

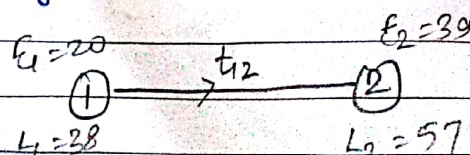
- Total float = 0 means resources are just sufficient to complete the activity.

Task	Duration	earliest		latest		Float		Predecessor
		Start	Finish	Start	Finish	Total	Free	
(1,2)	20	0	20	18	38	18-0=0	$\frac{20-10+20}{2}=0$	0
(1,3)	23	0	23	0	23	0	0	0
(1,4)	8	0	8	31	39	31	31	31
(2,5)	19	20	39	38	57	18	0	0
(3,4)	16	23	39	23	39	0	0	0
(3,7)	24	23	47	43	67	20	20	20
(4,5)	0	39	39	57	57	18	0	0
(4,6)	18	39	57	39	57	0	0	0
(5,6)	0	39	39	57	57	18	18	0
(5,7)	4	39	43	63	67	24	24	6
(6,7)	10	57	67	57	67	0	0	0

Total float = $L_i - E_i$

- $= 0$: just sufficient resource
- > 0 : surplus resources. one has freedom to relocate the resources elsewhere.
- < 0 : resources are not enough and project may not finish in time.

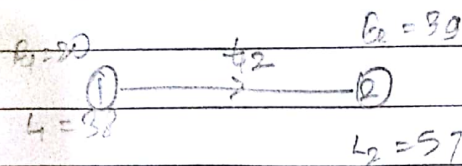
Free float: That portion of the total float within which an activity can be manipulated without affecting the float of the subsequent activities. The free float indicates the value by which an activity can be delayed without causing any delay in its immediate successor activity.



Free float
= $E_2 - (E_1 + t_{12})$

Independent float: It is that portion of the total float within which an activity can be delayed for start without affecting float of the preceding activities.

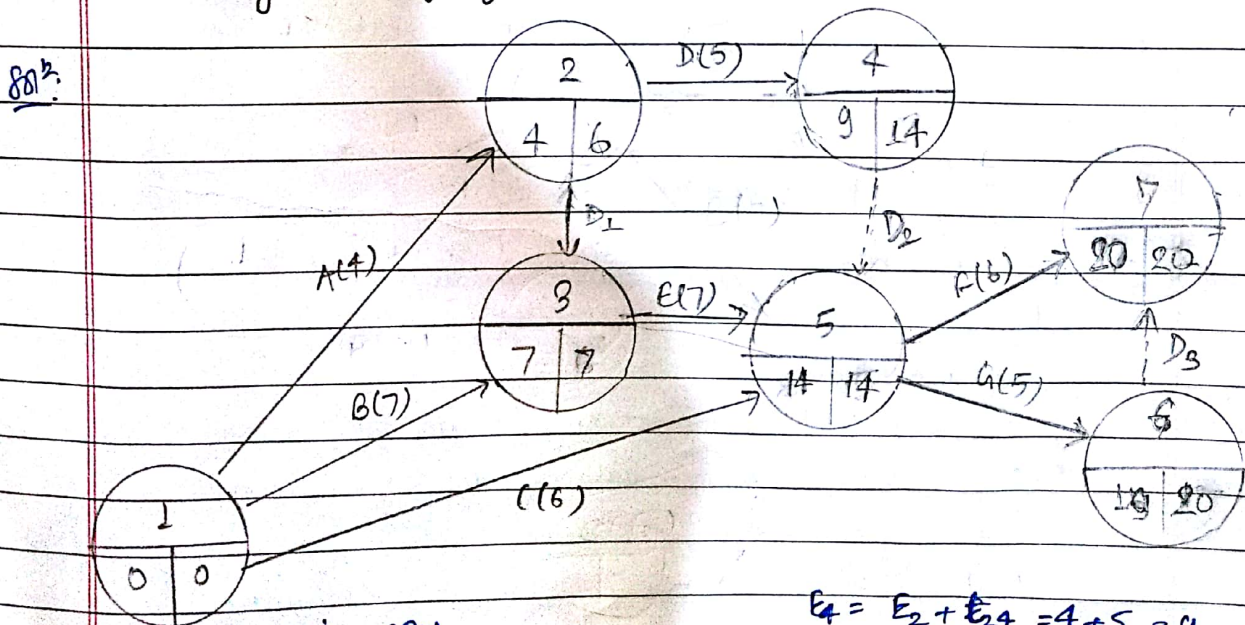
If the value of independent float is negative, it is taken as 0.



$$\text{Independent float} = E_2 - (L_1 + t_2)$$

Activity	Preceding act.	Duration
A	-	4
B	-	7
C	-	6
D	A, B	5
E	A, B	7
F	C, D, E	6
G	C, D, E	5

Draw the network and find the project completion time. Calculate total float, free and independent float for each activity & highlight the critical path.



Using CPM
FPM

$$E_1 = 0$$

$$E_2 = E_1 + t_2 = 0 + 4 = 4$$

$$E_3 = E_1 + t_{13} = 0 + 7 = 7$$

$$E_4 = E_2 + E_{24} = 4 + 5 = 9$$

$$E_5 = \max \begin{cases} 9+7 \\ 0+9 \\ 0+6 \end{cases} = 14$$

$$E_6 = 14 + 5 = 19$$

$$E_7 = \max \begin{cases} 14+6 \\ 19+0 \end{cases} = 20$$