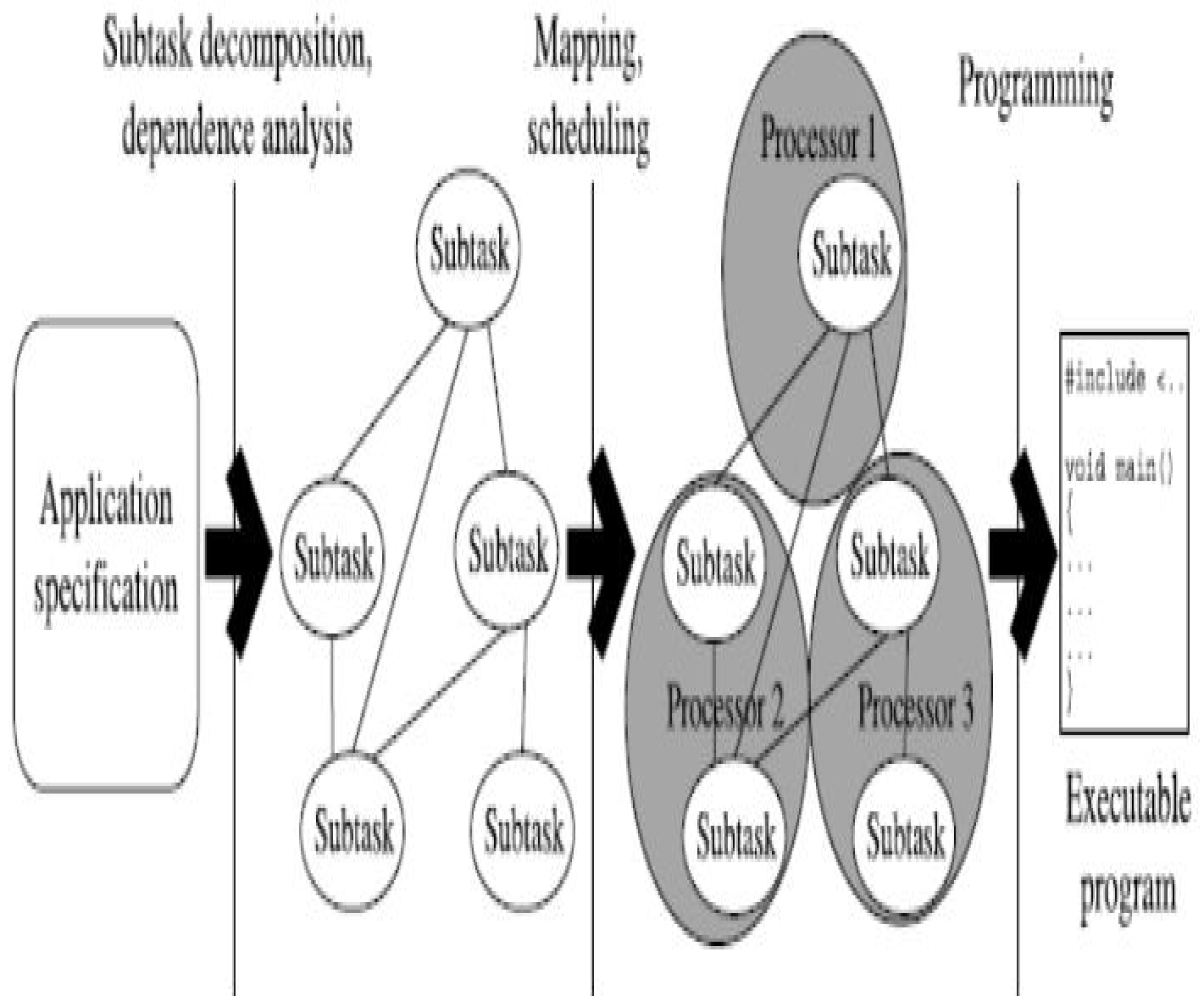


Parallel programming—process of parallelization

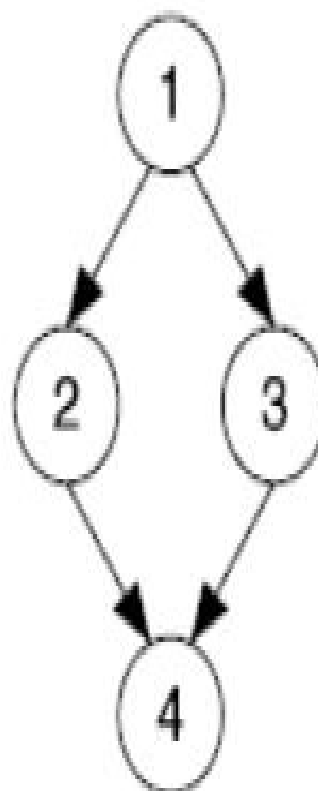


1: $a = 2$

2: $u = a + 2$

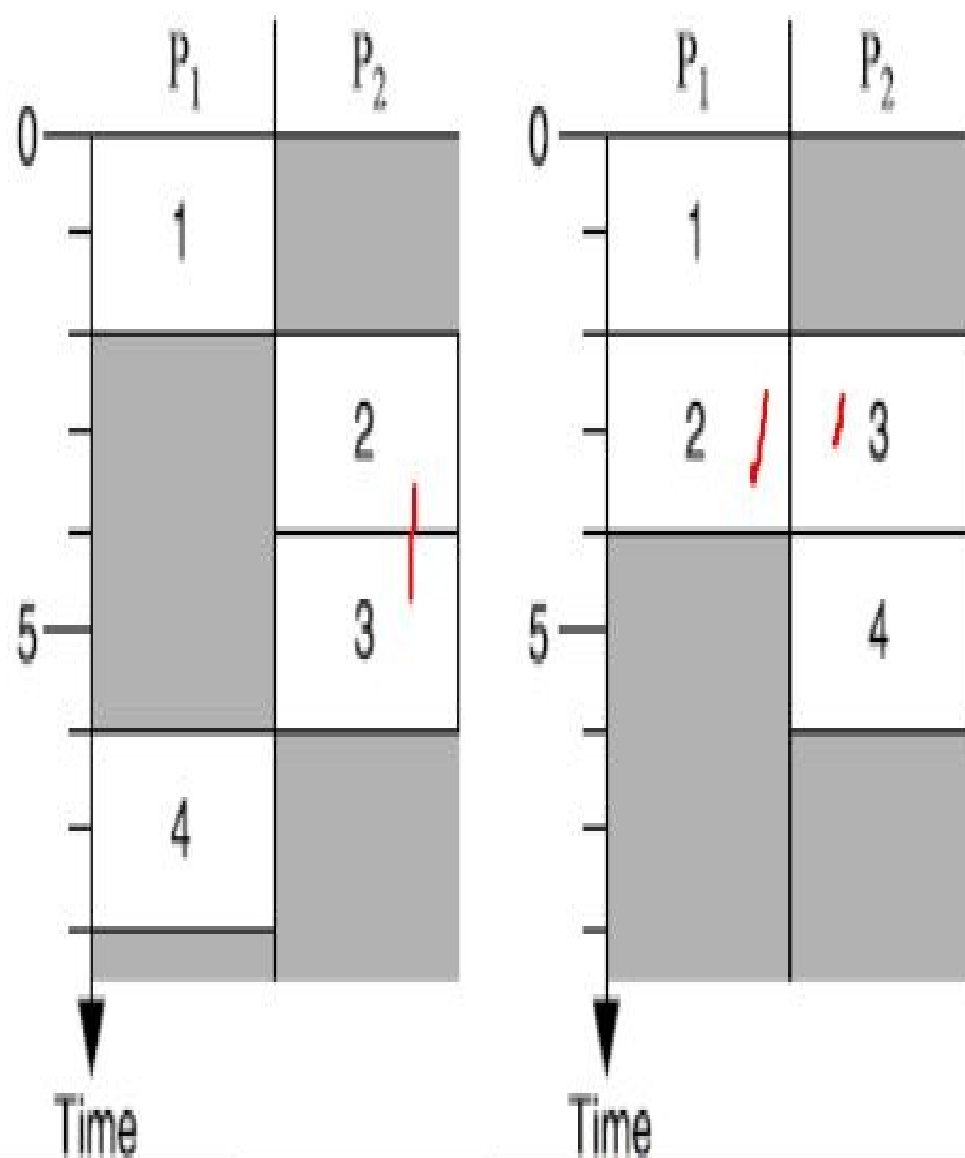
3: $v = a * 7$

4: $x = u + v$



DAG

Example of task graph representing a small program segment.

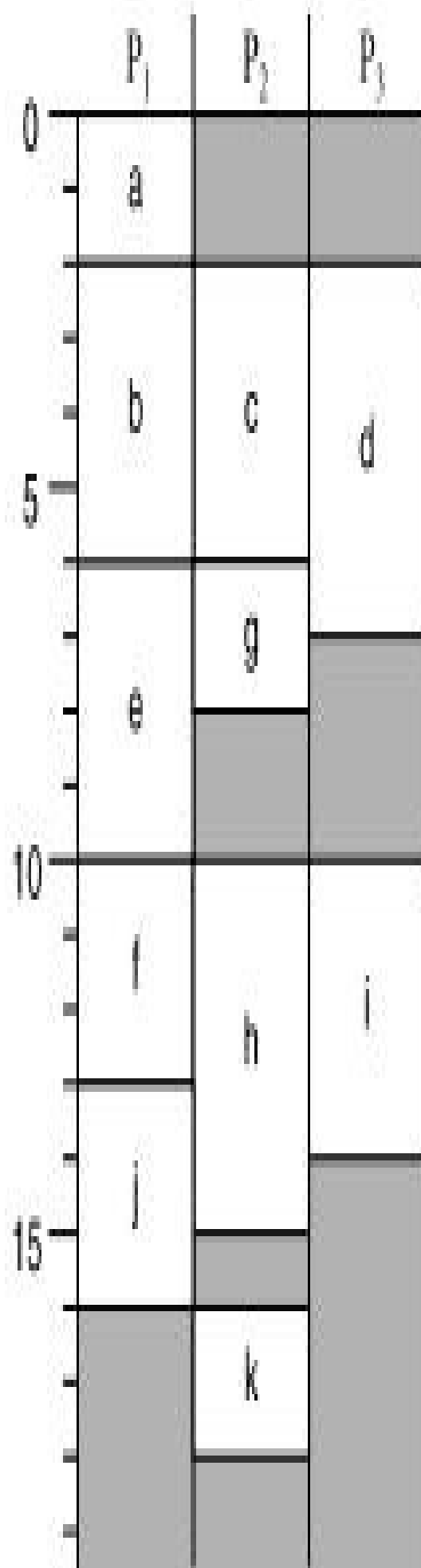
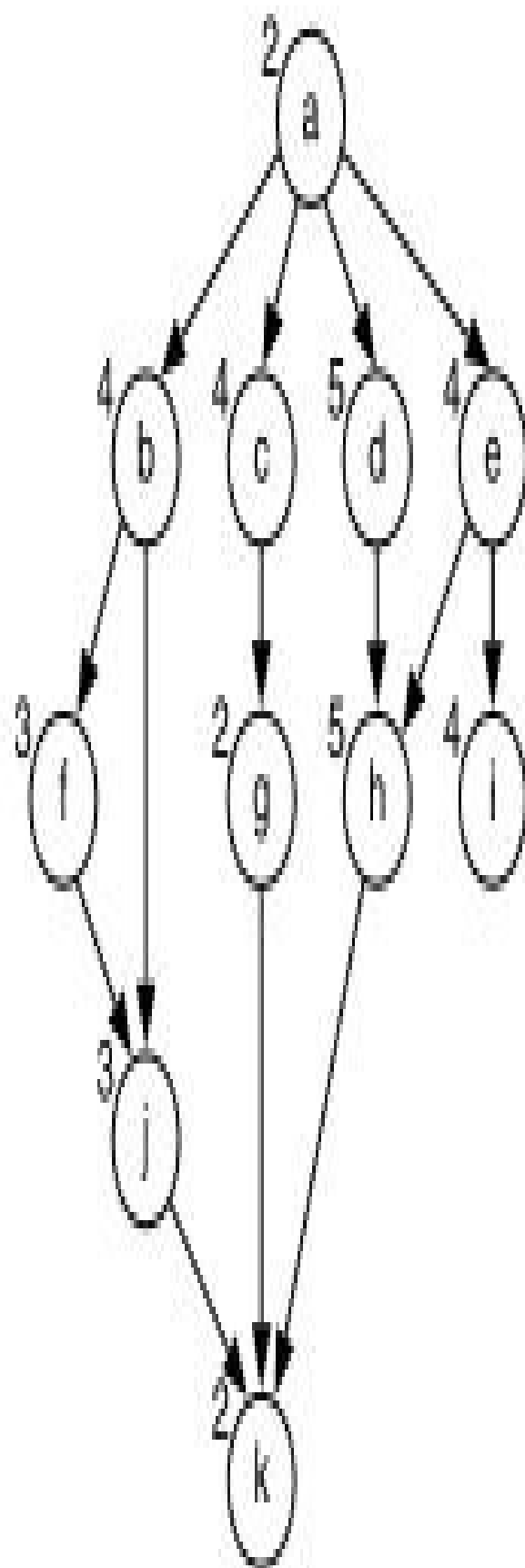


DAG

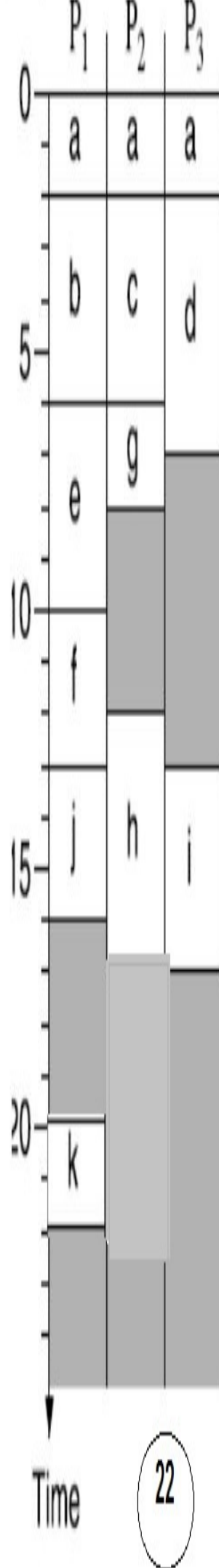
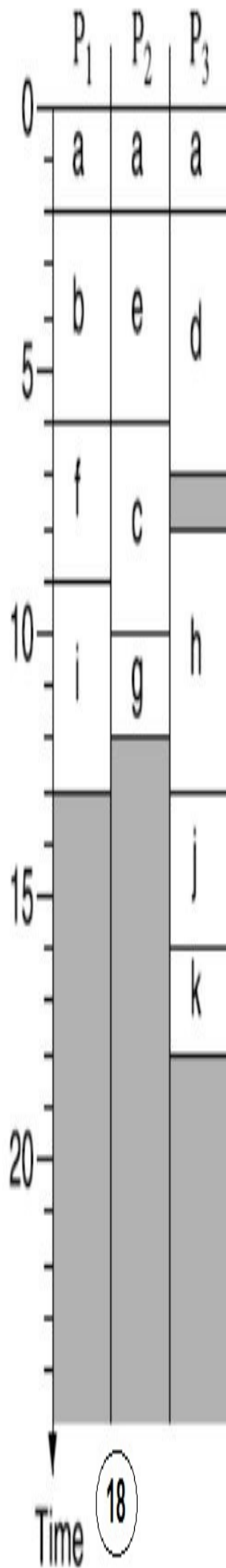
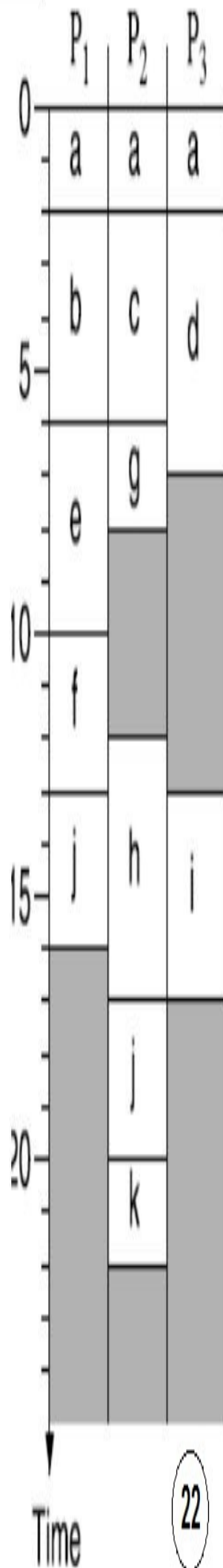
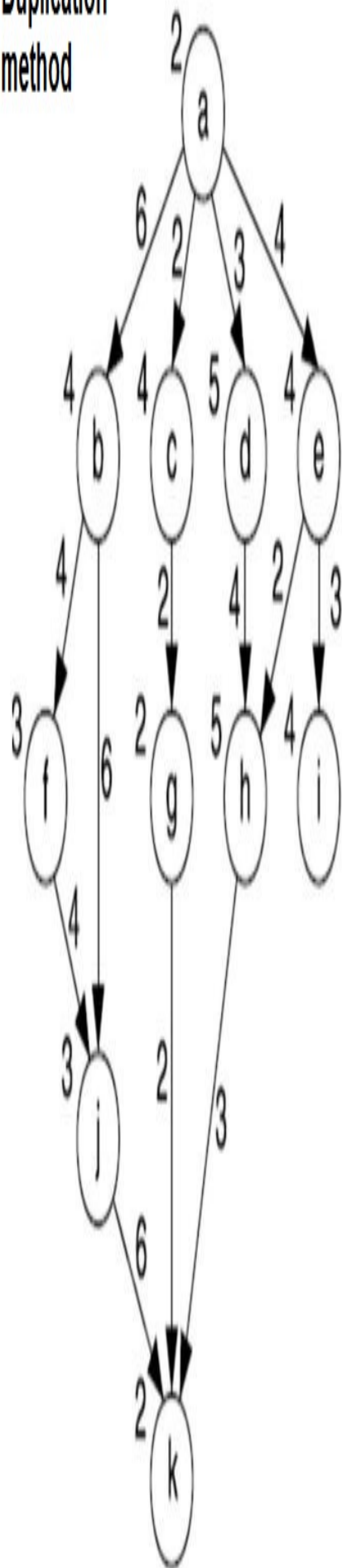
- Example 2 Program for $x = a * 7 + (a * 5 + 2)$
- 1: $a = 2$
- 2: $v = a * 5$
- 3: $u = v + 2$
- 4: $v = a * 7$
- 5: $x = u + v$



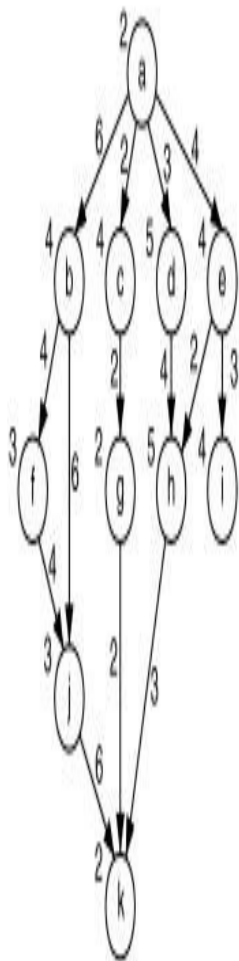
Without Communication cost



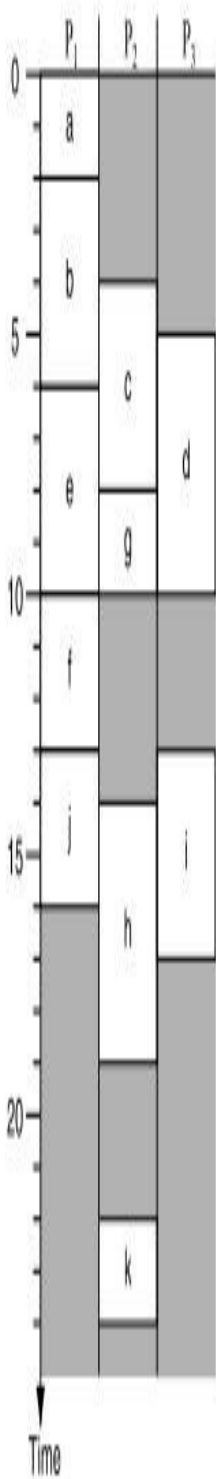
Duplication method



Breadth ****



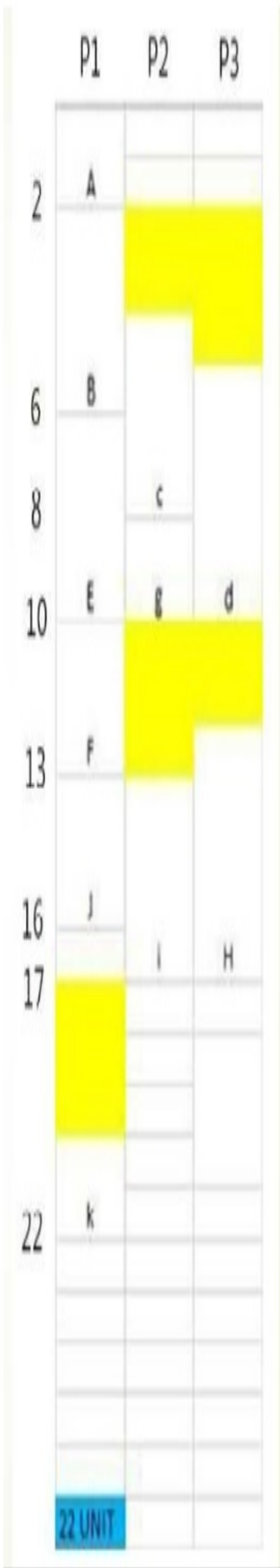
(a)



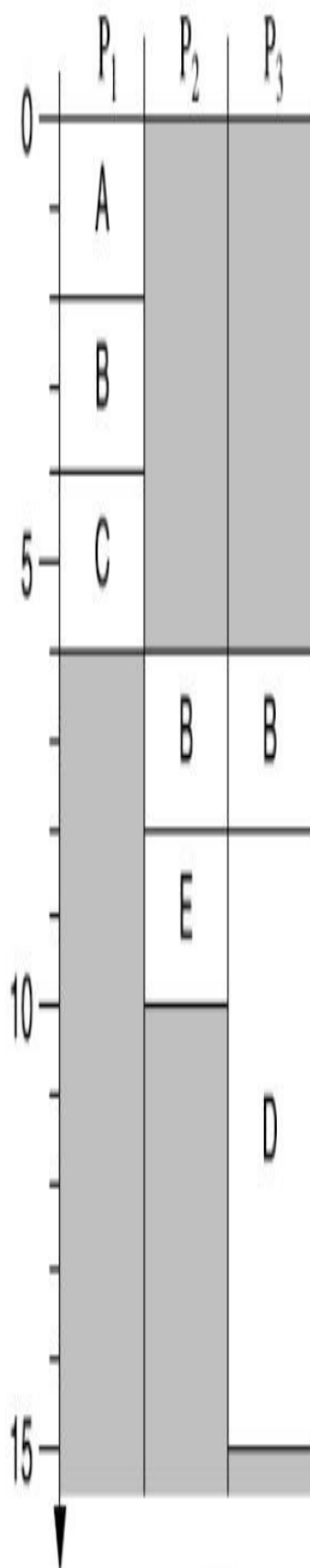
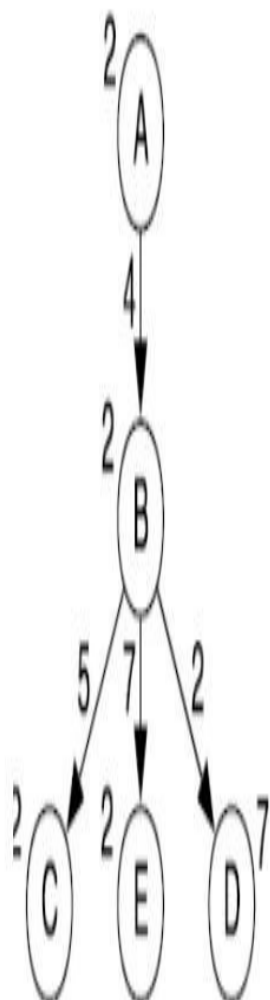
(b)

both

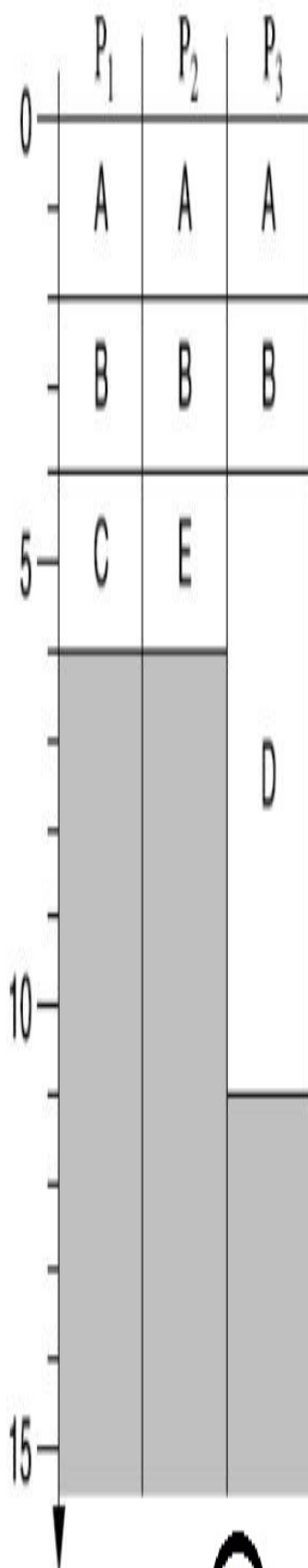
24



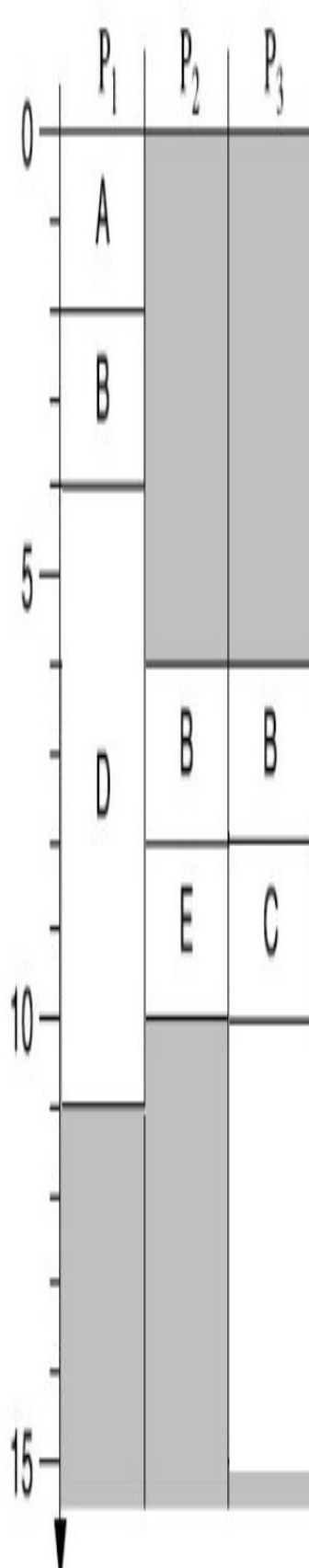
Duplication Method



(a) 15



(b) 11

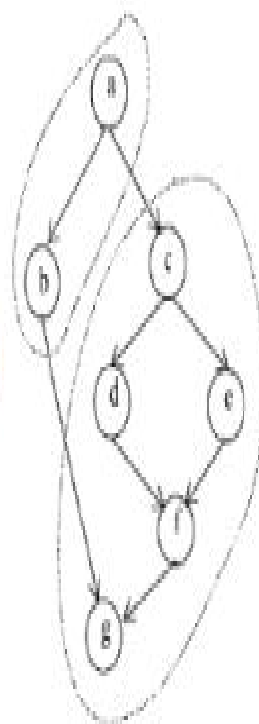


(c) 11

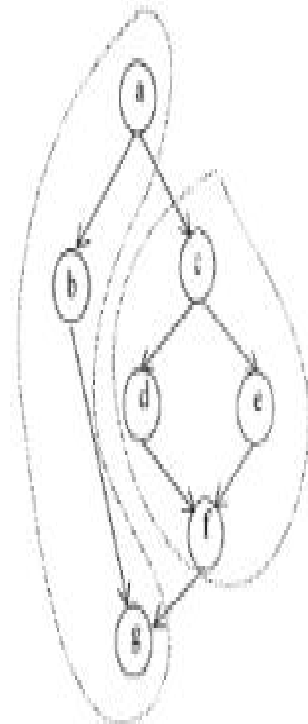
4- CLUSTERING

Clustering

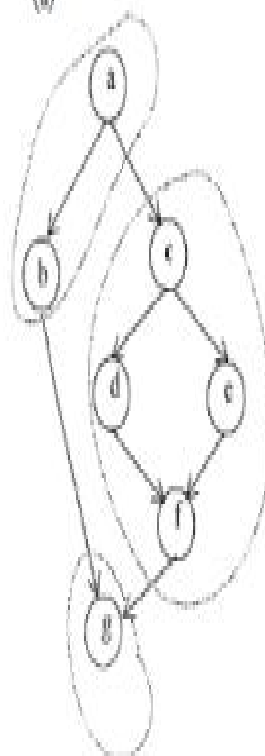
- Different ways to cluster a task graph



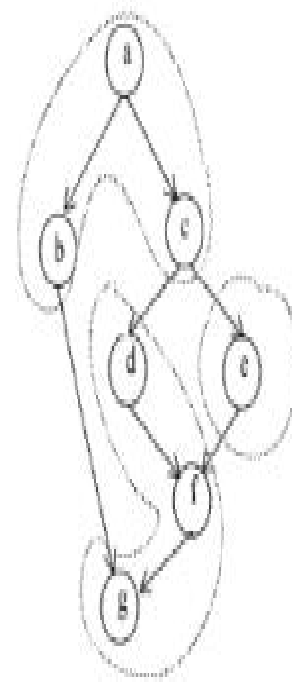
(a)



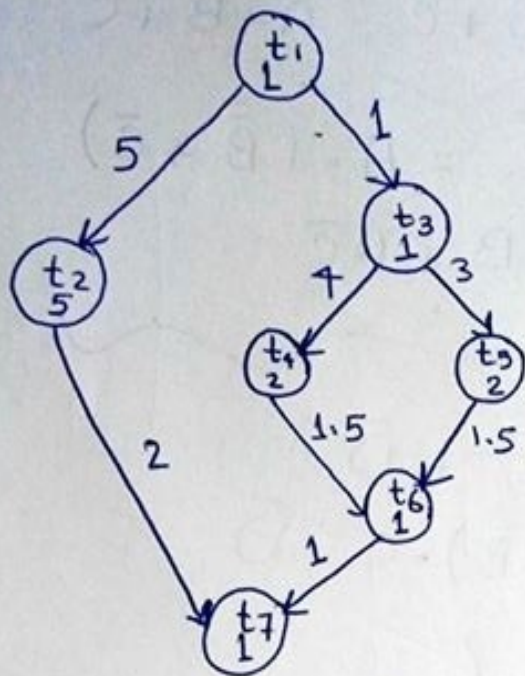
(b)



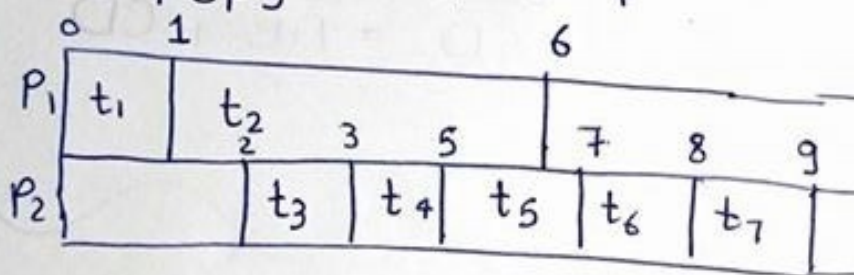
(c)



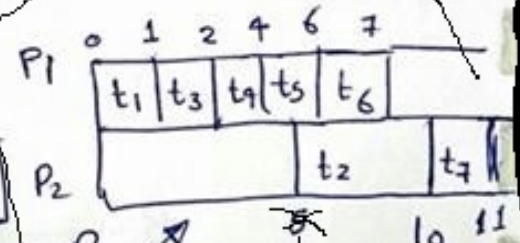
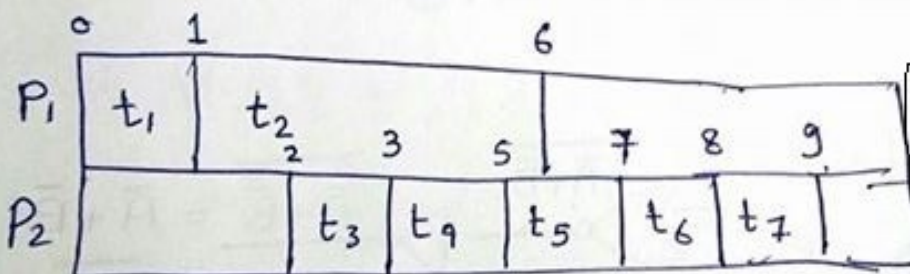
(d)



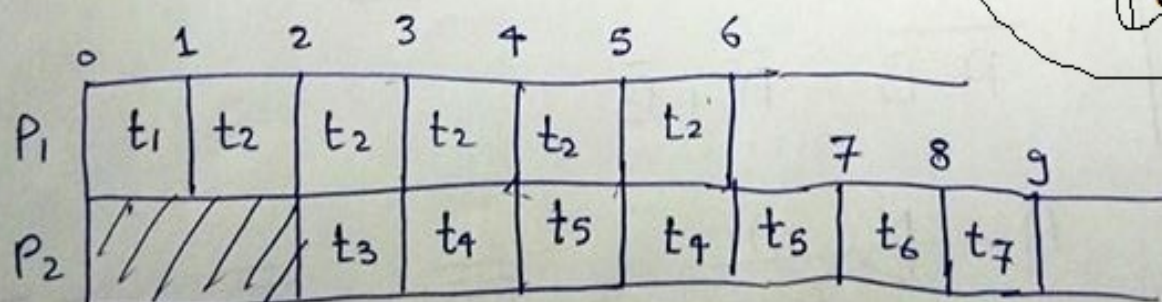
⇒ FCFS $t_1 \rightarrow t_7$



⇒ SJF $t_1 \rightarrow t_3 \rightarrow t_4 \rightarrow t_5 \rightarrow t_6 \rightarrow t_2 \rightarrow t_7$



⇒ RR



OR

ده الحل