

CMPE 117 - Embedded Software Homework 1

Winter Quarter 2004

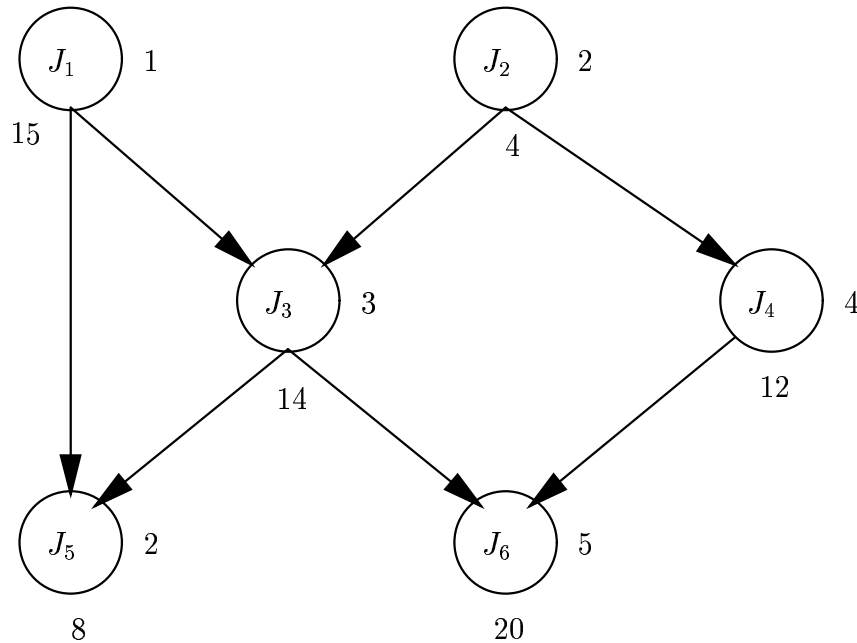
Due Tuesday February 3rd

Question 1 [20 points]

Consider six **aperiodic** processes $J_1, J_2, J_3, J_4, J_5, J_6$ with release times 0, computation times C_i and deadlines D_i given, for $1 \leq i \leq 6$, by:

	C_i	D_i
J_1	1	15
J_2	2	4
J_3	3	14
J_4	4	12
J_5	2	8
J_6	5	20

and with the dependency relation indicated below:



Question 1, Part 1 [10 pt] Are the processes schedulable? Explain.

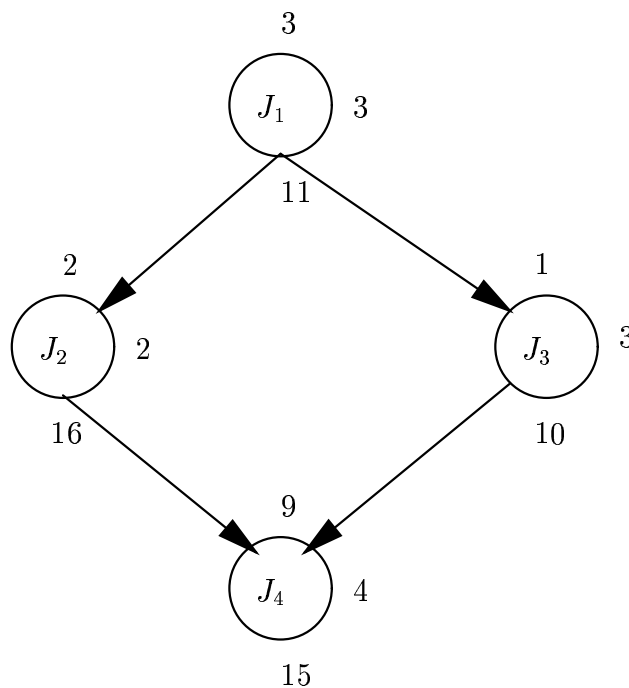
Question 1, Part 2 [10 pt] What is the maximum lateness?

Question 2 [20 points]

Consider four **aperiodic** processes J_1, J_2, J_3, J_4 with computation times C_i , release times r_i , and deadlines D_i given, for $1 \leq i \leq 4$, by:

	r_i	C_i	D_i
J_1	3	3	11
J_2	2	2	16
J_3	1	3	10
J_4	9	4	15

and with the dependency relation depicted below:



Question 2, Part 1 [10 pt] Modify release times and deadlines to schedule the processes with EDF. Suggestion: do it on the picture on the previous page.

Question 2, Part 2 [10 pt] Schedule the resulting processes with EDF. Are they schedulable?

Question 3 [20 points]

Consider four **aperiodic** processes J_1, J_2, J_3, J_4 with computation times C_i , release times r_i , and deadlines D_i given, for $1 \leq i \leq 4$, by:

	r_i	C_i	D_i
J_1	3	5	13
J_2	0	4	16
J_3	5	4	10
J_4	1	5	17

Assume that there is no dependency relation between the processes.

Question 3, Part 1 [5 pt] Are the processes schedulable by EDF? If yes, draw a schedule, if not, explain why.

Question 3, Part 2 [5 pt] Are they schedulable by any other method than EDF? Explain.

Question 3, part 3 [5 pt] Are J_1, J_2, J_3 schedulable? If yes, give the schedule, if not, explain why.

Question 3, part 4 [5 pt] Are J_1, J_2, J_3 schedulable, if pre-emption is not allowed? If yes, give the schedule, if not, explain why.

Question 4 [20 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	2	6
J_3	3	8

Question 4, Part 1 [10 pt] Are J_1, J_2, J_3 schedulable by the Rate Monotonic algorithm?

Question 4, Part 2 [10 pt] Are J_1, J_2, J_3 schedulable by any other algorithm? If Yes, say which one, and explain why. If No, say why.

Question 5 [20 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 5, Part 1 [10 pt] Are the above periodic processes schedulable by EDF?

Question 5, Part 2 [10 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?