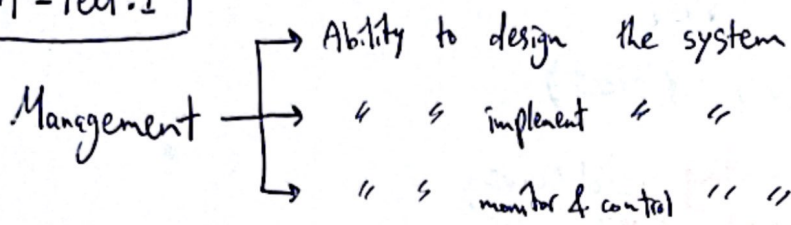


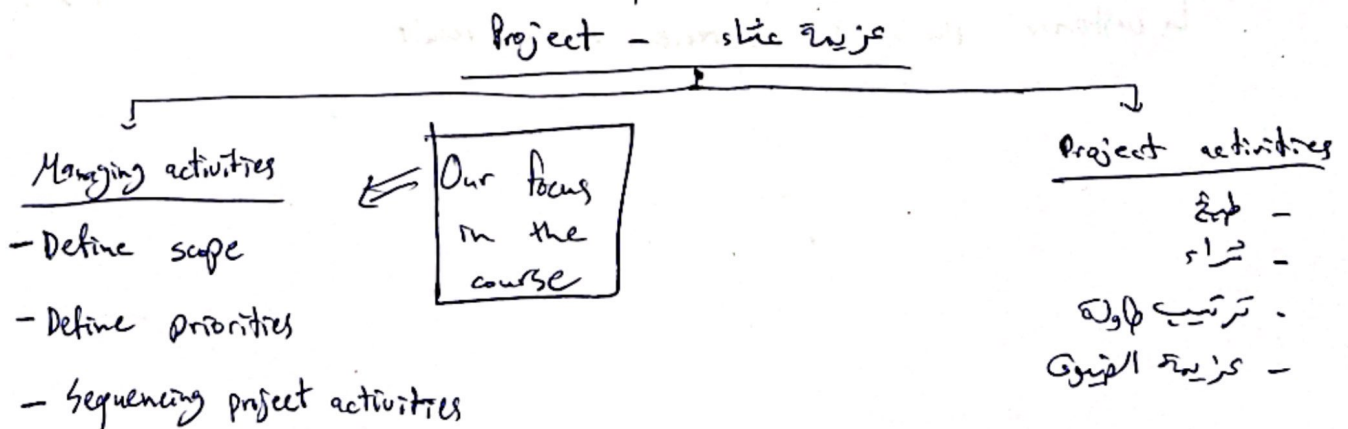
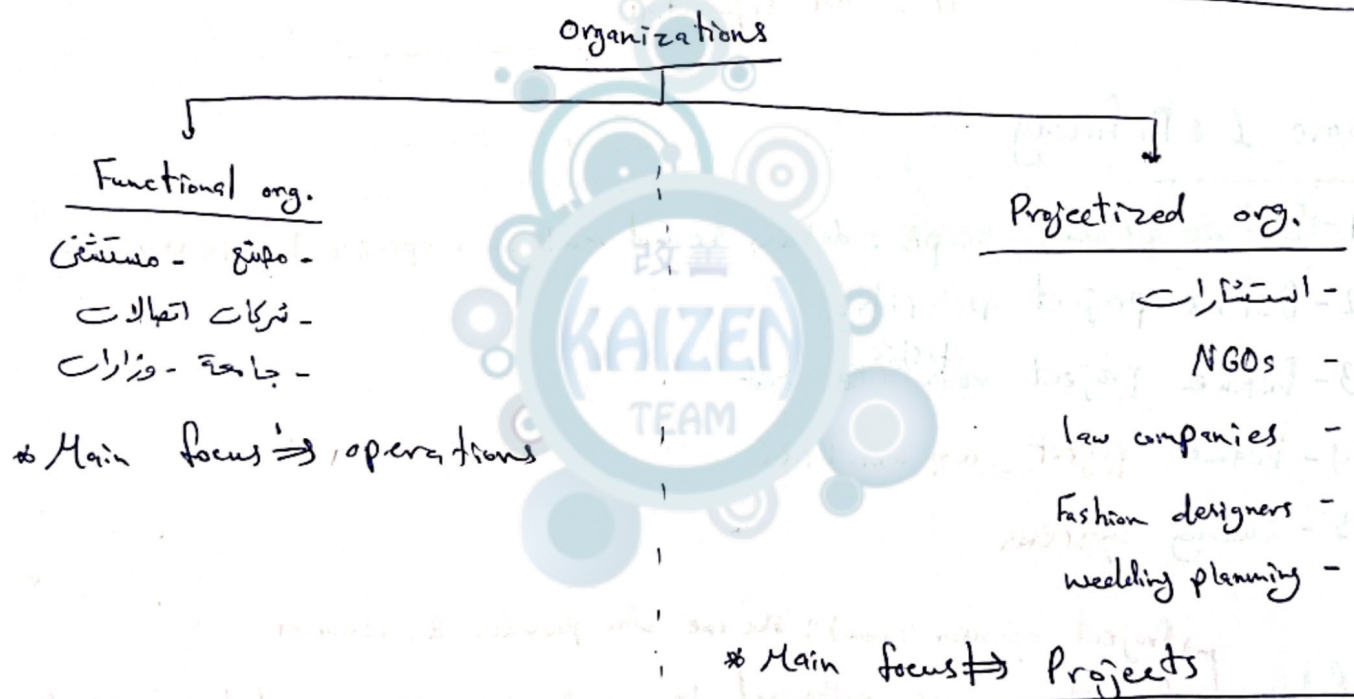
PM - lect. 1



Project: - a one time effort

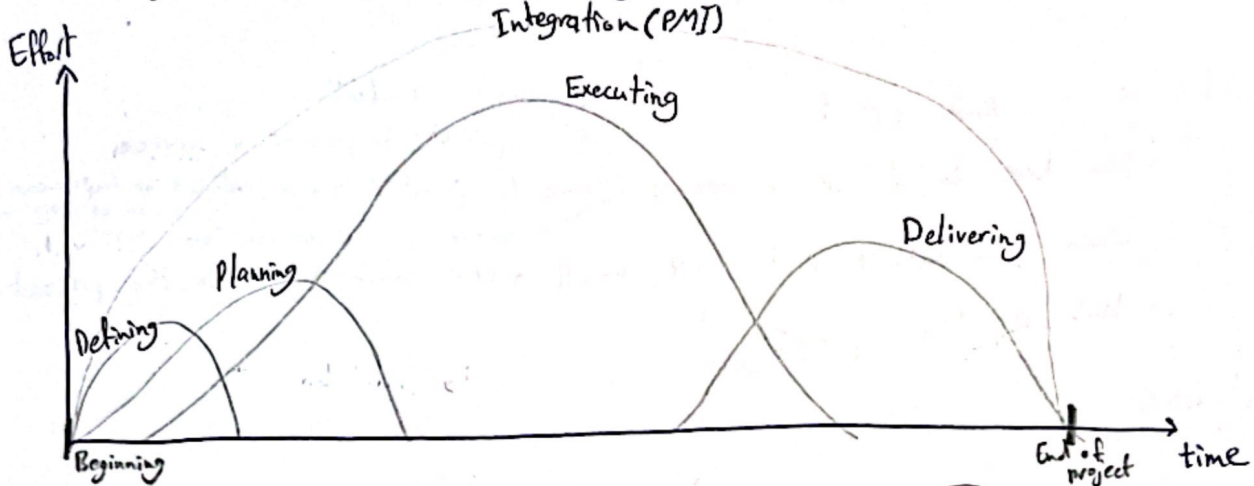
- you have to deliver a result
 - tangible product
 - capability to perform a service
 - development of a new product or improvement in an existing one
 - number, decision, conclusion
- when you submit that result, you'll never come back to the project
- has a life span $\leftarrow$ start $\rightarrow$ end

Operations:



Project Phases (Phases of managing a project)

1 Defining 2 Planning 3 Executing 4 Delivering



The phases are overlapping not sequential



Phase 1 : Defining

- 1- Define project scope : defining the end result in a specific tangible way
- 2- Define project priorities
- 3- Define project ~~responsibilities~~ ^{tasks}
- 4- Define project responsibilities
- 5- Coding system

accountable to: sponsor & customer
at the end of it, the manager is assigned

Roles

- Project sponsor (owner) : the one who provides the resources
- Project manager : authorized to use the resources to conduct the project
- customer : the one that will receive the end result

roles/could be same person

Scope checklist (Project charter) ⇒ "define project scope" tool ①

- Project objective : what? when? how much? (budget)
- Deliverables : expected outcomes throughout the lifetime of the project (outputs)
- Milestones : significant events with specific dates
⇒ conducted according to deliverables
- Specification requirements
- limits & exlutions : what is included & excluded in the project
{ dei lix lo go go dei lix go }
- Customer Review : check & approve ⇒ then assign project manager

how much?

① is it a project?
yes ← (annual)

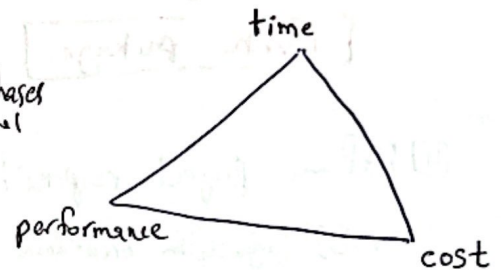
② customer's goal when introd. a new prod. line or product
↳ internal customer

PM - lect 3 ② Defining project priorities

↳ helps in making decisions in ~~future~~ future phases
↳ customer defines priorities whether internal or external

time
cost
performance

} must prioritize between them



The tool : project priority matrix ⇒

← لا بد يا سيدي
← ناول لا نغير
← عادي لو تغير

	Time	Cost	Performance
Constraint		✓	
Enhance	✓		
Accept			✓

Example

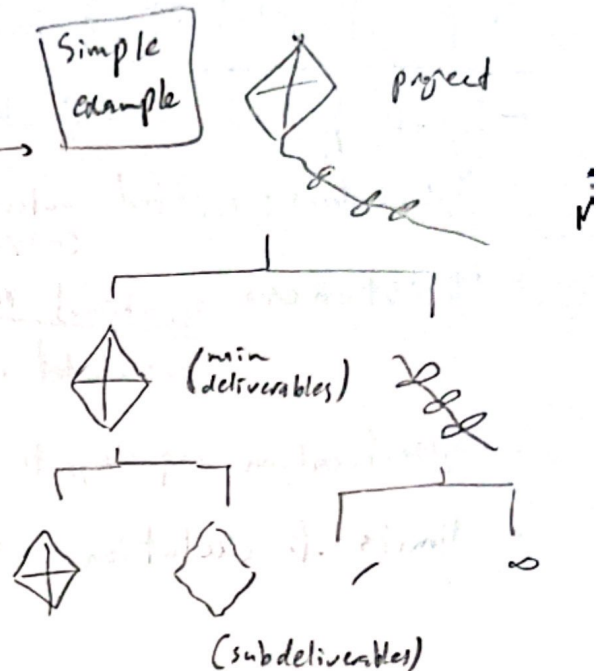
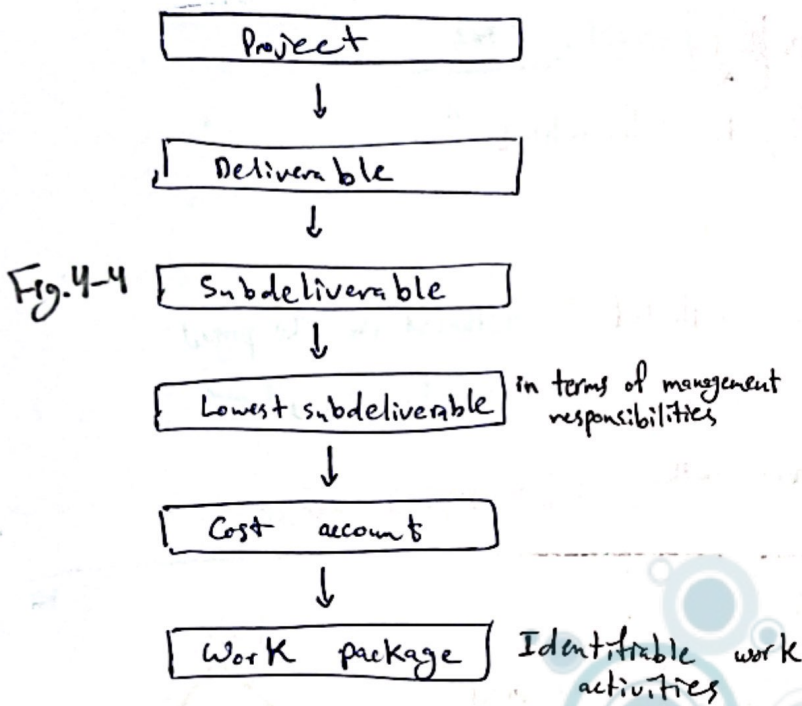
- local conference •

- International conference •

	time	cost	performance
Constraint	• •		
Enhance		•	•
Accept		•	•

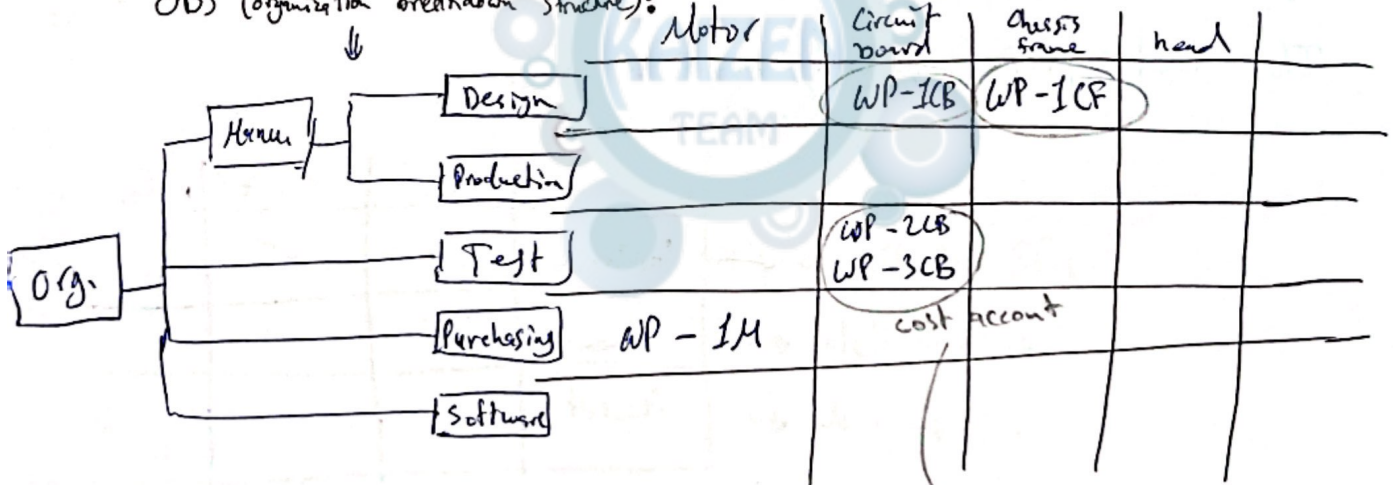
③ Define Project tasks (activities)

⇒ Tools Work breakdown structure



④ Define project responsibilities (who is responsible for each task.)

OBS (organization breakdown structure):



⇒ Software: Indentation System

⇒ Cost account: monitoring & controlling the budget by finance dept.

⑤ * WBS dictionary

Coding System

→ numerical indentation system
→ numbers & letters

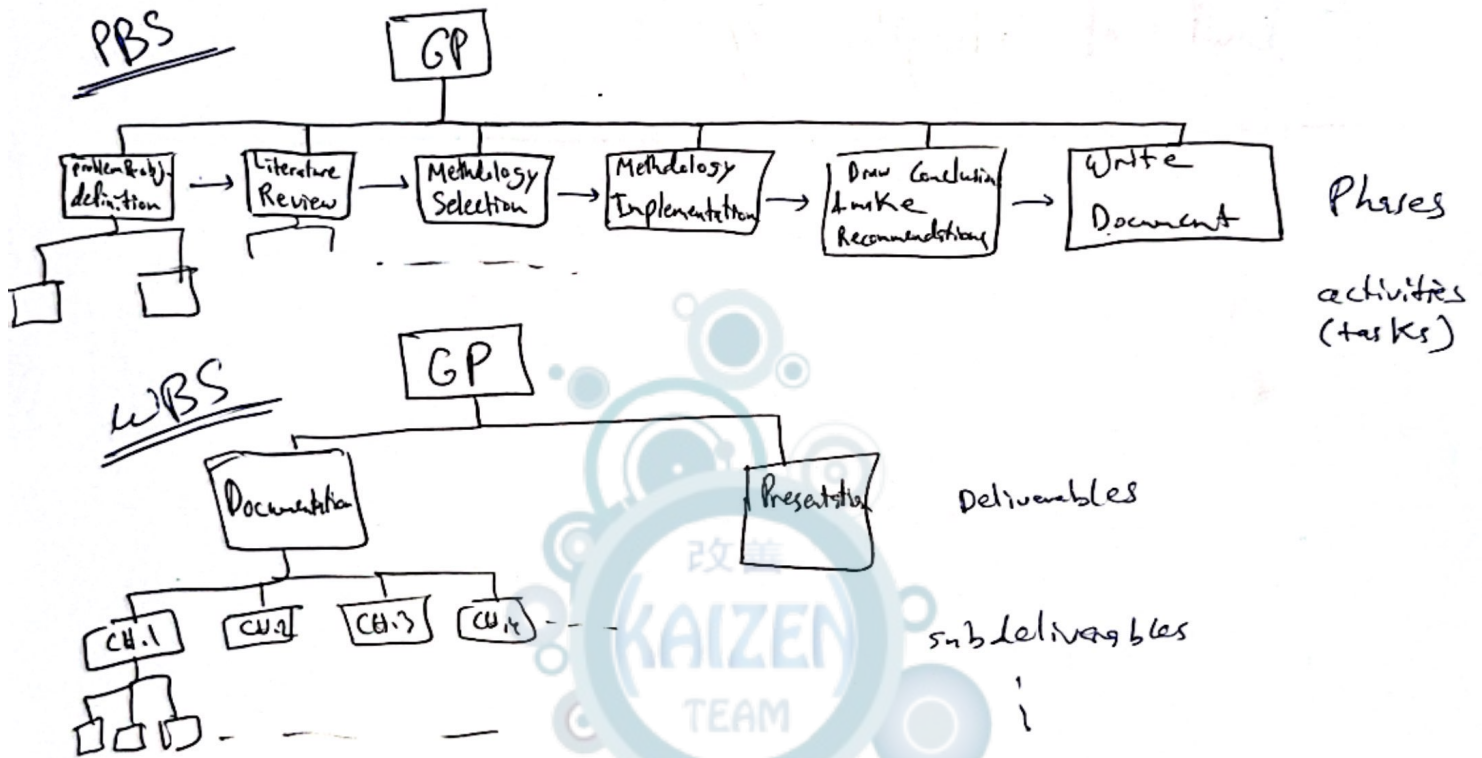
* Must have → system
→ dictionary

Process Breakdown structure (PBS)

- Deliverable oriented projects $\Rightarrow$ WBS $\rightarrow$ deliverables & subdeliverables
- Phase oriented projects $\Rightarrow$ PBS $\leftarrow$ activities & subactivities
deliverables documented

Proposals WBS
 ↳ respons. matrix
 ↳ Gantt chart
 ↳ main tasks
 ↳ milestones

Example: Graduation Project



Responsibility Matrix

* Types of involvement

- Responsible
- Support
- Consult
- Notification
- Approval

OR RACI matrix

tasks / Task packages	organization (All parties involved)

Responsible : مسؤول عن التنفيذ
 Accountable : Questionable about the results

المسؤول عن (الناتج)
 من يمكنه ان يكونوا
 نفس الشيء

GP

	GP Team	GP supervisor	Company (ex: production manager)
Prob. Def.	R	C	C
Litret. Rev.	R	C	
Method. select.	R	C/A	S
⋮			
draw conclusion	R		N

End of chapter 4

Macro estimation of time & cost

- 1 - Consensus method : Judgment (intuition or experience)
- 2 - Ratio method
- 3 - Apportion method
- 4 - Function point method (software projects) self study
- 5 - learning curves

2 Ratio



super deluxe
deluxe
عزلة

250 JD/m²
150 JD/m²
100 JD/m²

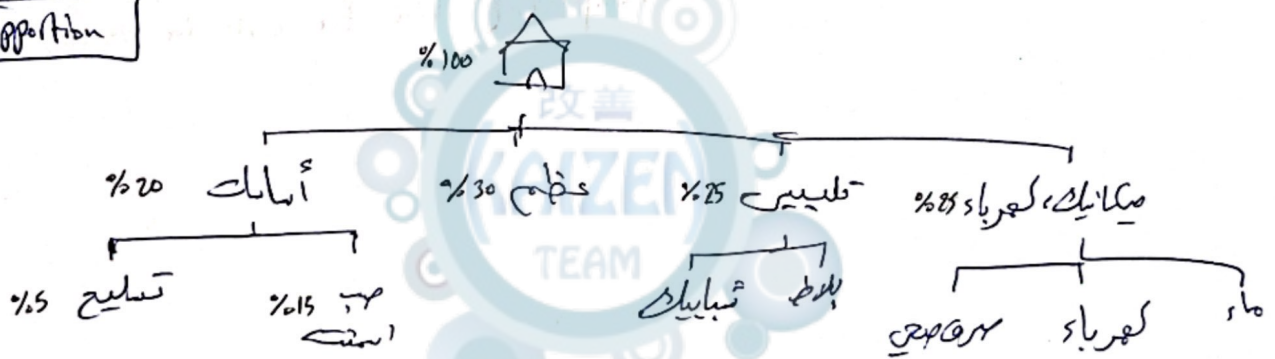


1000 m²

⇒ 150,000 JD

rough estimate
according to historical data

3) Apportion



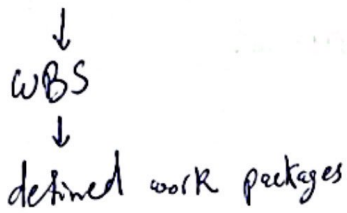
⇒ You divide main cost on main & subdeliverables as a percent from total

5) learning curves → labor difficult processes (complex) note: automated & simple processes doesn't have

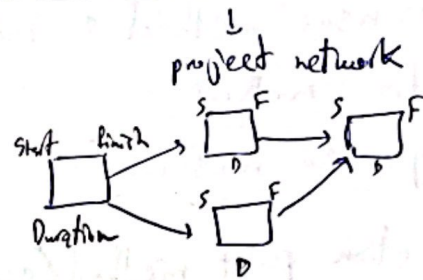
↳ Appendix 5-1

Micro estimation of time & cost

defining phase



Planning phase



↳ micro estimation: detailed estimate of time & cost for each activity alone

↳ ask people responsible to do the activity to give you estimates about time & cost, how?

- experience
- Parametric procedure (ratio method)
- Template (archive for costs in previous projects)



Types of Costs

- Direct cost: directly related to a specific activity in the project ~~labor - material - equipment~~
 - Direct overhead cost: directly related to the project but not to a specific activity
 - labor - material - equipment
 - General & administrative cost (G&A)
- * Direct overhead cost usually as a percent of direct cost
- * G&A cost usually as a percent of Total direct cost (direct + direct overhead)

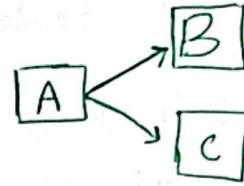
Example

Direct cost	80,000 \$
Direct overhead cost (25% of direct)	20,000 \$
Total direct	100,000 \$
G&A cost (20% of total direct)	20,000 \$
Total cost	120,000 \$
Profit (20% of total cost)	24,000 \$
Total bid	144,000 \$

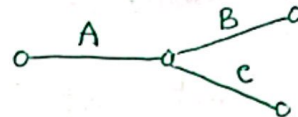
PM - lect. 9 "Project Network"

* Techniques to develop project networks:

- ✓ **1 Activity - on - node (AON)**
 in our course
 - activities represented by nodes
 - relations represented by arrows/lines



- 2 Activity - on - arrow (AOA)**
 - activities represented by arrows
 - relations represented by nodes



* Some terminologies:

- Activity: could be actual activity or waiting

- Predecessor activity
- Successor activity

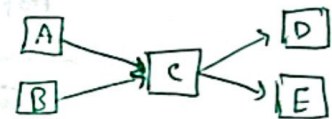


finish to start relationship

- Merge activity: activity with more than one predecessor
- Burst activity: activity with more than one successor

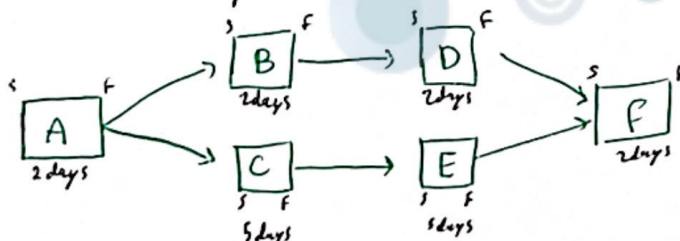
A predecessor B

B successor A



C is a merge and burst activity

- Parallel activity: activities with no dependencies



B//C
 B//E
 D//C
 D//E

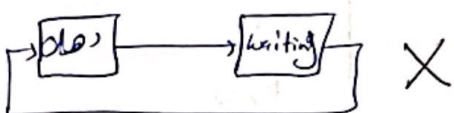
- Path: all paths must be completed for a project to end

⇒ the longest ^{duration} path is called critical path and determines the minimum duration of the project

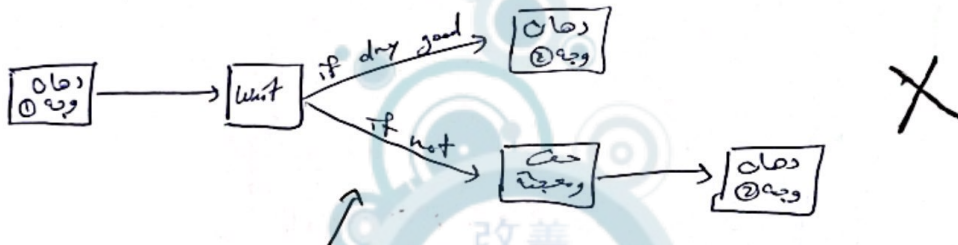
in our example → the min. duration = 14 days
 → the critical path is path 2

- Events: start & finish of activities

* Consider for project networks:

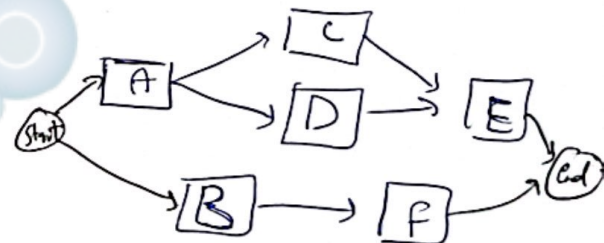
- Draw from ~~the~~ left to right
- Draw phase to phase ارسم كل مرحلة مع أناس أو أدوات
- Arrows can cross each other
- Leave gaps when coding 1 → 2 → 5
- Looping isn't allowed


• Conditional statements isn't allowed, Project Networks are built according to normal conditions



Uncertain events ⇒ taken into consideration through risk management

- Start activities: grouped in a start node
- End activities: grouped in an end node



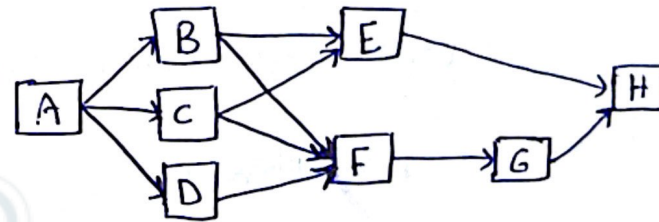
• Precedence table

	Activity	Predecessor
WP7	← A	None
WP11	← B	None
WP3	← C	A
	D	B
	E	C
	F	
	G	
	H	

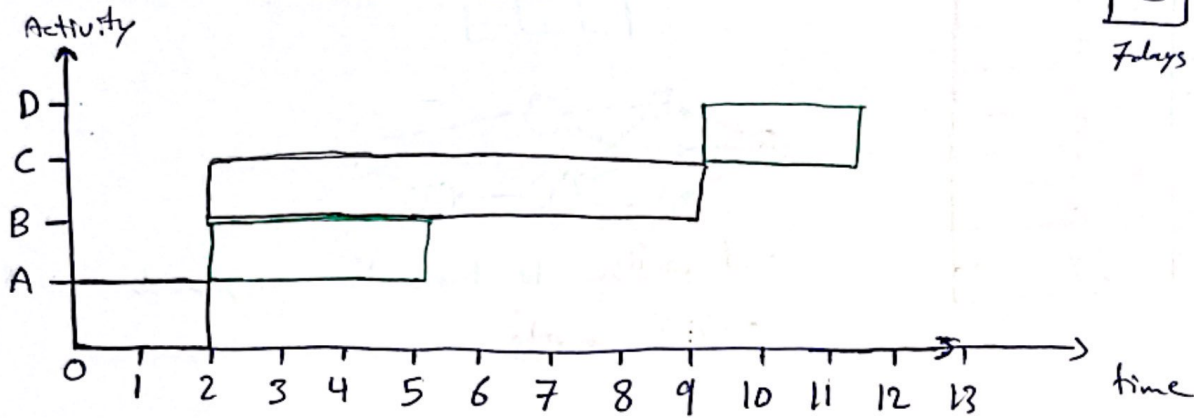
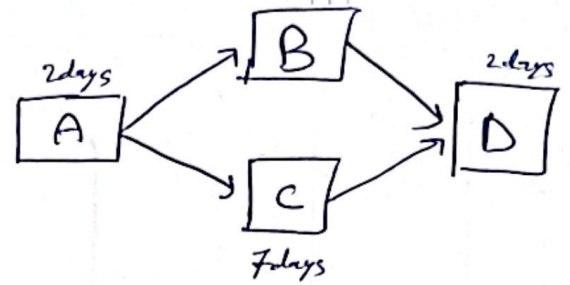
Example: Developing a Project Network

Precedence table

Activity	Description	Preceding activity
A	Approval	None
B	plans	A
C		A
D		A
E		B, C
F		B, C, D
G		F
H		E, G



Critical Path Method (CPM)


$$E_S^A$$
 E_{f_A}
$$ES_B$$
 EF_B
$$ES_c$$
 EF_c

LSc

ES_D

 EF_0

LSA

LF_A

LSB

LS_D

LFD

$$LF_c$$

Cons

بشوق السهم الي والقتل م

* Forward pass calculations :

$$LF_c$$

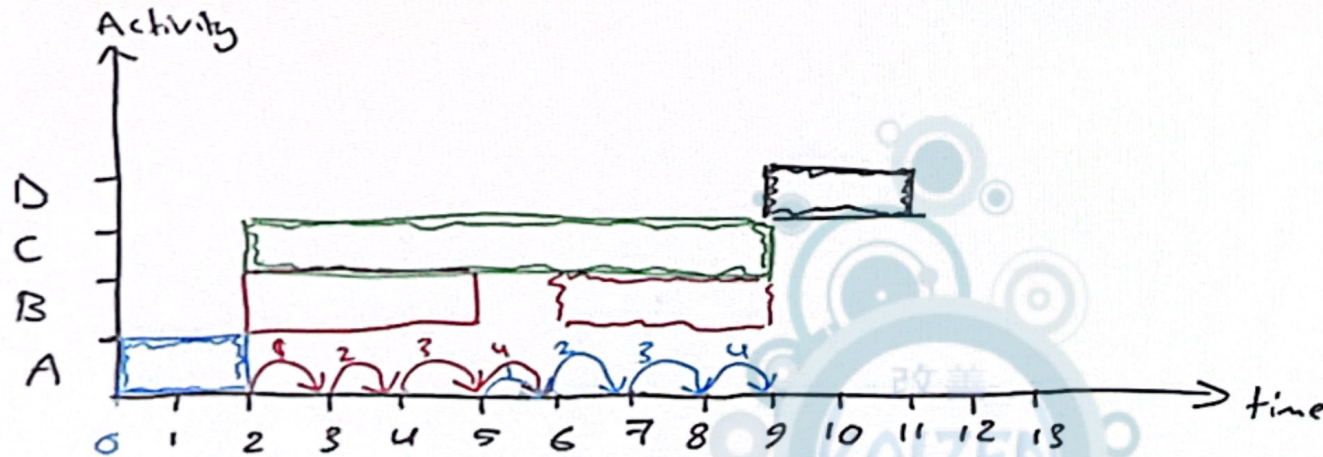
(میں عامل علی constraint)

- ES } for all activities (early start & finish)
- EF }
- minimum project duration = 11 days

* Backward pass calculations (constraint calculation)

- LS } for all activities (late start & finish)
- LF }
- Slack start } for all activities
- Slack finish }
- Critical Path is a sequence of critical events with slack = 0
 - each project will have at least one critical path
 - the duration of the critical path equals the minimum project duration

Critical path method (CPM)



ES_A

EF_A

ES_B

EF_B

ES_C

EF_C

ES_D

EF_D

LS_D

LF_D

LF_C

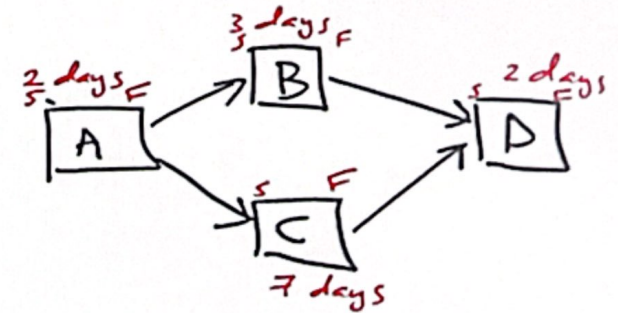
LF_B

LS_A

LS_C

LS_A

LS_B



Forward pass calculations

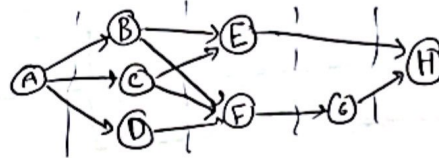
- ES } all activities
- EF } all activities
- minimum project duration

Backward pass calculations

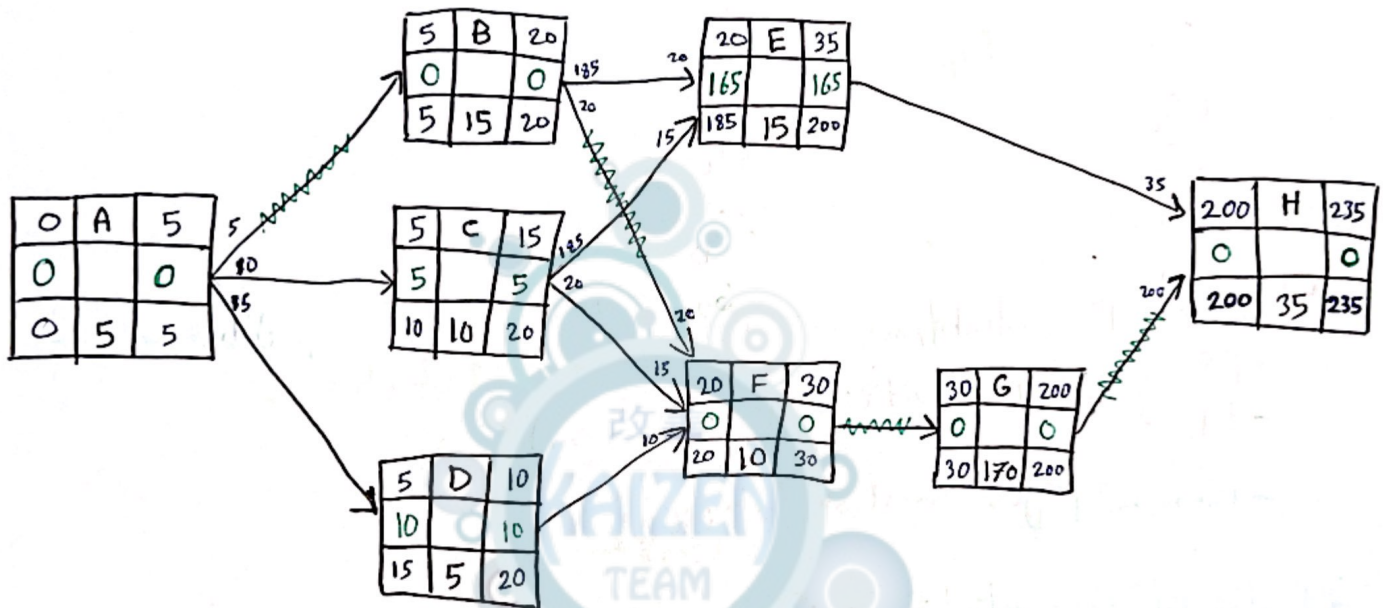
- LS } all activities
- LF } all activities
- slack start } all activities
- slack finish } all activities
- critical path

Activity	Preceding activity	Activity time
A	None	5
B	A	15
C	A	10
D	A	5
E	B, C	15
F	B, C, D	10
G	F	170
H	E, G	35

ES	ID	EF
S/K		S/K
LS	Dur.	LF



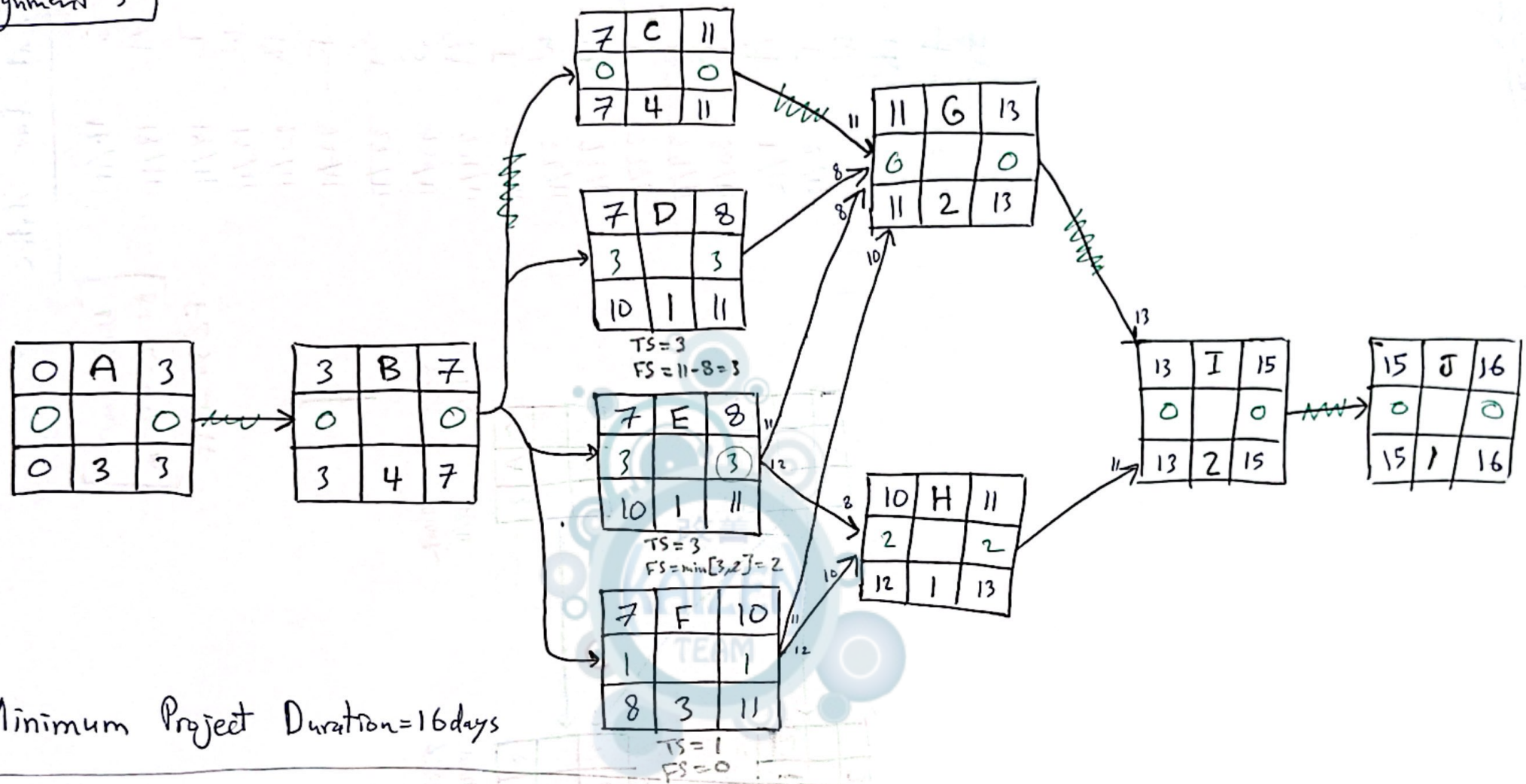
Good practise to know how many levels we need
 $\Rightarrow$ 5 levels



* Minimum Project Duration = 235

* Number of paths = 5

Assignment 3



Minimum Project Duration = 16 days

* Total slack: allowable delay without delaying project duration beyond minimum duration

* Free slack: allowable delay without delaying the early start of the successor

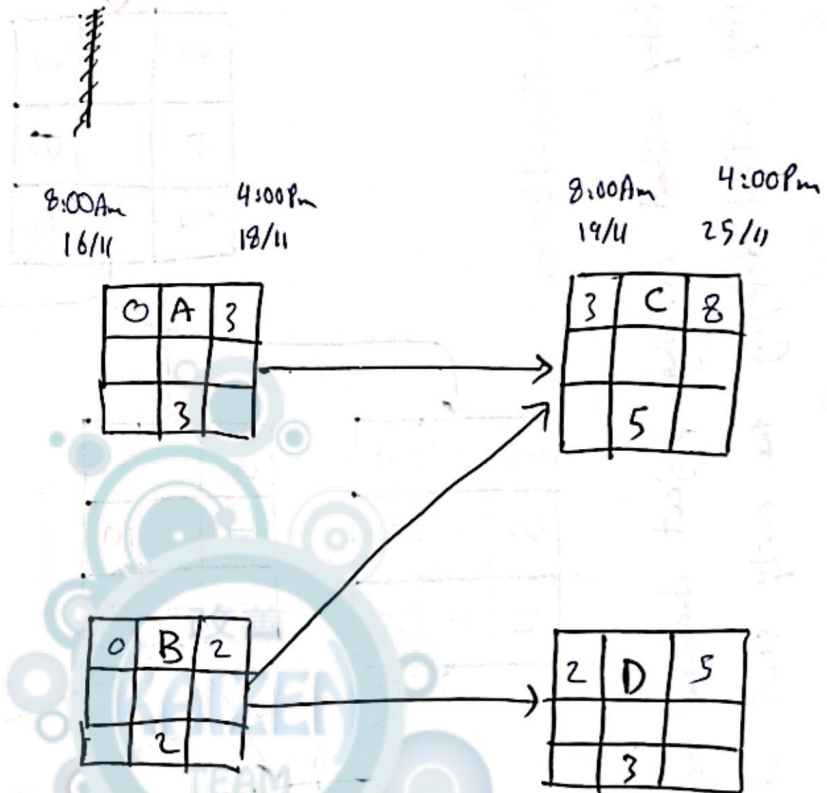
$$\text{Free slack} = \min [ES_{\text{successor}} - EF_{\text{activity}}]$$

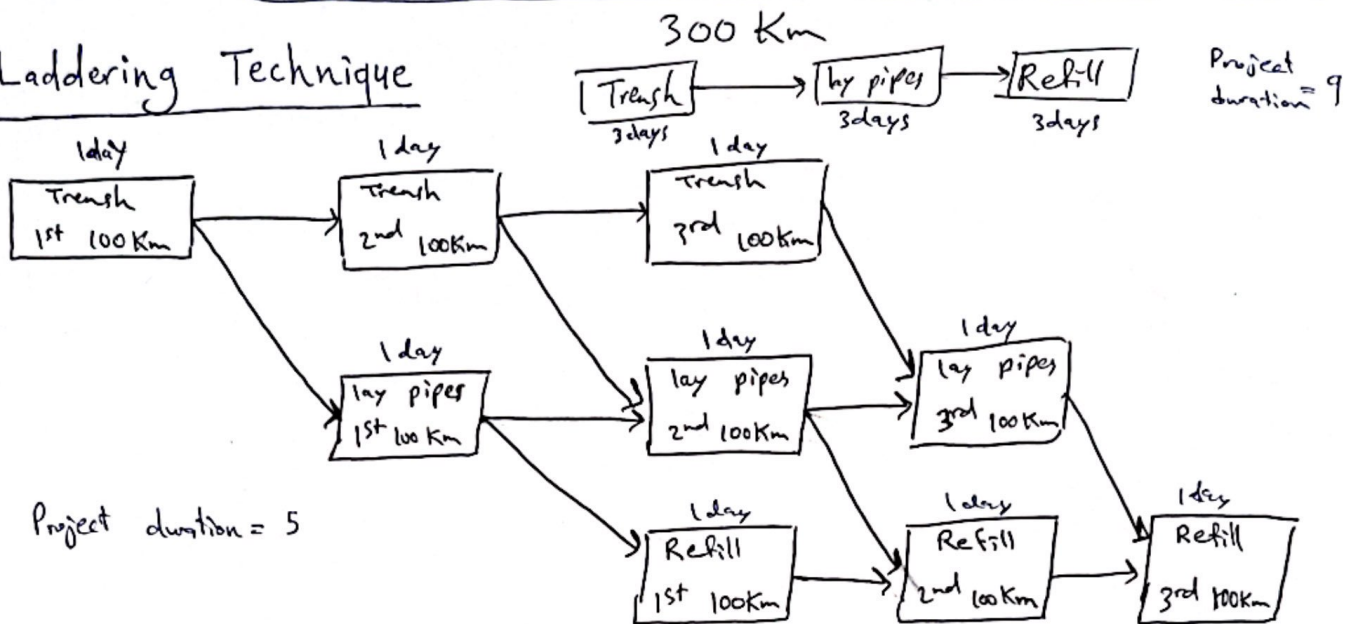
3 cases $\begin{cases} FS = TS \\ FS < TS \end{cases}$

Calendar dates

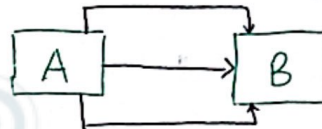
✓ S 16/11
 ✓ M 17/11
 ✓ T 18/11
 ✓ W 19/11
 ✓ Th 20/11
 F 21/11
 Sa 22/11
 ✓ S 23/11
 ✓ M 24/11
 ✓ T 25/11
 W 26/11
 Th 27/11
 F 28/11
 Sa 29/11
 S 30/11
 M 1/12
 T 2/12
 W
 Th
 F
 Sa

[Work hours
 8:00 Am - 4:00 Pm
 F & Sa → off



1 Laddering Technique2 Use of lags on different relationships

1 - Finish - to - start relationship



2 - Finish - to - finish relationship



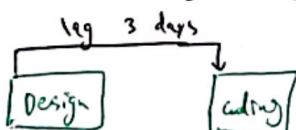
3 - Start - to - start relationship



4 - Start - to - finish relationship

Case 1 :

you must start design & wait 3 days
before starting coding



start - to - start with lag 3 days

Case 2 :

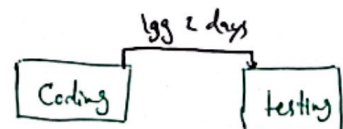
you must finish testing
before you can finish documentation



finish - to - finish

Case 3 :

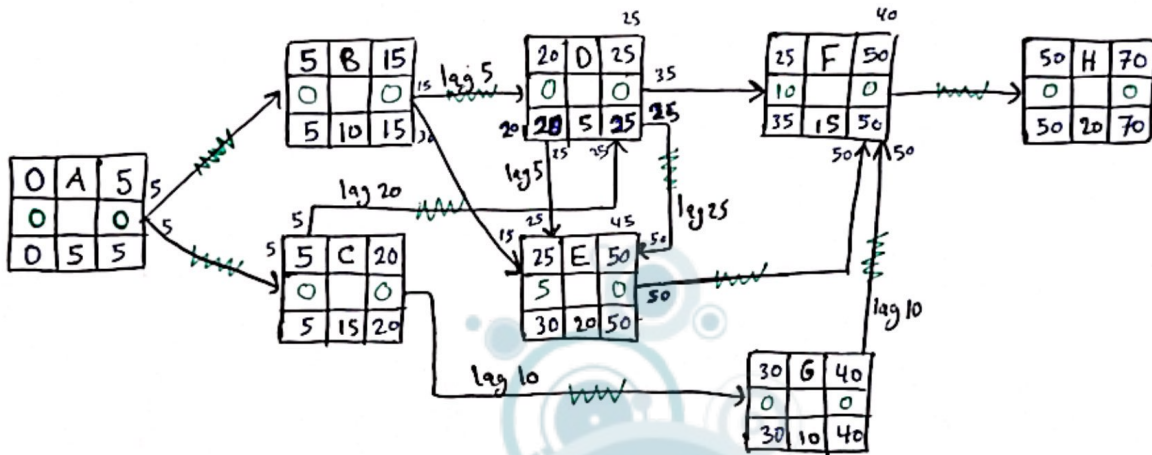
you must finish coding & wait
2 days before starting testing



finish - to - start with lag 2 days



ID	Duration	Finish-to-Start Predecessor	Finish-to-Start Lag	Additional Lag Relationships	Lag
A	5	None	0	None	0
B	10	A	0	None	0
C	15	A	0	Start-finish C to D	20
D	5	B	5	Start-start D to E	5
				Finish-finish D to E	25
E	20	B	0	Finish-finish E to F	0
F	15	D	0	None	0
G	10	C	10	Finish-finish G to F	10
H	20	F	0	None	0



* Minimum project duration = 70

* # of critical paths = 3

③ Hammock Activity

