CSC9006: Real-Time Systems

Lecture 1: The Real-Time Environment

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Real-world real-time systems

- Electronic Stability Control (ESC) in a car
  - https://www.youtube.com/watch?v=LVz9f5WQhCI
- Rolling mills
  - https://www.youtube.com/watch?v=LWM6b8P0r3E
  - https://www.youtube.com/watch?v=h7XtOlQB6oY

- Real-time strategy games
  - https://www.youtube.com/watch?v=bCwJjelux0E

Requirements for real-time systems

- Functional requirements
  - Sensing and actuating
  - Human-computer interface (HCI)
- Temporal requirements
  - Deadline (more on this later)
- Dependability requirements
  - Reliability
  - Availability

(Blackboard sessions)

- Real-time systems and real-time environment
  - Operator cluster, computational cluster, and controlled cluster
- Illustrations for reliability and availability
  - Bathtub curve and predictive maintenance
- Example: temperature control
  - sensing + computing + actuating
  - End-to-end response time
  - Settling time and overshoot in control

Summary

- Course logistics
  - Visit the course website for latest information
  - Submit your homework assignments and view scores via Moodle
- TODOs
  - Start to work on Homework 0 today
  - Set up your email address on Moodle to receive course notifications
  - Reading assignments
    - This lecture: Chapter 1
    - Next lecture: Chapter 9

The QR code for the course website