

L6 RT Scheduling

1. Which of the following is NOT a key requirement of a Real-Time Operating System (RTOS)?

- A. Timeliness
- B. Predictability
- C. Maintainability
- D. Average Throughput

Answer: D

2. A periodic task is characterized by which three attributes?

- A. (C_i, T_i, D_i)
- B. (C_i, J_i, D_i)
- C. (T_i, D_i, R_i)
- D. (C_i, T_i, R_i)

Answer: A

3. For Rate Monotonic (RM) scheduling with harmonic task periods, what is the utilization bound?

- A. 0.828
- B. 0.780
- C. 0.693
- D. 1.0

Answer: D

4. Which schedulability test is both necessary and sufficient for Earliest Deadline First (EDF)?

- A. Utilization bound $U \leq N(2^{1/N} - 1)$
- B. Utilization bound $U \leq 1$
- C. Response Time Analysis (RTA)
- D. None of the above

Answer: B

5. The Mars Pathfinder priority inversion issue was resolved using:

- A. Rate Monotonic Scheduling
- B. Priority Inheritance Protocol (PIP)
- C. Least Laxity First (LLF)
- D. Static Cyclic Scheduling

Answer: B

6. In Least Laxity First (LLF) scheduling, priority is determined by:

- A. Absolute deadline
- B. Remaining execution time
- C. Laxity $(d_i - t - e_i)$
- D. Task period

Answer: C

7. Dhall's effect primarily affects which scheduling algorithms in multiprocessor systems?

- A. LLF and EDF
- B. RM, DM, and EDF
- C. Static Cyclic Scheduling
- D. Partitioned Scheduling

Answer: B

8. A sporadic task is defined by having:

- A. Arbitrary interarrival times
- B. A minimum interarrival time constraint
- C. Periodic activation
- D. No deadline

Answer: B

9. Which type of jitter refers to the variation in the time between a task's start and finish?

- A. Start-time jitter
- B. Finish-time jitter
- C. Completion-time (I/O) jitter
- D. Activation jitter

Answer: C

10. A feasible schedule is defined as one where:

- A. Tasks execute in harmonic periods
- B. All tasks complete within specified constraints
- C. Utilization exceeds 0.69
- D. No preemption occurs

Answer: B

11. A set of tasks is schedulable if:

- A. Its total utilization is ≤ 1
- B. It passes the Rate Monotonic bound test
- C. There exists at least one feasible schedule
- D. All tasks are periodic

Answer: C

12. Partitioned scheduling in multiprocessor systems is analogous to:

- A. Global queue management
- B. Bin-packing problem
- C. Priority inversion
- D. Work-conserving scheduling

Answer: B

13. Global scheduling is characterized by:

- A. Assigning tasks to specific processors
- B. Work-conserving behavior with a common queue
- C. Using harmonic periods for all tasks
- D. Prohibiting task migration

Answer: B

14. The recursive equation for Response Time Analysis (RTA) for Fixed-Priority Scheduling is guaranteed to converge to a finite value.

- A. True
- B. False

Answer: B