

Discussion 02/09/18

2/09/2018

Name:

Instructions. You will be randomly assigned groups to work on these problems in discussion section. List your group members on your worksheet and turn it in at the end of class.

1. **Construction.** You're running a company contracted to build dorms at UMass Amherst. Each dorm has a basement, a living space, and a roof. These three components must be built in that order. The college has designed each dorm, and each dorm component will need a certain predictable amount of time to build.

Dorm	Basement Time	Living Space Time	Roof Time
Anderson	2 days	2 days	3 days
Burleson	3 days	2 days	2 days
Ciesielski	4 days	3 days	2 days

For legal reasons, your company can only be working on one basement at any given time. However, your company can work on any number of living spaces and roofs in parallel with a basement.

You want to build your dorms in an order such that the last dorm to finish being built will be finished as soon as possible. What is a good ordering of the dorms? What is a general strategy that you used?

2. **Computational Scheduling.** Suppose we have a scheduler trying to schedule jobs on a computer cluster with a limited number of resources available. Assume that these compute jobs have a start time (external resources like a database may not be available until a certain time), and a runtime. Jobs cannot be started until their start time, and then they run for the prescribed run time. During this time no other jobs can be scheduled.

As the head of this cluster, we can choose a policy to schedule the jobs and we'd like to minimize the last finishing time (i.e., the finishing time of the last job in the queue). Lets analyze some possible policies:

- (a) **Sort by start time.** What happens if we run the jobs by the start time? Is this guaranteed to be optimal? Why or why not?
- (b) **Sort by runtime.** What happens if we run the jobs by their runtime? Is this guaranteed to be optimal? Why or why not?
- (c) **Sort by finish time.** What happens if we run the jobs sorted by their finishing time? Is this guaranteed to be optimal? Why or why not?