Feedback Control Systems

- A collection of hardware and software for commanding, directing or regulating a physical plant.
- The key state information represents basic system information that can be measured or detected - position, speed, on/off, open/closed, ...
- Two types of control - Closed-loop and open-loop.
The Closed Loop System

System State Variables

Sensors

Analog/Digital Interface

ADC

Software

State Estimator

Physical Plant

Disturbing Forces

X(t)

Y(t)

V(t)

U(t)

Actuators

Control Software

Compare

X*(t) - X'(t)

Desired State X*(t)

Closed Loop System

X(t)

X'(t)

X*(t)
Open Loop System

- An open-loop system has no state estimator.
- For example, a toaster.

Heat On --> Wait 3 minutes --> Heat Off
More Open-Loop Systems

• A traffic light for two one-way streets
  ◦ Use a simple finite-state automata
Closed-Loop Systems

- A temperature control system.