Real-Time Systems Project 1

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In the current project, we have written and executed a source code for simulators for rate-monotonic and earliest deadline first scheduling schemes. In rate-monotonic scheduling the priorities of the tasks is fixed. The task having the smallest period is always given the highest priority. Therefore, at every time instance, whichever task is available and has the smallest period will be scheduled first regardless of the deadline. In the case of earliest deadline first, the priorities of the tasks is not fixed, it changes at every time instance. At every time instance, if a set of tasks are available then the absolute deadline of each task is calculated and the task having the closest absolute deadline is scheduled first.

The RM and EDF simulators created as a part of this project were tested on 2 task sets: one in which the task sets had a utilization of atleast 0.9 but less than 1 and one in which the task sets were overloaded i.e., the utilization of the tasks was more than one. Now, when the RM and the EDF simulator were tested with the task set having utilization less than 1, there were some differences in the way the tasks got scheduled. In case of RM, the number of preemptions were more than that of EDF. Also, in the case of RM the there was an instance when the lowest priority task was dropped whereas in case of EDF no tasks were dropped. This is because this task set contained 5 tasks with implicit deadlines and the utilization upper bound for 5 tasks to be scheduled according to RM is 74.3% but he utilization in this case was 96.67%. However, for the tasks to be scheduled by EDF just utilization has to be less than 1.

Now, when the RM and EDF simulators were tested with an overloaded task set, the result was a bit different. The total number of times any tasks were dropped increased in both the cases. However, in this case too the number of preemptions and task drops(deadline misses) were more in the case of RM than EDF. The highest priority task in the case of RM never gets dropped for either task sets nor does it get preempted.