

Homework 11

(54 points)

“On a Real-Time Scheduling Problem”

1. By looking at the abstract and the conclusion, make a bullet point list of the main contributions of this paper. (4 points)
2. List two open problems stated as possible future work in the conclusion. (4 points)
3. After reading Section 1, on what types of systems and algorithms does this paper focus (deadline type, preemptive or non-preemptive, synchronous or asynchronous)? (6 points)
4. Illustrate the example given in Section 2 from time $t=0$ to time $t=1+\epsilon$. Assume there are four processors and five tasks and that ϵ is small. Clearly indicate which job is running on each processor. (10 points)
5. Look up the bin packing problem. Briefly describe the problem and state its computational complexity. Cite any sources you use. (6 points)
6. How does task partitioning correspond to the bin packing problem? (2 points)
7. Briefly describe the RM-Next-Fit and RM-First-Fit approaches. (6 points)

“LITMUS^{RT}: A Testbed for Empirically Comparing Real-Time Multiprocessor Schedulers”

8. Which scheduling algorithms are being compared in this paper? (2 points)
9. Why was LITMUS^{RT} built by modifying Linux instead of by using some other approach? (2 points)
10. Look at Figure 4(b) and Figure 4(c), as well as the text corresponding to these two figures. What is shown in these figures? What are the main takeaways? Based on these graphs alone, which scheduler would you choose to use? (12 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. Any other feedback?