Lecture-6
SL

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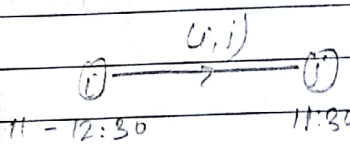
Project management includes the following steps -

i) Project planning (Drawing the network)
ii) Time estimation (Network analysis) } PERT and CPM are used.
iii) Scheduling (
iv) Time-cost trade-off
v) Resource allocation
vi) Project control

Forward pass
Backward pass

* Network analysis is quite useful for planning, designing controlling and decision making so that the project could be economically completed in the minimum possible time with limited available resource.

- Planning - Drawing the network and establishing relationship.
- Scheduling - Scheduling computation gives the earliest and the latest start and finish time for each activity and as a by-product they identify the critical path.



CPM (Critical path method)

* Time estimation is a part of scheduling.
* CPM operates on the assumption that time taken by each activity in the project is already known precisely.
* PERT is used when time is not precisely defined.
* For time analysis in CPM, 2 methods are used -
i) Forward pass method (FPM)

t_{ij} : Duration of activity (i, j)

E_j : Earliest occurrence time of event j. It is the earliest time at which an event can occur without affecting the total project time.

ES_{ij} : Earliest start time for activity (i,j). It is the time at which activity can start without affecting the total project time.

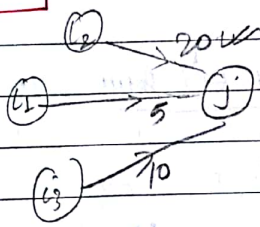
EF_{ij} : Earliest finish time for activity (i,j). It is the earliest time at which the activity can finish without affecting the total project time.

Assume earliest occurrence time for initial event of project is 0 i.e., $E_1 = 0$

Also, $ES_{ij} = E_i$

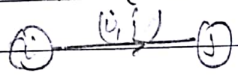
$EF_{ij} = E_i + t_{ij}$

$E_j = \max_{i} (E_i + t_{ij})$



j will be reached only after all related activities are finished.

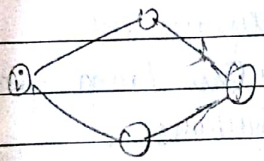
2) Backward pass method (BPM)



L_i : Latest occurrence time of event i. It is the latest time at which event i can occur without affecting the total project time.

LS_{ij} : Latest start time for activity (i,j). It is the latest time by which the activity must start without affecting the total project time.

LF_{ij} : Latest finish time for activity (i,j).



$L_j = E_j$ for the last event

$LF_{ij} = L_j$

$LS_{ij} = L_j - t_{ij}$

$L_i = \min_{j} (L_j - t_{ij})$