▶ **Problem 11.5-12**

Fred and Wilma Noseworthy are planning a dinner party. The things they must do before their guests arrive and the time required for each are shown in the following table. The fish must be caught and the wine purchased before the table is set. The Noseworthys are not fond of raw fish or raw vegetables and do not use wine in their cooking. The table must be dusted before it can be set. Vacuuming is never done until the table is set. Fortunately, Fred and Wilma have the full support of their student daughter and son, who are always very willing to help their parents with whatever jobs need to be done (so up to four jobs can be done simultaneously). The entire family greets their guests together after all tasks have been completed.

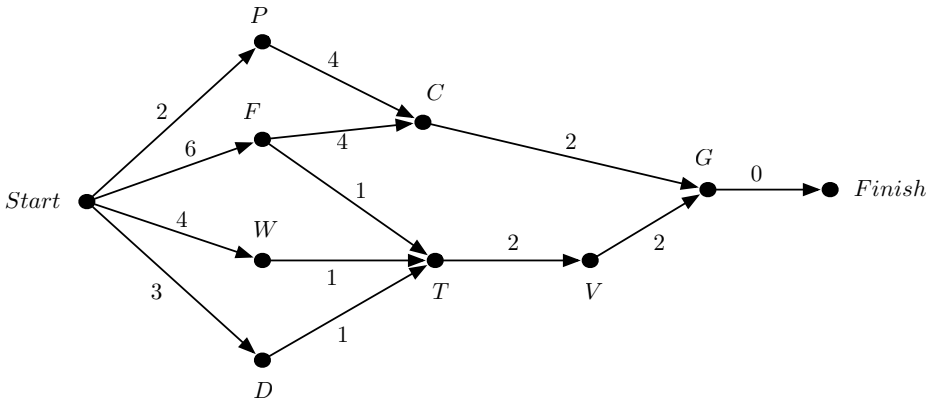
Dust house	D	3
Vacuum house	V	2
Set table	T	1
Buy wine	W	4
Catch fish	F	6
Pick vegetables	P	2
Cook food	C	4
Greet guests	G	2

(a) What type of scheduling problem is this (I or II)? Why? Draw the appropriate directed network.

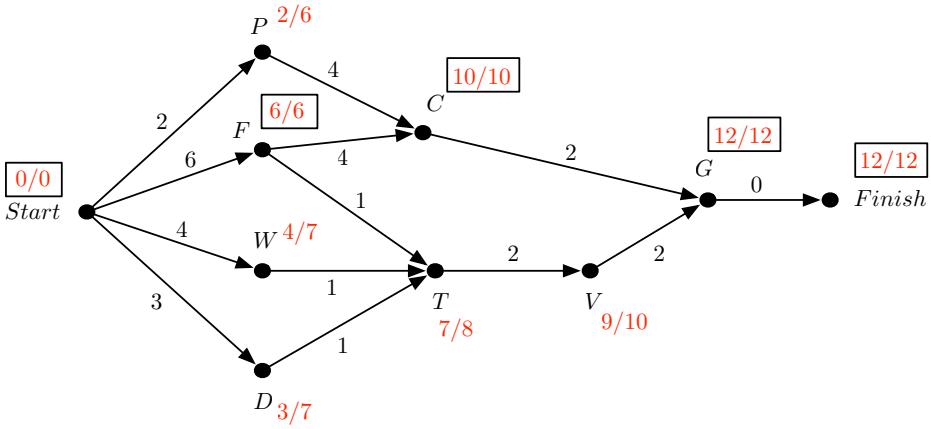
(b) What is the shortest possible time in which dinner preparations can be accomplished? Describe the critical path and illustrate with a directed network, showing all labels.

(c) Find the slack in W, C, and D.

Solution. (a) Since the times for the various tasks are independent of which tasks have already been completed, and since various tasks can occur simultaneously, this is a problem of type II.



(b) As the digraph shown, the shortest time in which dinner can be prepared is 12 units. The critical path is $Start \to F \to C \to G \to Finish$.



(c) The slacks of W, C, and D are given as follows:

$slack(W) = 7 - 4 = 3$;

$slack(C) = 10 - 10 = 0$;

$slack(D) = 7 - 3 = 4$; □