CMSC 330: Organization of Programming Languages

Project 5

Multithreaded Simulation

- Goal
  - Implement multithreaded Metro simulation in Ruby
    - Separate threads for trains, passengers
    - Monitors to avoid data races
  - Implement simulation verifier in Ruby
    - Examine log file of simulation
    - Determine whether simulation output is consistent

Metro Simulation

- You are given
  - List of metro lines & stations on each line
  - List of passengers & their stops

- You need to simulate
  - One train per metro line
    - Train goes up & down line, stopping at each station
  - Passengers
    - Passengers board & leave trains

Simulation Verifier

- Analyze simulation output for feasibility
  - Trains start at their initial station
  - Trains move forward and backward along their lines
  - Trains enter a station before they leave it
  - 2 trains are not at the same station at the same time
  - Passengers follow their path as given in input
  - Passengers only board & leave train when in station
  - Passengers get to where they're going
  - No extra passengers on trains

Simulation Output

- Example
  - Train green leaving Fort Totten
  - Train blue entering L'Enfant Plaza
  - Train red entering Fort Totten
  - Train yellow entering Pentagon
  - Paul boarding train yellow at Pentagon
  - Train green entering Gallery Place
  - Train red leaving Fort Totten
  - Train blue leaving L'Enfant Plaza
  - Train yellow leaving Pentagon
  - Train green leaving Gallery Place