

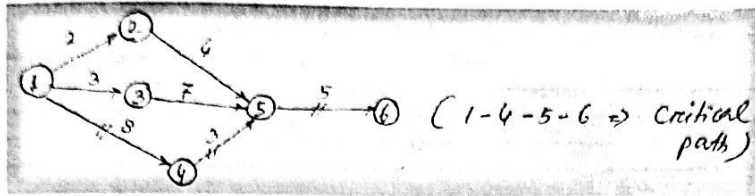
Terminologies used in network diagram

(i) **Activity:** An activity means work/job. it is a time consuming process. it is represented by an arrow (\rightarrow) in the network diagram. as shown below.

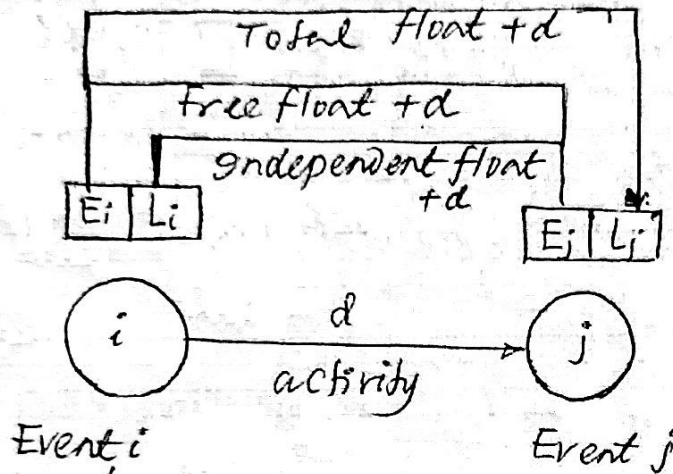
Tail \rightarrow head

(ii) **Event :** An event is a specific instant of time \rightarrow marks the "start" and "end" of an activity.

(iii) **Critical path:** It is the sequence of activities which decides the total project duration. Ex.



- (iv) **Duration (d)** : Duration is the estimated or actual time required to complete a task or an activity.



- (v) **Total project time**: time to complete the project. In other words, it is the duration of critical path.
- (vi) **Earliest start time (Ei)**: It is the earliest possible time at which an activity can start. It is calculated by moving from 1st to last event in the network diagram.
- (vii) **Latest start time (Li)** : It is the latest possible time by which an activity can start.
- (viii) **Earliest finish time (Ej)** : It is the earliest possible time at which an activity can finished/end.
- (ix) **Latest finish time (Lj)** : It is the last event time of the head event. It is calculated by moving backward in the network diagram.
- (x) **Float/slack** : Slack is with reference to an event. Float is with reference to an activity.
- (xi) **Total float** : (Latest finish time- Earliest start time) - Activity duration (See fig. above)
- (xii) **Free float** : (Earliest finish time- Earliest start time) - Activity duration.

- (xiii) **Independent float** : (EST of head event – LST of tail event) – Activity duration.
- (xiv) **Optimistic time (to)** : Time estimate for fast activity completion.
- (xv) **Pessimistic time (tp.)** : Maximum time duration. that an activity can take.
- (xvi) **Most likely time (tm)** : best guess of activity completion time.
- (xvii) **Expected time (te)** : $\frac{t_o+4t_m+t_p}{6}$
- (xviii) **Variance of an activity time** : $6_e^2 = \left(\frac{t_p-t_o}{6}\right)^2$
- (xix) **CPM** – Critical path method
- (xx) **PERT**- Program evaluation & review technique.

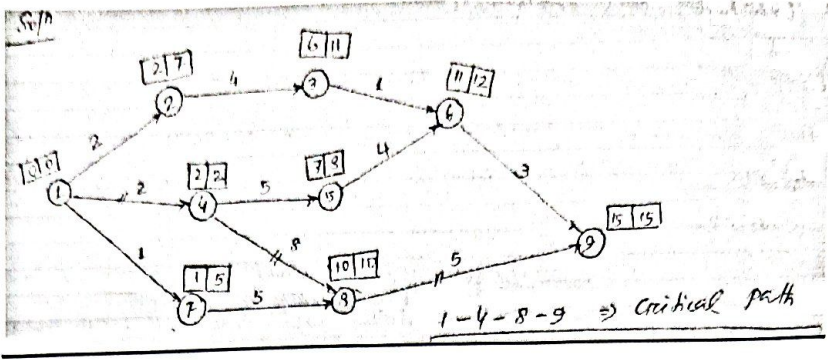
Problem-3:

A project schedule has the following characteristics →

Activity	1-2	1-4	1-7	2-3	3-6	4-5	4-8	5-6	6-9	7-8	8-9
Duration,day	2	2	1	4	1	5	8	4	3	5	5

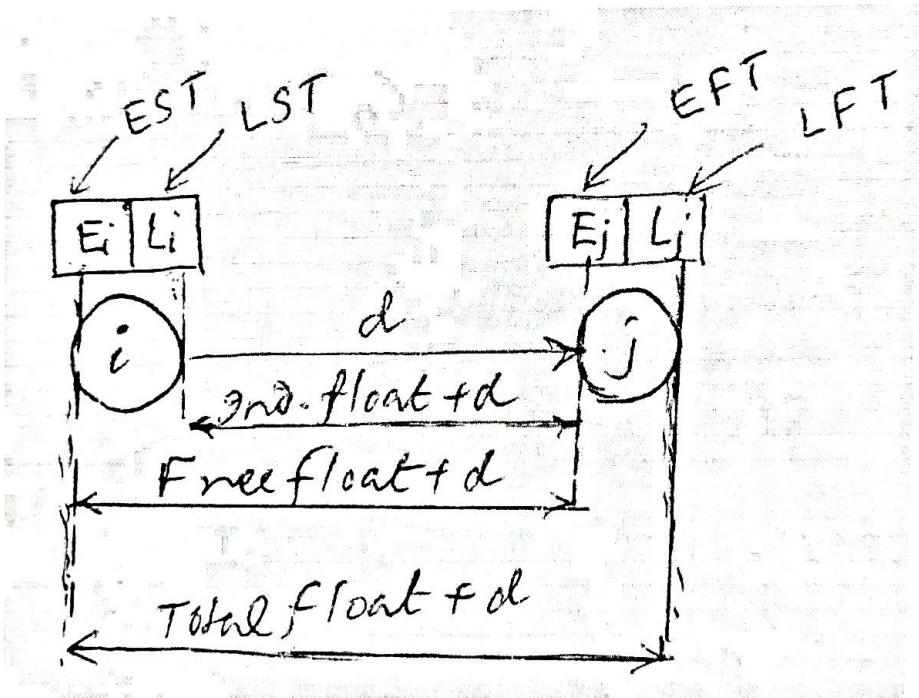
Construct the network and locate the critical path. Calculate the various time estimates and floats.

Solution:



The earliest start time (EST), the latest start time (LST) the earliest finish time (EFT) and latest finish time (LFT) are shown above at each node point by square block in the network diagram.

The various floats can be calculated w.r.t. the following figure :-



both

* At the critical path, a square block have same value.

* Total float of each activity on critical path is observed as zero.

$$\text{Total float} = (L_j - E_i) - d$$

$$\text{Free float} = (E_j - E_i) - d$$

$$\text{Independent float} = (E_j - L_i) - d$$

Correct Table -

Activity	Duration	EST	LST	EFT	LFT	Total float	Free float	Independent float
1-2	2	0	0	2	7	5	0	0
1-4	2	0	0	2	2	0	0	0
1-7	1	0	0	1	5	4	0	0
2-3	4	2	7	6	11	5	0	-5
3-6	1	6	11	11	12	5	4	-1
4-5	5	2	2	7	8	1	0	0
4-8	8	2	2	10	10	0	0	0
5-6	4	7	8	11	12	1	0	-1
6-9	3	11	12	15	15	1	1	0
7-8	5	1	5	10	10	4	4	0
8-9	5	10	10	15	15	0	0	0