Lab 5 Results and Conclusions
ECE 5780/6780 - Embedded Real-Time Systems
Michael Skillings
Ryan Zaugg

RM/RMA is a static priority algorithm which assigns task priorities based on their periods. Because shorter tasks are given a higher priority, fewer preemptions occur compared to EDF and LLF. EDF and LLF are both dynamic priority algorithms which require additional overhead to implement. EDF assigns priorities based on which tasks have the earliest deadline and LLF considers which task has the earliest deadline and the least laxity (time remaining before the deadline compared to their execution time). Generally speaking, EDF and LLF have more preemptions than RMA-based algorithms. Between EDF and LLF, LLF tends to have fewer preemptions, though it depends on the specific tasks being scheduled.

RMA doesn't guarantee an optimal system and tasks often miss their deadlines when the system is overloaded. EDF is optimal and guarantees deadlines will be met if the system is schedulable. As long as the system isn't overloaded, EDF will rarely or never miss deadlines. LLF also guarantees some level of optimality, though the guarantee isn't as strong as EDF. If the system is burdened or has particularly strict timing requirements, LLF will miss deadlines before EDF does.

The scheduling algorithms themselves weren't particularly hard to implement. Each one took no more than 15 minutes to write. The whole system setup that reads the input files, writes to the output files, and is capable of dynamically switching between scheduling algorithms took much longer to put together and test.

In conclusion, this lab was straightforward, but time-intensive as we designed, implemented, and tested the simulator. We feel we have a much better grasp on the scheduling algorithms discussed in class and better understand the key benefits and drawbacks of each. We promise to never actually use LLF and to only use RMA in situations where there exist dramatic computation or memory restrictions.