

Network diagrams

all activities of project represented in a diagrammatic form.
 project schedule = network diag + time required.

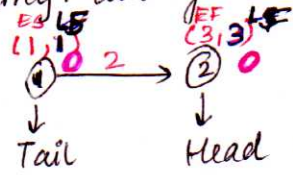
event: node or connector ○
 activity: → (one act one arrow)

Time flows from left to right.

- cyclical loop not allowed
- only 2 dangling events (start & end)
- avoid intersection (use bridge)
- 2 or more act ≠ one common start & end.

merge event:  burst event: 

dummy: always dotted lines.



1 Early start (ES): forward pass at merge events ES = maximum time (→)
 ES of an act = EF of previous act. EF = ES + duration.

2 Late finish (LF): backward pass (←) at burst events ES = minimum time.
 LF of an act = LS of next act. LS = LF - duration.

3 Critical path (CP): longest path of whole proj of all critical activities (longest duration)
 - Find out slack of each event = diff between ES & LF [0]
 - Join all slack to get CP.

4 Project duration: duration of critical path.

Format		1		2	
act	duration	ES	EF	LS	LF
TF	IF	FF	Tail slack	Incl float	FF - TS
LS - ES	Head slack	TF - FF			

Floats (free time associated with an activity)

Total float = LS - ES or LF - EF
 TF = FF + IF (diff btwn 2 start or 2 finish)

Free float (FF)

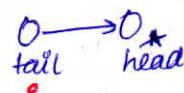
(bail)

$$FF = TF - IF$$

Independent float
 = FF - tail slack.

Interfering float (IF)

head slack.



PERT (1st draw net. diag)

Project timing

To: optimistic (minimum)

Tp: pessimistic (maximum)

Tm: most likely (proj duration)

$$\text{expected time} = \frac{T_p + T_o + 4T_m}{6}$$

* expected cost = $\sum$ (cost of ALL activities)

Standard deviation

$$\sigma = \sqrt{\sum (\text{variance of all critical act})}$$

$$\text{var} = \left[\frac{T_p - T_o}{6} \right]^2$$

CPM

- deterministic
- repetitive proj
- Time & cost

PERT

- probabilistic
- new project
- only time

Normal distribution

$$Z = \frac{x - \bar{x}}{\sigma}$$

$\bar{x}$ = CP time

σ = std dev

x = req time.

When $Z = P_i$

