

Monsoon 2020

Course: Real-Time Systems

Quiz 2

Instructions:

Relative Deadline for the test = 45 mins.

All questions carry 2 marks.

For questions with multiple correct choices, 2 marks will be given only if all the correct choices are selected. If a wrong choice is selected, you will be given 0 marks. If you select any correct choice with no wrong choices, then you will get 1 mark.

- 1) What is/are true about EDF scheduling algorithm?
 - a) Task-level dynamic-priority algorithm
 - b) Job-level dynamic-priority algorithm
 - c) Assigns different priorities to jobs of a task
 - d) Assigns same priorities to jobs of a task
- 2) When the relative deadlines are arbitrary, which of the following may be true?
 - a) Deadline Monotonic (DM) algorithm fails but Rate Monotonic (RM) algorithm produces a feasible schedule
 - b) DM algorithm fails and the RM algorithm fails
 - c) DM algorithm produces a feasible schedule while RM algorithm fails
 - d) None of the above
- 3) In a 2-task system scheduled by RM, task T_1 is higher priority task and task T_2 is lower priority task. What is/are true about the slack values of the T_1 and T_2 ?
 - a) The slack of T_1 may vary and the slack of T_2 is always constant with respect to time
 - b) The slack of T_1 and T_2 both are constant with respect to time
 - c) The slack of T_1 is always constant and the slack of T_2 may vary with respect to time
 - d) The slack of T_1 and T_2 both may vary with respect to time
- 4) For a 3 task system $\{T_1, T_2, T_3\}$ scheduled by Strict Least-Slack-Time-First algorithm, let us assume that at time t , T_1 has slack value 2, T_2 and T_3 both have slack value 5. Assuming all the tasks are schedulable, what may be true about the schedule?
 - a) The tasks finish execution in the order T_2, T_1 and T_3
 - b) The tasks finish execution in the order T_1, T_3 and T_2
 - c) The tasks finish execution in the order T_2, T_3 and T_1
 - d) The tasks finish execution in the order T_1, T_2 and T_3
- 5) Given the total utilization of a task set is 0.8, what can you tell about the schedulability of the task set with RM scheduling?
 - a) The task set will be schedulable
 - b) The task set may not be schedulable if the periods of the tasks are not related
 - c) The task set will be schedulable if the periods of the task are multiples of each other
 - d) All of the above
- 6) For the following task set, what can you tell about the schedulability?

τ_i	e_i	p_i	D_i
τ_1	8	10	10
τ_2	0.9	18	18
τ_3	0.6	20	20

- a) The task set is schedulable using EDF and RM
- b) The task set is schedulable using EDF but not RM
- c) The task set is not schedulable using EDF or RM
- d) The task set is not schedulable

7) Is the following task set schedulable? If yes/no, briefly explain what test you used to conclude that.

τ_i	e_i	p_i	D_i
τ_1	3	5	5
τ_2	2	10	10
τ_3	2	20	20

8) Find the schedulability of the following task set using an exact schedulability test.

τ_i	e_i	p_i	D_i
τ_1	1	3	3
τ_2	1.5	5	5
τ_3	1.25	7	7

9) For the task system $T_1(1,0.6,2)$ and $T_2(5,2.3,4)$, what is/are true about its schedulability?

- a) It is schedulable by EDF and DM algorithms
- b) It is schedulable by EDF but not by DM
- c) It is not schedulable
- d) None of the above

10) For the task set $T_1(5,1)$, $T_2(3,1)$, $T_3(7,2.5)$ and $T_4(16,1)$, are all tasks schedulable? If no, which task/tasks is/are not schedulable?

11) Given a number of task sets N , if we perform the schedulability tests using the Liu and Layland bound and the Hyperbolic bound on all the task sets, we get the number of task sets schedulable with each bound given by n_{LL} and n_H respectively. What is/are always true from the following?

- a) $n_{LL} \leq n_H$
- b) $n_{LL} < n_H$
- c) $n_{LL} = n_H$
- d) $n_{LL} > n_H$

12) Please determine the schedulability of the periodic task set $T_1(10,2)$, $T_2(12,5)$ and $T_3(15,4)$ under RM scheduling.