Ranked Positional Weight (RPW)

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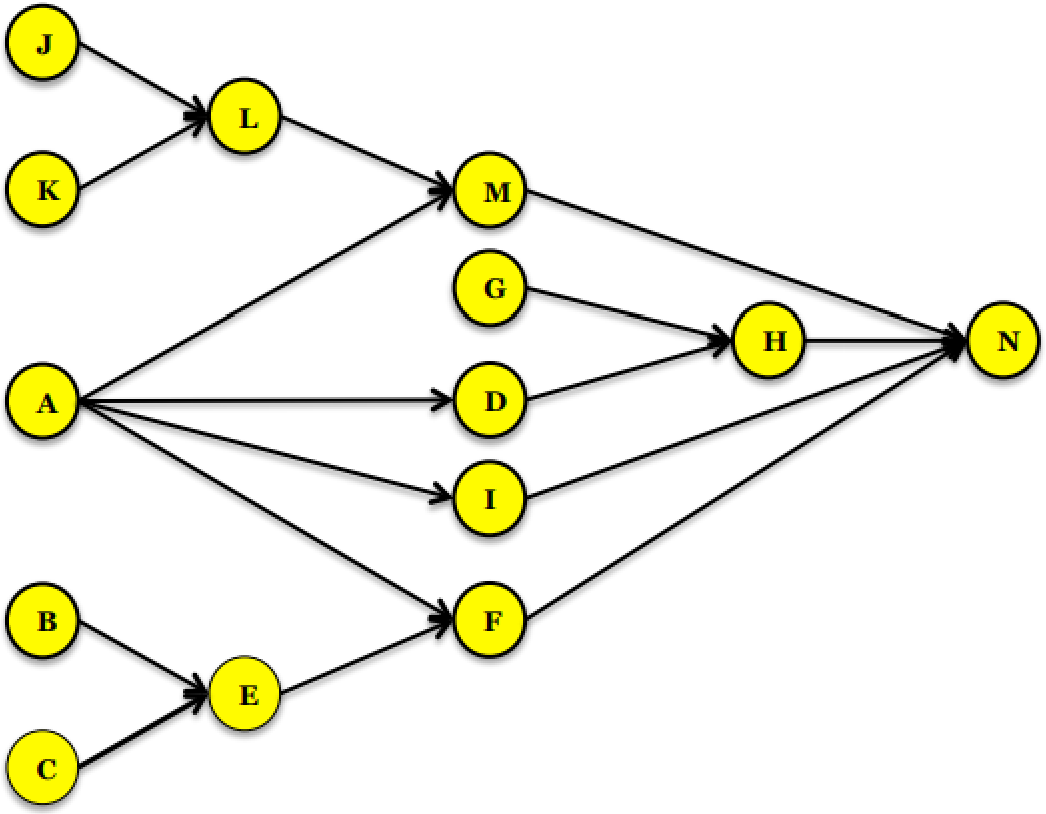
1. Construct a **diagram of precedence** relationships among the tasks (arrows indicate which tasks must proceed others)
2. For each task, **add up the task times** for that task *and* **ALL** tasks that must <u>follow</u> it *directly* and *indirectly.* This value is called positional weight for the task.
3. Select the task with the **largest positional weight** and assign it to the first work station.
4. Select the task with the **next largest positional weight** and assign it to the earliest possible work station that exists, as long as:
   - The maximum cycle time is not exceeded
   - All the task´s predecessors must be assign to the same or earlier work stations

A company wants to design a new assembly line for their latest products. The company wants to produce at least 270 units per day and they expect to operate the production line 450 minutes per day. The assembly requires 14 different tasks and the work element data is shown in the table below.

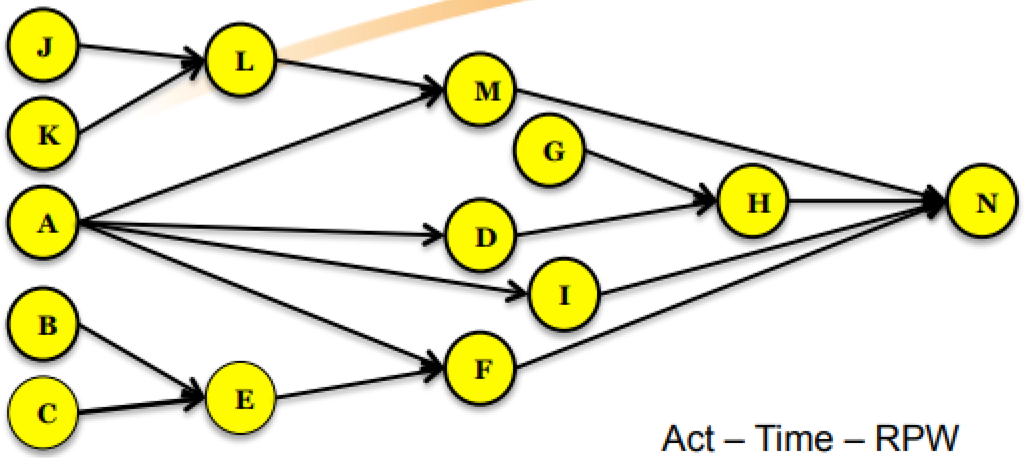
Work element	Time (seconds)	Immediate Predecessor(s)
A	10	None
B	25	None
C	10	None
D	35	A
E	65	B, C
F	35	A, E
G	30	None
H	20	D, G
I	45	A
J	50	None
K	20	None
L	40	J, K
M	30	A, L
N	70	F, H, I, M

a) Draw a precedence diagram.
b) What cycle time (in minutes) results in the desired output rate?
c) What is the theoretical minimum number of workstations and which work elements are assigned to which station?
d) What is the efficiency of your solution?



b) CT = (450x60) / 270 = 100s/unit.

c) Total process time = 485s.
485/100 = 4.85, which means that at least 5 stations are required.



Act	Time	RPW
A	10	245
B	25	195
C	10	180
D	35	125
E	65	170
F	35	105
G	30	120
H	20	90
I	45	115
J	50	190
K	20	160
L	40	140
M	30	100
N	70	70

Station	Element	Cumulative time	Slack
S1	A	10	
	B	35	
	J	85	
	C	95	5
S2	E	65	
	D	100	0
S3	K	20	
	L	60	
	F	95	5
S4	G	30	
	I	75	
	H	95	5
S5	M	30	
	N	100	0

d) Efficiency

485/5x100 = 97%