

CMPE 117 - Embedded Software

Homework 3

Spring Quarter 2003

Due Tuesday April 29

Question 1 [40 points]

Consider three **periodic** processes J_1, J_2, J_3 , with computation times C_i and periods T_i given by, for $1 \leq i \leq 3$:

	C_i	T_i
J_1	1	4
J_2	4	10
J_3	3	12

Question 1, Part 1 [10 pt] Are J_1, J_2, J_3 schedulable by the Rate Monotonic algorithm?

Question 1, Part 2 [10 pt] Assume now that the processes have deadlines shorter than the periods:

$$D_1 = 3 \quad D_2 = 8 \quad D_3 = 9$$

Are the processes schedulable by the Deadline Monotonic algorithm?

Hint: since $T_1 < T_2 < T_3$ and $D_1 < D_2 < D_3$, RM and DM assign the same priorities to the three processes. Hence, you may be able to reuse some work from Part 1.

Question 1, Part 3 [20 pt] Are the processes, with deadlines D_1, D_2, D_3 , schedulable by some algorithm?

Question 2 [30 points]

Consider two **periodic** processes J_1, J_2 , with computation times C_i and periods T_i given by, for $1 \leq i \leq 2$:

	C_i	T_i
J_1	2	4
J_2	3	6

Question 2, Part 1 [15 pt] Are the above periodic processes schedulable by EDF?

Question 2, Part 2 [15 pt] Consider now the case where there are deadlines shorter than the periods, with $D_1 = 3$ and $D_2 = 5$. Are the processes still schedulable by EDF?

Question 3 [30 points]

Consider four *periodic* processes J_1, J_2, J_3, J_4 with periods, computation times, and deadlines (relative to the period) as follows:

	T_i	C_i	D_i
J_1	10	2	6
J_2	10	2	5
J_3	10	3	8
J_4	10	2	9

Assume also that J_2 and J_3 can start only after J_1 has terminated, and that J_4 can start only after both J_2 and J_3 terminate.

Question 3 [30 points] Are the processes schedulable? If so, give a schedule; otherwise, explain why not.