Computational Thinking by Analogy

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Describe the algorithm
Computational Thinking

Computer science concepts applied across a variety of domains

Including:
- Data Representation
- Problem Decomposition
- Abstraction
- Algorithms
- Simulation
- Parallelization
My bias

- Anti-programming (sort of)
- Pro-models
- Complex ideas abstracted
Scheduling algorithms

• “Pure” computer science
• Applicable to real life
• Focused on a few algorithms:
  o Round Robin
  o Simple Priority
  o Lottery
  o Shortest Job First
  o Credit-based fair queueing
Curriculum

1. What is scheduling?
2. Algorithm presentations & role plays
3. Read Netlogo code & examine simulation
4. Field trip to traffic light – data collection
5. Create model
6. Modify simulation
7. Add additional algorithms to simulation
NetLogo

http://ccl.northwestern.edu/netlogo/
Exam questions

• Describe what you think should happen with the traffic light when a train signals that it is coming? Be specific.

• Why does shortest job first not work at a traffic light? What would make it work?

• Throughput is how many cars go through an intersection. Waiting time is how long cars have to wait before they can go. You know what fairness is. Between throughput, waiting time, and fairness, which is the most important in scheduling? Defend your answer.
What’s hot & what’s not

• Read before write
• Struggling through with students
• Having extra help
• Some programming experience better than none
• Freedom to get the wrong answer/not understand the whole system
Questions?

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