TCES 420 - Week 10

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Homework 8

1)

1-Assume three periodic tasks in a real time system:

TA: $T = 4$, $P = 1$; TB: $T = 6$, $P = 2$; TC: $T = 8$, $P = 2$;

a)Apply Earliest Deadline Scheduling(EDS). Show your result in a timing diagram.

b)Is Rate Monotonic Scheduling (RMS) possible? Prove your point by a timing diagram sketch.

c)Replace TCwith (T=6, P=1). Repeat part b.

2)

Propose a method to implement EDS in RTX.

EDS, to my understanding, priority is is given out to each process dynamically based on each individual processes deadline. We can find what is known as a hyper period by taking the LCM of all the periods. This gives use the period for all the processes. The global interval can be found by taking the GCD of all the process intervals. The size of our table will then be the division of Global Period/Global Interval. The Table pointer is then $(i+1)\%$the size of the table.

If there is a change within processes to fix the issue, like with your Mars example, you must decrement the prior task to last in the priority queue. This ensures there are no processes hogging up the queue.

3)

Propose a method to implement RMSin RTX.

RMS maps one-to-one to a real time operating system and lends itself well to RTOS for this reason.

4)

Propose a method to implement Earliest Start Timein RTX.

Sort the start deadlines by start deadlines then put them in a queue. This list of processes are now scheduled based on this queue. In the interrupt service routine a scheduler is implemented based on current state, where if the next state is different it switches priority. If there are no tasks to schedule, schedules the idle task.

5)

In a multicore system, on which processor(core?) the OS is running?

The OS can exist on any core at any time.