

State Diagrams

Part a: Introduction

Ian Ludden

Learning Objectives

By the end of this lesson, you will be able to:

Learning Objectives

By the end of this lesson, you will be able to:

- Read and interpret basic notation for state diagrams.

Learning Objectives

By the end of this lesson, you will be able to:

- Read and interpret basic notation for state diagrams.
- Trace walks in a state diagram.

Learning Objectives

By the end of this lesson, you will be able to:

- Read and interpret basic notation for state diagrams.
- Trace walks in a state diagram.
- Define a deterministic state diagram.

State diagrams represent discrete systems.

State diagrams represent discrete systems.

Definition

A **state diagram** is a directed graph in which:

State diagrams represent discrete systems.

Definition

A **state diagram** is a directed graph in which:

- nodes represent states of some system, and

State diagrams represent discrete systems.

Definition

A **state diagram** is a directed graph in which:

- nodes represent states of some system, and
- edges represent actions, or **transitions**, between states.

State diagrams represent discrete systems.

Definition

A **state diagram** is a directed graph in which:

- nodes represent states of some system, and
- edges represent actions, or **transitions**, between states.

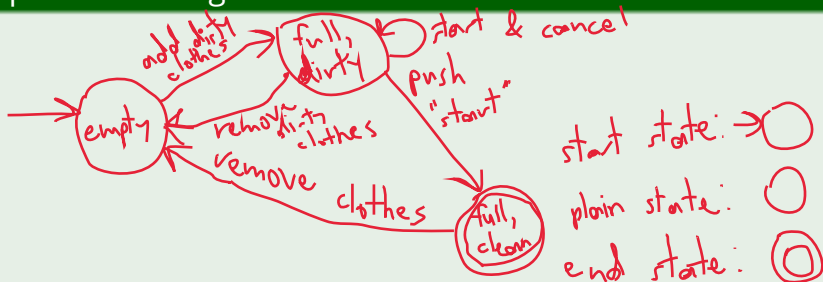
State diagrams represent discrete systems.

Definition

A **state diagram** is a directed graph in which:

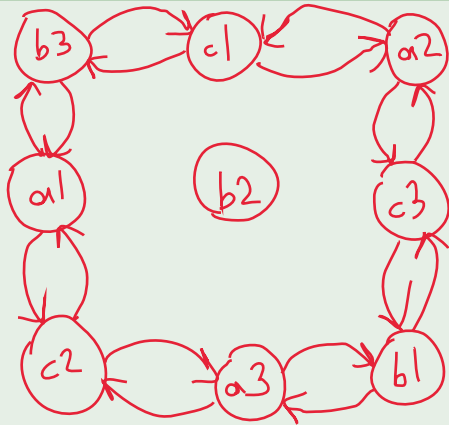
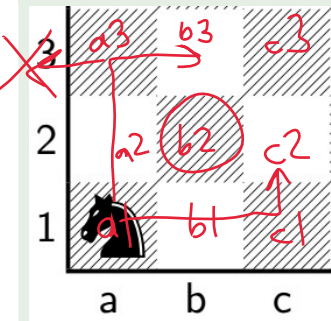
- nodes represent states of some system, and
- edges represent actions, or **transitions**, between states.

Example 1: Washing Machine



State diagrams represent discrete systems.

Example 2: Knight on 3×3 Chess Board



State diagrams represent discrete systems.

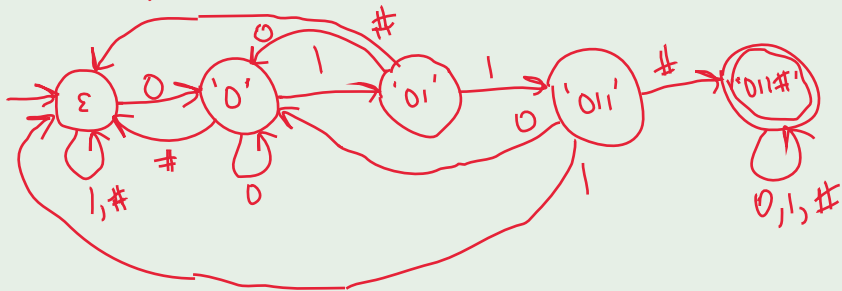
Example 3: Garage Door Keypad

011# $A = \{0, 1, \#\}$

End/accept state: door is open

1011011# ✓

011101# ✗



Deterministic: \exists exactly one edge leaving each state for each action.

Recap: Learning Objectives

By the end of this lesson, you will be able to:

- Read and interpret basic notation for state diagrams.
- Trace walks in a state diagram.
- Define a deterministic state diagram.