions

- Transitions may have an associated condition
- A transition can only occur when the condition is satisfied

**Condition:** pass the exam

Enrol in the course

Attend lectures

Take the exam

Finish the course

**Condition:** fail the exam

- Here the conditions are shown but not the actions, to make the diagram less crowded

---

# Our Final Lab

- State diagrams can be used to visualize lots of different processes

- In our final lab we will use state diagrams to help us understand the stages necessary to help a robot get to the exit of a maze

- *The robot*

- *The exit*