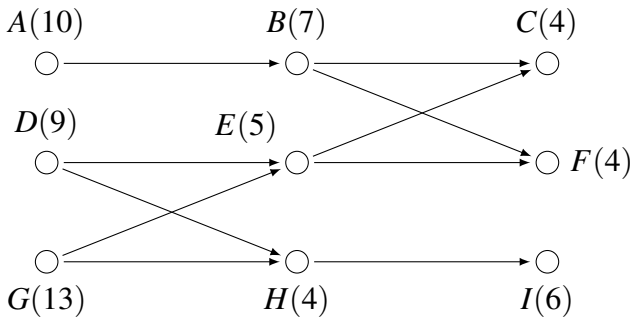
Worksheet Scheduling 2: Critical Path Algorithm

1. Consider the digraph from the previous scheduling worksheet:

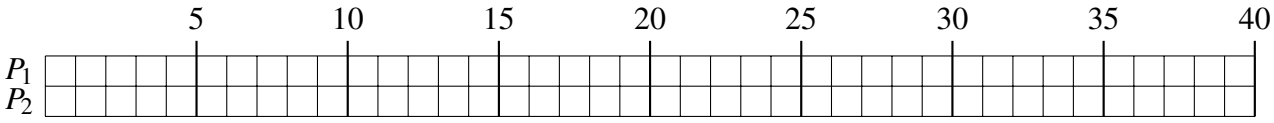


(a) Use the backflow algorithm to label each vertex in the digraph.

(b) Construct a priority list using the Critical Path algorithm.

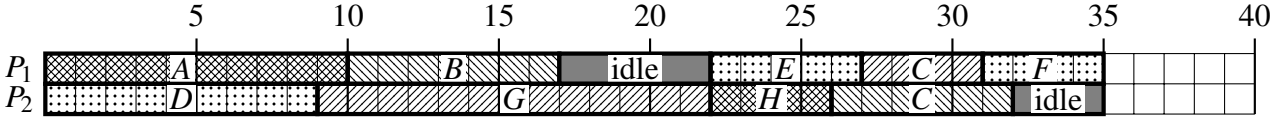
(c) Construct a schedule that corresponds to the priority list you just found.

time	
done	
ready	

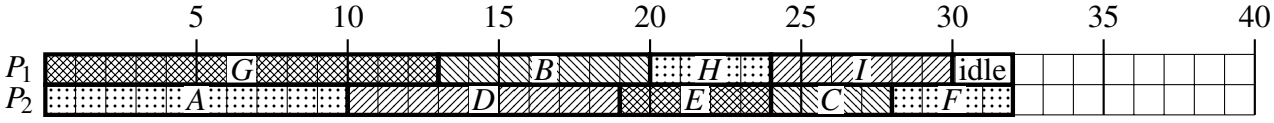


(d) The schedules that you found on the previous worksheet are shown below:

Priority List A,B,C,D,E,F,G,H,I



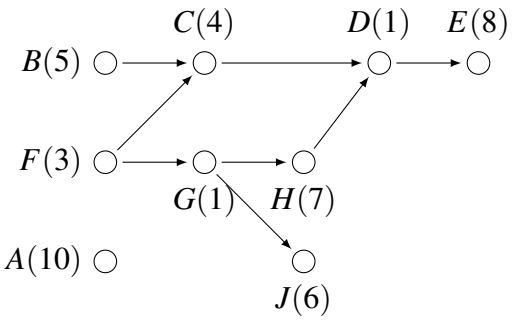
Priority list from the Decreasing Time Algorithm: G,A,D,B,I,E,C,F,H



(e) How can you identify the overall critical path given the labels you put on the digraph from the backflow algorithm?

(f) How does the schedule you found using the critical path priority list compare to the other schedules you found?

2. Typically the Critical Path algorithm produces a very good schedule, but it may or may not be optimal. Consider the following digraph:



(a) Construct the priority list corresponding to the decreasing time algorithm.

_____

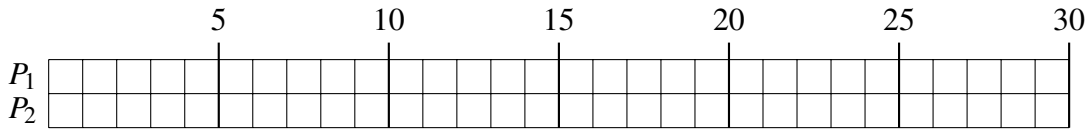
(b) Label the graph using the backflow algorithm.

(c) Construct the priority list corresponding to the critical path algorithm.

_____

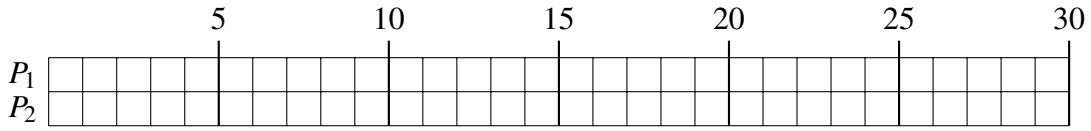
(d) Construct the schedule using the **critical path** priority list.

time	
done	
ready	



(e) Construct the schedule using the **decreasing time** priority list.

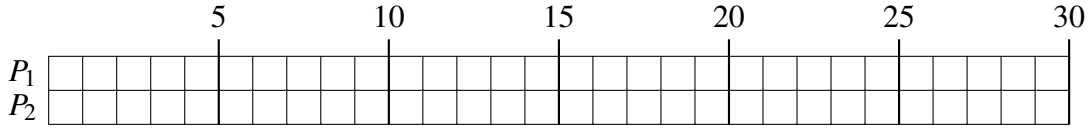
time	
done	
ready	



(f) Construct a schedule using the priority list

$$F, B, G, C, H, J, D, A, E$$

time	
done	
ready	



(g) How long would it take one processor to complete all the tasks? _____

(h) Explain why the schedule you constructed in (f) must be an optimal schedule for two processors.

3. For each of the following, circle the correct answer and say a few words.

True False (a) The critical path algorithm always produces an optimal schedule.

True False (b) The decreasing time algorithm always produces a less-optimal schedule than the critical path algorithm.

True False (c) You can always find an optimal schedule.

True False (d) Adding more processors will give you a shorter schedule.