

# CMPE 117 - Embedded Software Homework 2

Spring Quarter 2003

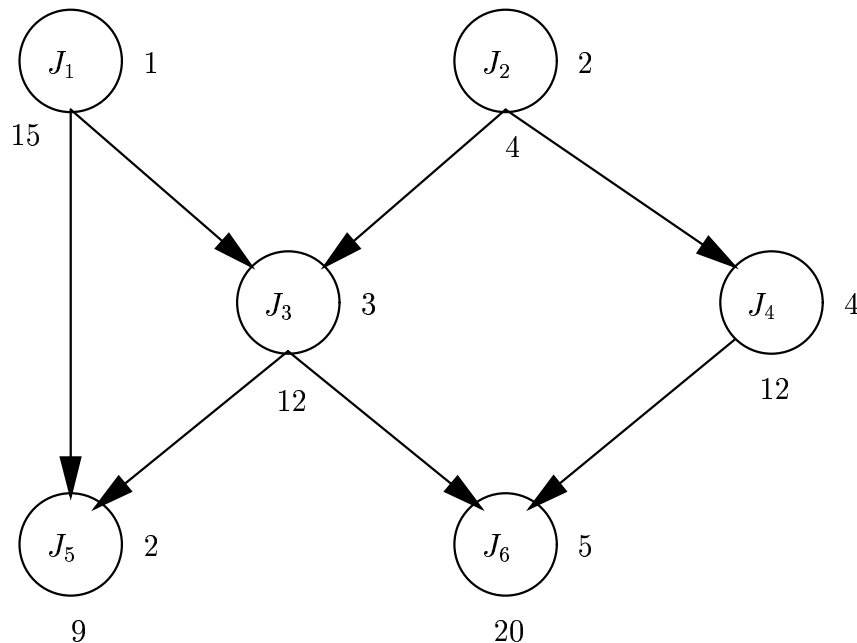
Due Tuesday April 22

## Question 1 [30 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	12
$J_4$	4	12
$J_5$	2	9
$J_6$	5	20

and with the dependency relation indicated below:



**Question 1, Part 1 [20 pt] Are the processes schedulable? Explain.**

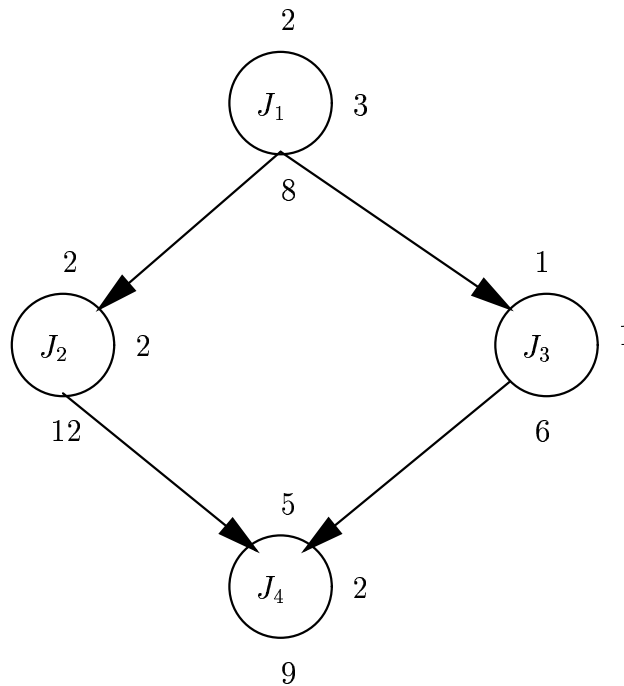
**Question 1, Part 2 [10 pt] What is the maximum lateness?**

## Question 2 [30 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:

	$r_i$	$C_i$	$D_i$
$J_1$	2	3	8
$J_2$	2	2	12
$J_3$	1	1	6
$J_4$	5	2	9

and with the dependency relation depicted below:



**Question 2, Part 1 [20 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 [40 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:

	$r_i$	$C_i$	$D_i$
$J_1$	2	3	8
$J_2$	2	2	12
$J_3$	1	1	6
$J_4$	5	2	9

Assume that there is no dependency relation between the processes.

**Question 3, Part 1 [10 pt]** Are the processes schedulable by EDF? If yes, draw a schedule, if not, explain why.

**Question 3, Part 2 [10 pt]** Are they schedulable by any other method than EDF? Explain.

**Question 3, part 3 [10 pt]** Are  $J_1, J_2, J_3$  schedulable? If yes, give the schedule, if not, explain why.

**Question 3, part 4 [10 pt]** Are  $J_1, J_2, J_3$  schedulable, if pre-emption is not allowed? If yes, give the schedule, if not, explain why.