

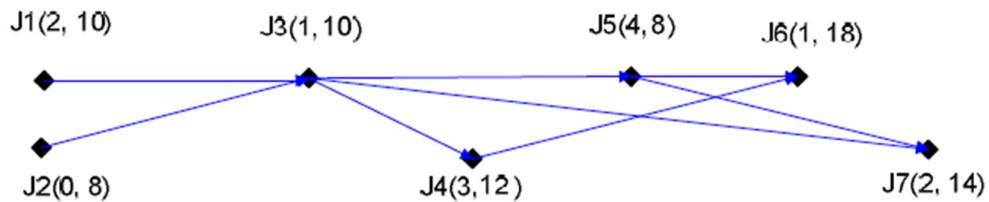
COSC6384 Assignment 1 (Spring 2019)

Question 1.

Explain the difference between *preemptive* and *non-preemptive*, *online* and *offline* algorithms.

Question 2.

Consider a set of jobs $J(r, d)$ where r is the release time and d is the deadline. The precedence constraints are shown in the graph below. Derive the formula for calculating the *effective* release time and deadline. Calculate the *effective* release time and deadline for each job in the job set.



Question 3

Consider the following implicit-deadline periodic task set. Assume all tasks are released at time 0. Is this task set rate-monotonic schedulable? If so, what is the schedule?

task	period	computation time
A	2	1
B	4	1
C	10	1

Question 4

For the task set in Question 3, is it schedulable by the EDF algorithm? If so, what is the schedule?

Question 5

Consider the following three periodic tasks:

T₁: $c_{1,1} = 1$, $c_{1,2} = 3$, $c_{1,3} = 4$, $d_1 = p_1 = 18$.

T₂: $c_{2,1} = 1$, $c_{2,2} = 1$, $d_2 = 5$, $p_2 = 6$

T₃: $c_3 = 2$, $d_3 = p_3 = 18$.

T₁ must rendezvous with T₂ after the first, second, and third scheduling blocks.

T₂ must rendezvous with T₁ after the first scheduling block.

Construct a schedule for this task set

Question 6

Construct a task set (showing start times, computation times and periods) that is schedulable by LLF but not schedulable by EDF algorithm on a 2-processor system.

Question 7

A job may be blocked for many reasons. The term *blocking time*, denoted by b_i , refers to the maximum total duration for which each job in task T_i may be delayed by both lower-priority tasks and deferred execution of higher-priority tasks. Extend the schedulability conditions 2 & 3 to consider tasks that can be blocked.

Question 8

Consider a set of n independent tasks arriving at $t=0$. Each task T_i is characterized by its computation time C_i and deadline D_i .

Prove that EDF is optimal for both preemptive and non-preemptive cases.

Question 9

Consider a two-task system where each preemption has an overload of x . Given $C_1, C_2,$

P_1, P_2 ($P_2 > P_1$), obtain the minimum value of P_1 for which the task set is

RM-schedulable.

Question 10

Construct a set of periodic tasks (showing start times, computation times and periods) which can be scheduled by the EDF algorithm but not by the RM algorithm.