

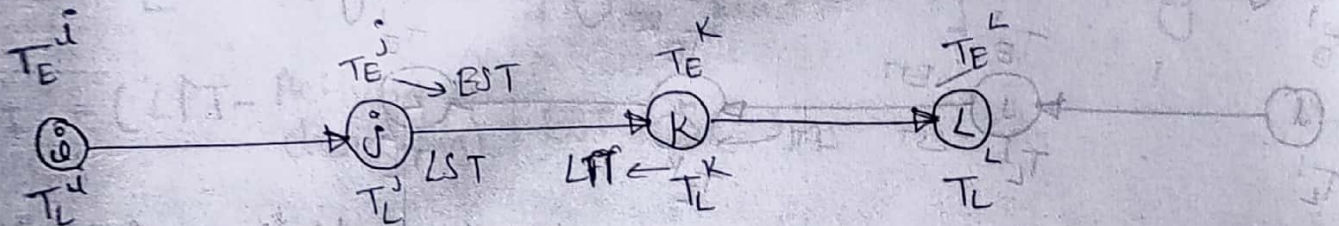
Define types of float

① Total float :- Total float is the time by which starting or finishing of an activity can be delayed without affecting the scheduled completion time of a project.

(OR)

It may be also define as the excess of time maxi. time available over the activity duration.

While Analysing the total float finishing of preceeding activity and starting of succeeding activity both are affected.



$$\begin{aligned}
 F_T &= (\text{maxi. time available}) - \text{Activity duration} \\
 &= (TL^k)_{\text{Head}} - (TE^j)_{\text{Tail}} - t_{e^{j-k}} \quad \text{--- (1)} \\
 &= [(TL^k)_{\text{Head}} - (t_{e^{j-k}})] - (TE^j)_{\text{Tail}}
 \end{aligned}$$

$$F_T = LST - EST$$

from eqⁿ (1)

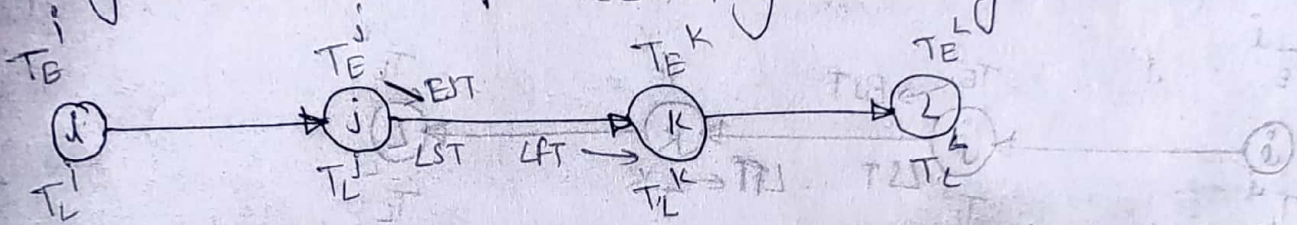
$$F_T = (TL^k)_{\text{Head}} - (TE^j + t_{e^{j-k}})$$

$$F_T = LFT - EFT$$

Free float:- Free float is that positive portion of total float by which starting or finishing of an activity can be delayed without affecting the succeeding activity.

The concept of free float is on the basis of the fact that all event must occur at its earliest time.

While analysing the free float finishing of preceeding activity is affected but starting of succeeding activity is not affected. So free float only affect the preceeding activity not succeeding.



maxi time available without affecting. - Activity duration
succeeding Activity float

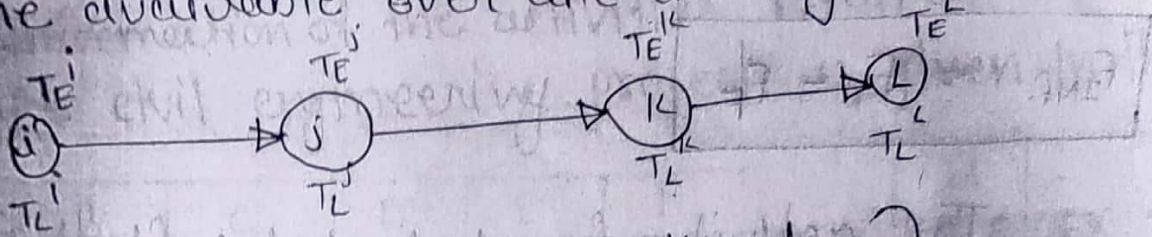
$$\begin{aligned}
 FF &= [\text{maxi time available without affecting.} - \text{Activity duration}] \\
 &= [TE^k - TE^j] - te^{j-k} \\
 &= [LFT - S_k] - (TE^j + te^{j-k}) \\
 &= (LFT - EFT) - (S_k) \text{ Head event} \\
 &= F_T - \text{Slack of Head event}
 \end{aligned}$$

$S_k = TL^k - TE^k$
 $TE^k = LFT - S_k$

Independant Float (F_{IO}):- It is a time by which starting or finishing of an activity can be delayed without affecting the succeeding or preceeding activity.

- It means without affecting the total float of succeeding or preceeding activity.

It may be also define as the excess of minimum time available over the activity duration.



$F_I =$ { more time available without affecting succeeding & preceeding } - Activity duration

$$F_I = (T_E^k - T_L^j) - t_{e^{i-j}}$$

$$F_I = [LFT - (S_k)_{Head}] - [S_j_{Head} + EST] - \text{Activity duration}$$

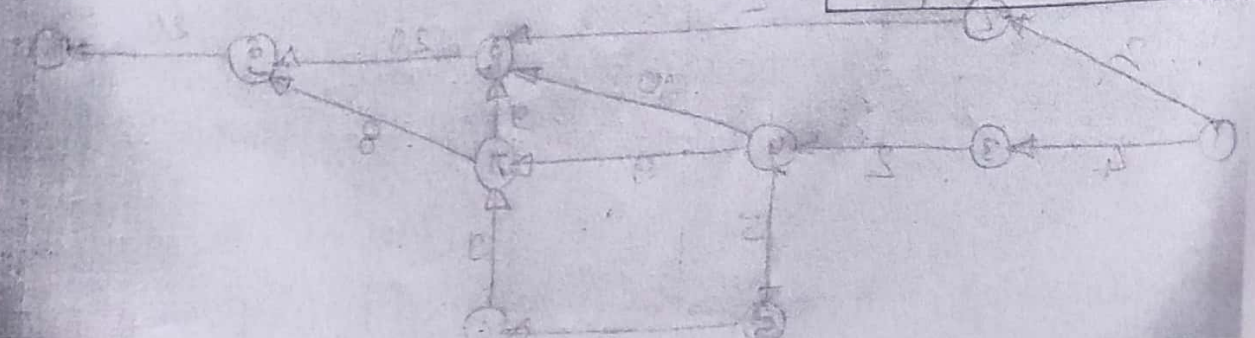
$$F_I = (LFT - \text{Activity duration}) - EST - S_k - S_j$$

$$F_I = (LST - EST) - (S_k)_{Head} - (S_j)_{tail}$$

$$F_I = (F_T - S_{head}) - S_{tail}$$

$$F_I = F_F - S_{tail}$$

- (i) $S_j = T_L^j - T_E^j$
- $T_L^j = S_j + T_E^j$
- $T_L^j = S_j + (EST)_{j=k}$
- (ii) $S_k = T_L^k - T_E^k$
- $T_E^k = T_L^k - S_k$
- $T_E^k = LFT - S_k$



Interfering float: - It is just another name given to head event slack

$$F_{INF} = S_{Head\ event}$$

$$F_{INF} = F_T - F_F$$

Note: - The activities for which total float is positive are termed as sub critical activity and the path joining these activity is termed as sub critical path.

The activities for which total float is zero are term as critical activity and the path joining these activities is termed as critical path.

The activities for which total float is ^{Negative} ~~critical~~ are termed as super critical activities and path joining these activities is termed as super critical path.

Question The network for certain project is shown with the estimated time of completion of each activity. Calculate Total float all type of float are each activity and determine the critical path.

