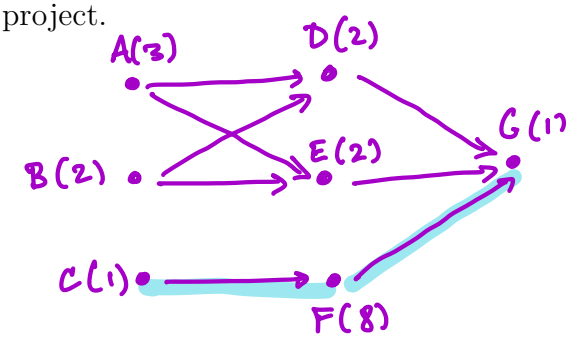
Worksheet 15 (Scheduling 1): Priority Lists and Decreasing Time Algorithm

Group Names: Solutions

1. The following tasks need to be completed for a project.

Task	Time Required	Prerequisites
A	3 hours	
B	2 hours	
C	1 hour	
D	2 hours	A, B
E	2 hours	A, B
F	8 hours	C
G	1 hours	D, E, F



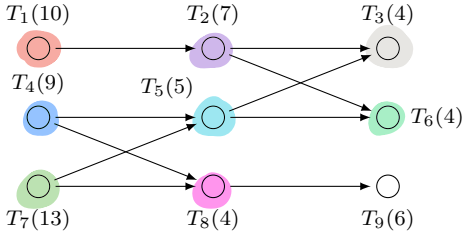
(a) To the left of the chart, draw a digraph to represent this project.

(b) If there is only one processor, how long will it take to complete the project? 19 hours

(c) What is the critical path for this project? C → F → G

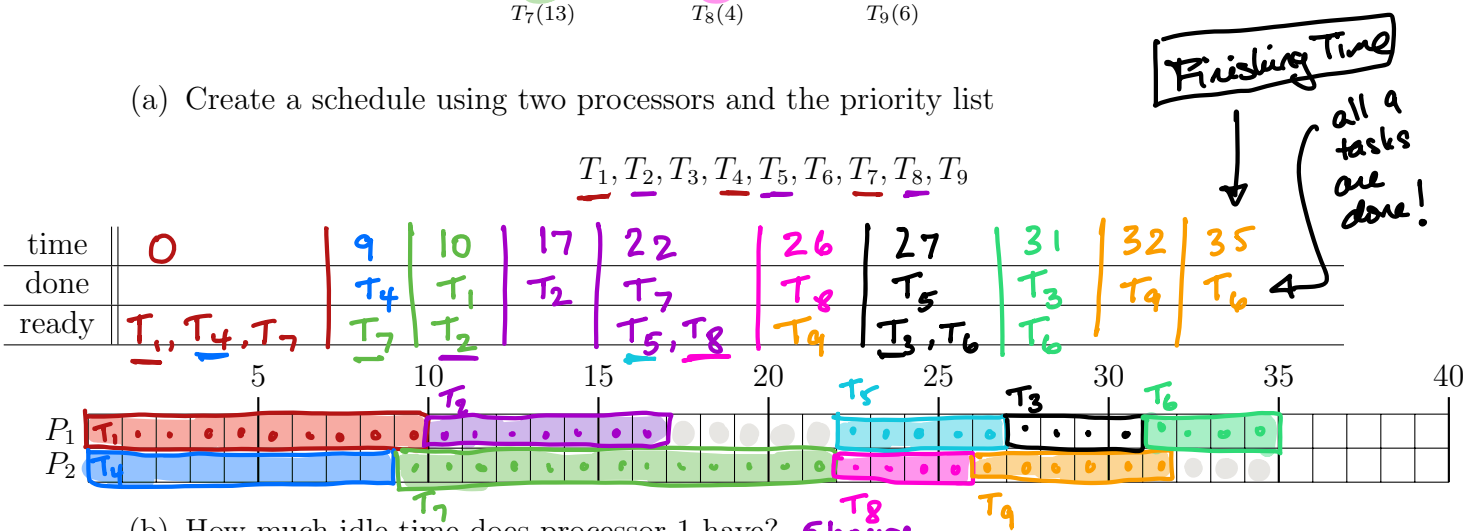
What is the critical time? 10 hours

2. Consider the following digraph:



(a) Create a schedule using two processors and the priority list

$T_1, T_2, T_3, T_4, T_5, T_6, T_7, T_8, T_9$



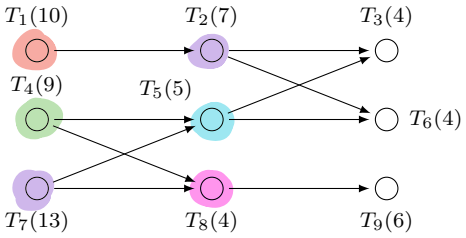
(b) How much idle time does processor 1 have? 5 hours

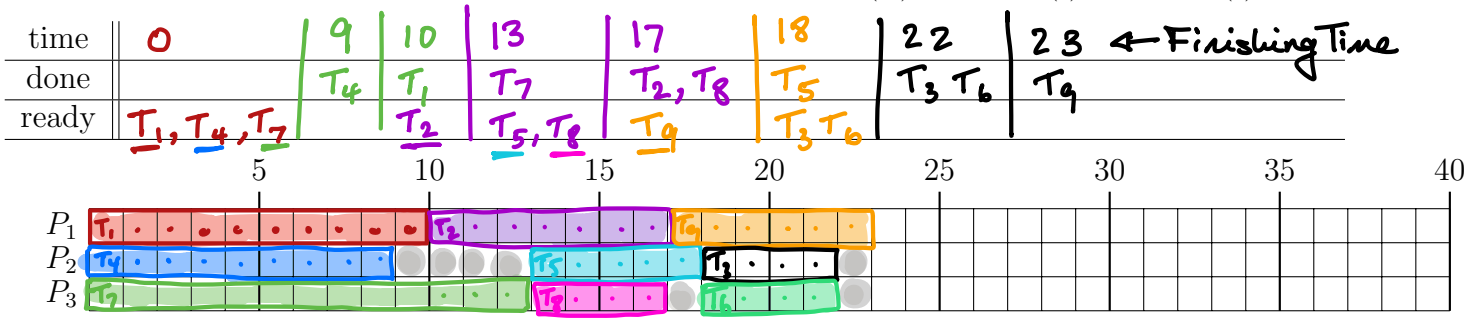
How much idle time does processor 2 have? 3 hours

(c) Here's the digraph again. Create a schedule using the same priority list

$$T_1, T_2, T_3, T_4, T_5, T_6, T_7, T_8, T_9$$

assuming you have three processors.





(d) How does the time to completion compare with using two processors?

It's 12 hours less!

How does the idle time compare?

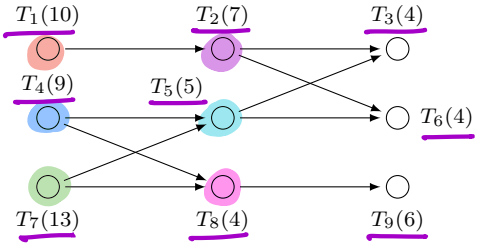
7 hours idle rather than 8

(e) What is the critical path for this digraph? $T_7 \to T_8 \to T_9$, critical time = 23

Have you found an optimal schedule? How do you know?

Yes: the minimal time is 23 and we found a schedule that only takes 23 hours.

(f) The Decreasing Time Algorithm says: Create the priority list by listing the tasks in order from longest completion time to shortest completion time.

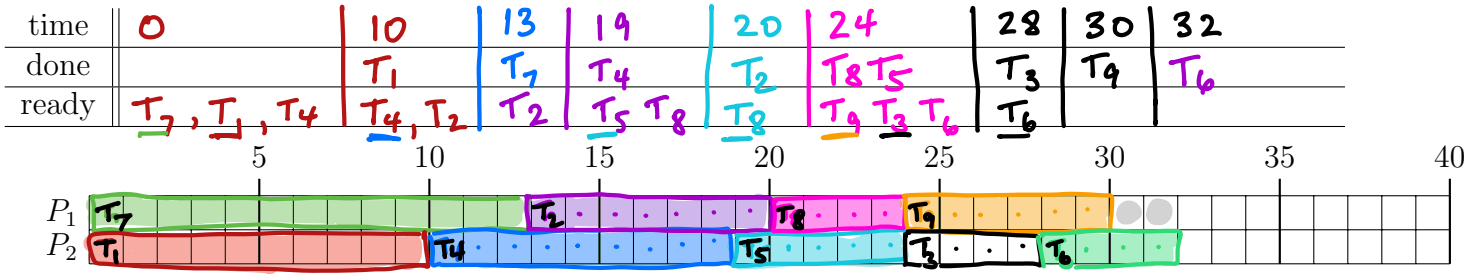


What priority list do you get if you prioritize the tasks using the Decreasing Time Algorithm?

13 10 9 7 6 5 4 4 4

$T_7, T_1, T_4, T_2, T_9, T_5, T_3, T_6, T_8$

(g) Create a schedule using the priority list you just found using the Decreasing Time Algorithm, assuming you have only two processors. How long does it take? _____



How does it compare to your previous schedule?

It finishes in 32 hours rather than 35, and it has 2 hours of idle time rather than 8.