Homework 9

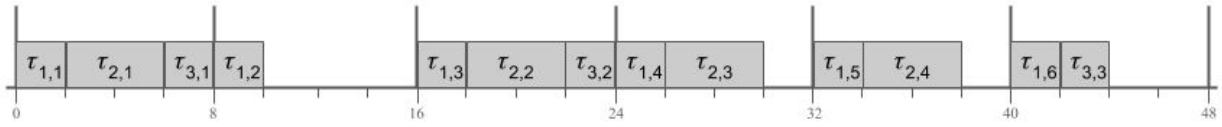
(90 points)

Part 1 - Scheduling with RM and Cyclic Executive

1. Draw the time demand graph for the third task of the task set below; that is, include all jobs of the third task and higher priority tasks (by RM) in the time demand. Draw the graph for time t=0 to t=47. For each increase in demand, indicate which job(s) it corresponds to. What is the length of the busy interval for the third task?
(T, C)= (8, 2), (17, 9), (24, 4), (45, 2). (25 points)

2. Create a cyclic executive schedule of the tasks (T, C) = (6, 1), (10, 3), (12, 2), (15, 5). State what the hyperperiod is and what frame size you choose. Recall a job can only be added to a frame that begins at or after the job's release time. Additionally, a job's deadline must happen at the end of the frame in which it is scheduled or later. These constraints may require trying several frame allocations for the jobs. (15 points)

3. Using the cyclic executive schedule of periodic work shown below, show how the following aperiodic work can be scheduled by using slack stealing. Schedule this work in order of earliest deadline and assume that the aperiodic work can be preempted.
(r, C, D) = (8, 7, 26), (30, 4, 48), (33, 2, 45) (15 points)



Part 2 - Reading Questions

1. Slack Stealing can be used with RM as described in our book. Draw the RM schedule of the tasks (T, C) = (6, 2), (8, 3) from t=0 to t=24 and indicate the earliest slack available as done in the book. Then, draw the function A(0, t) and the function A(10, t). Based on these functions, when would an aperiodic job (r, C) = (0, 4) complete? If the release time of this job were instead 10 (so (r, C) = (10, 4)), when would it complete? (20 points)

2. For this question, search the internet or reference an algorithms textbook. In your own words, what is the P vs. NP question and why is it important? What does it mean for a problem to be NP-hard? What is one example of an NP-hard problem. Cite at least one source (and cite all sources you used to answer this question). (15 points)

Feedback

1. How much time did you spend completing this assignment (ignoring interruptions)?
2. How much time did you spend doing the assigned reading (ignoring interruptions)?
3. How much time did you spend doing Programming Assignment 3?
4. Any other feedback?