



Shoubra faculty
of Engineering

2nd year Communication
2020/2021



Projects Management (PM)

إدارة المشروعات

Lecture 6

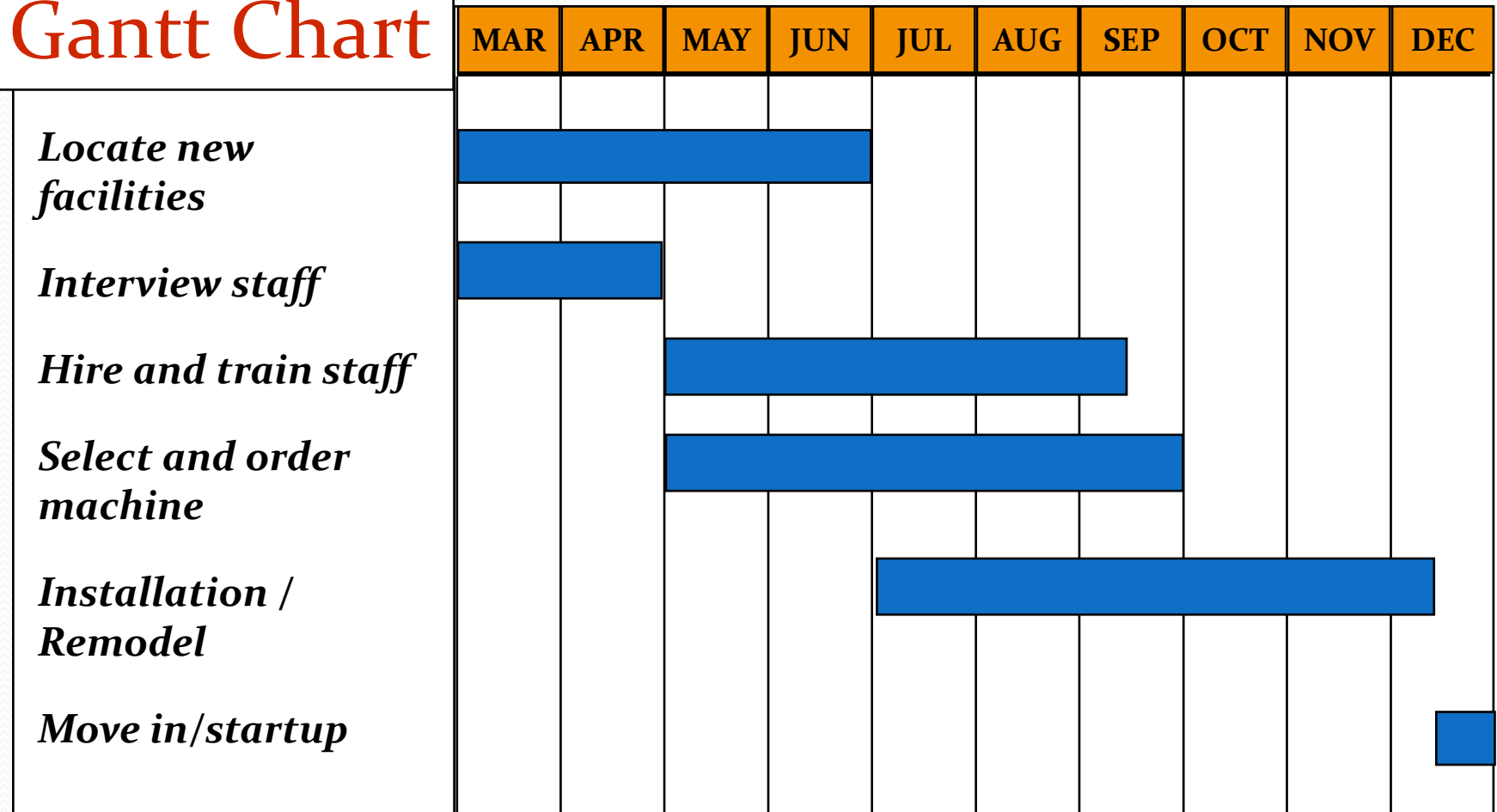
Time Management

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Planning and Scheduling

Gantt Chart



- What are the Major Administrative Issues?

- Executive responsibilities

- Project selection
- Project manager selection
- Organizational structure

- Organizational alternatives

- Manage within functional unit
- Assign a coordinator
- Use a matrix organization with a project leader

matrix organization



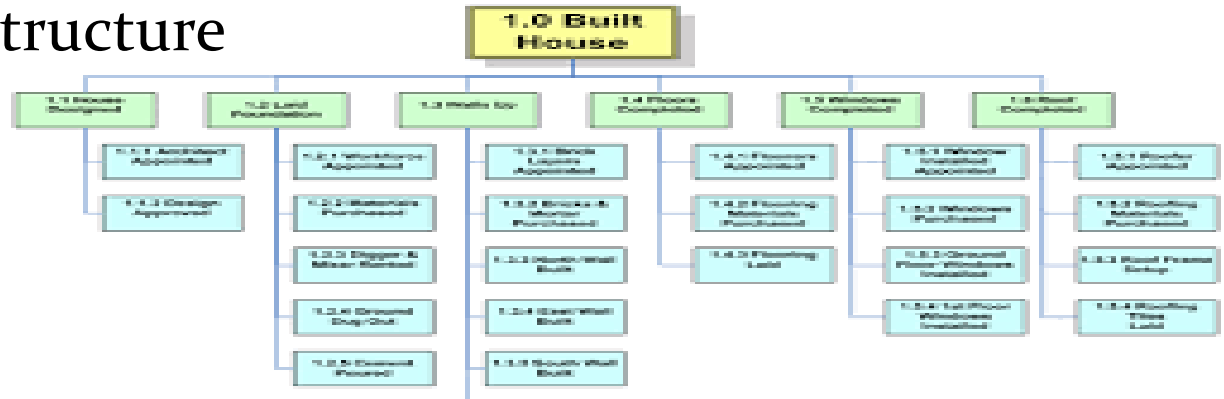
What are the tools usually used by project manager?

Work breakdown structure

Network diagram

Gantt charts

Risk management



Activity	Predecessor	L	E	L	Mean (μ)	Variance (σ^2)	Standard Deviation (σ)
A	-	2	4	9	4.8	1.94	1.39
B	A	5	8	14	9.5	2.25	1.50
C	B	4	10	13	9.4	2.25	1.50
D	B	4	7	10	7	1.00	1.00
E	C	15	14	20	14.5	2.25	1.50
F	D	8	13	18	12.9	1.36	1.17
G	E,F	2	4	9	4	0.49	0.67



Risk Category	Extended categories
Technical	Requirements, Technology, Interfaces, Performance, Quality, etc.
External	Customer, Contract, Market, Supplier, etc.
Organizational	Project Dependencies, Logistics, Resources, Budget, etc.
Project Management	Planning, Schedule, Estimation, Controlling, Communication, etc.

What are the key decision elements in PM?

- Deciding which projects to implement
- Selecting a project manager
- Selecting a project team
- Planning and designing the project
- Managing and controlling project resources
- Deciding if and when a project should be terminated

Project Manager

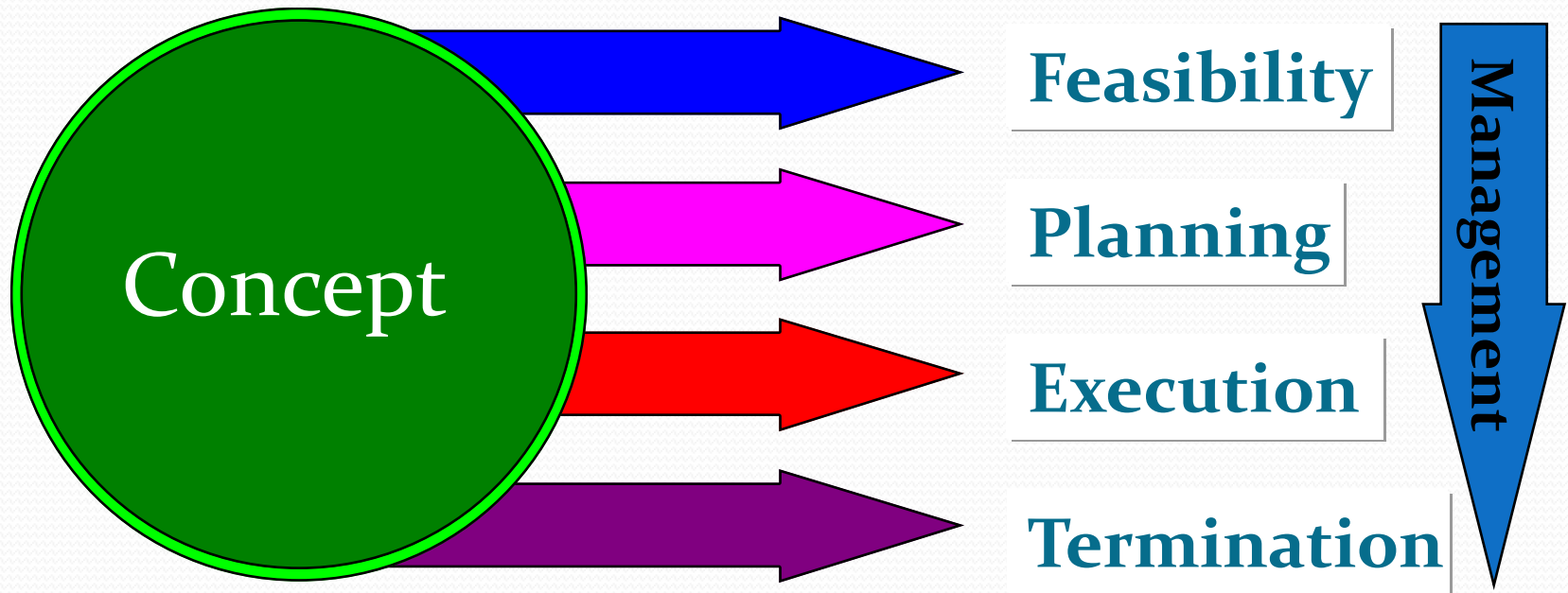
If you are a project manager, what is your Major responsibilities?

PM Responsible for:

- ✓ Work
- ✓ Human Resources
- ✓ Communications
- ✓ Quality
- ✓ Time
- ✓ Costs



Project Life Cycle



Time Management

Project Management Knowledge Areas

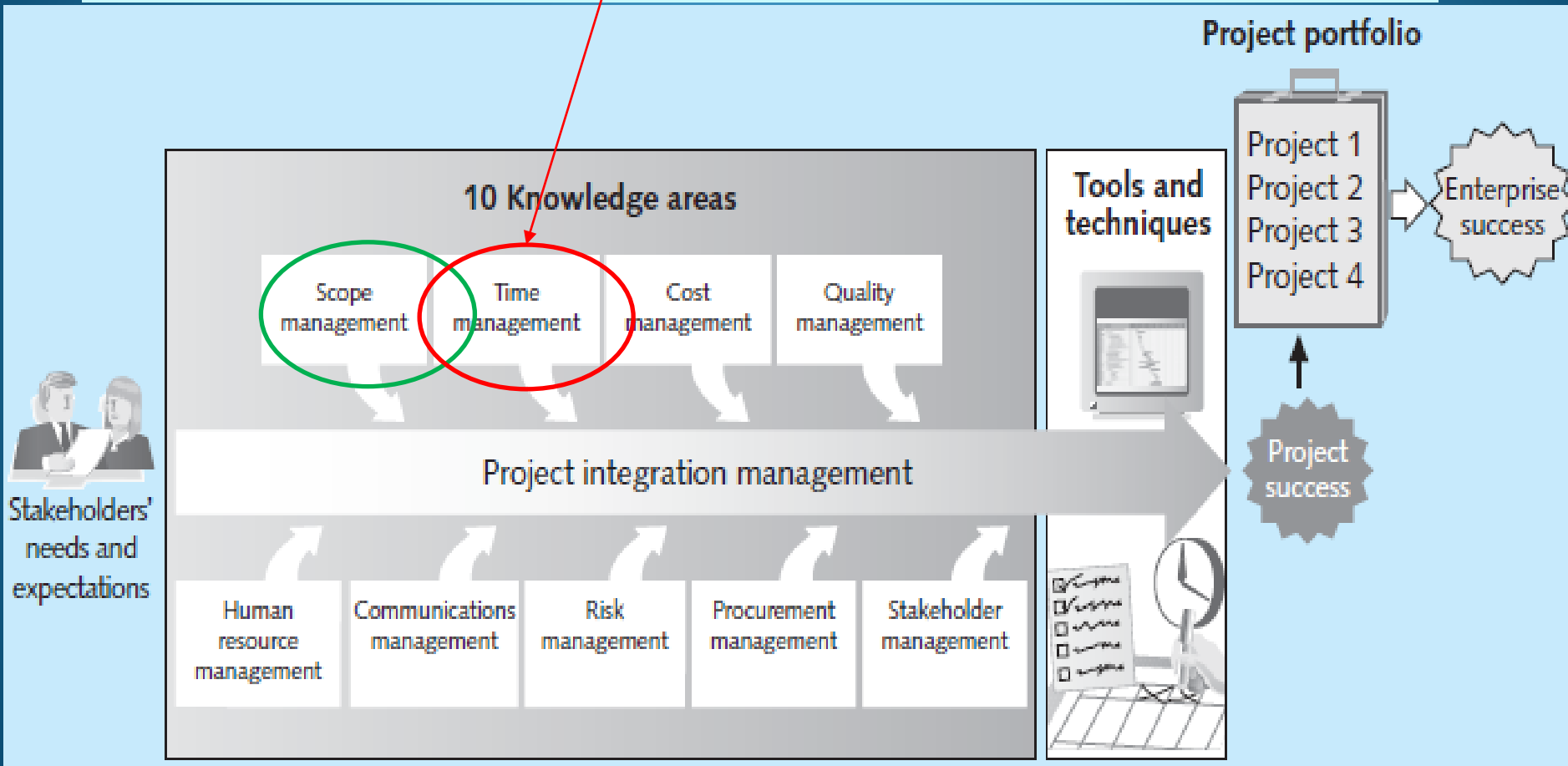


Fig. Project Management Framework clarifying knowledge areas

Time Management

- Managers often cite the need to deliver projects on time as one of their biggest challenges

كثيرا ما يستشهد المديرون بالحاجة إلى تقديم مشاريع في الوقت المحدد كأحد أكبر التحديات

- **Project time management involves the processes required to ensure timely completion of a project.**

تشتمل أداره وقت المشروع علي العمليات المطلوبة لضمان إنجاز المشروع في الوقت المناسب.

Time Management (cont'd)

7 processes are involved in time management:

PM Process Group	Time Management Processes
Planning	<ol style="list-style-type: none">1) Planning schedule management2) Defining Activities3) Sequencing Activities4) Estimating Activity Resources5) Estimating Activity Durations6) Developing the Schedule
Monitor and Control	<ol style="list-style-type: none">7) Controlling the Schedule

Basis of Schedule:
further define the
triple constraints

1) Planning Schedule Management

- Involves determining the policies, procedures, and documentation that will be used for planning, executing, and controlling the project schedule. تحديد السياسات والإجراءات والوثائق لاستخدامها في التخطيط والتنفيذ والتحكم.

A Precedence Diagramming Method (PDM), which is sometimes also known as the Activity on Node (AON) Diagramming Method, is a graphical representation technique, which shows the interdependencies among various project activities.

Critical path is the sequence of project network activities which add up to the longest overall duration, regardless if that longest duration has float or not.

- Examples: Define schedule model (AOA(activity-on-arrow), PDM)-Methodology (e.g., critical path (CPM) or other method)- units of measure (e.g., days, hours, or other unit)- control threshold (i.e., $\pm 10\%$)
- The project charter often mentions planned project start and end dates, which serve as the starting points for a more detailed schedule.

2) Defining Activities

- Defining activities involves identifying the specific actions that will produce the project deliverables in enough detail to determine resource and schedule estimates

- 1) Defining Activities
- 2) Sequencing Activities
- 3) Estimating Activity Resources
- 4) Estimating Activity Durations
- 5) Developing the Schedule

- Further define the activities included in the WBS.

Example: a WBS item called “Produce study report.” may be further defined in this stage as:

- ✓ How long should the report be?
- ✓ Does it require a survey or extensive research to produce?
- ✓ Decompose to several subtasks e.g., developing a survey, analyzing the survey results, writing a draft report, editing, and finally producing the report

- Further defining the task will help the project team determine how long it will take to do and who should do it.

2) Defining Activities (cont'd)

Main Inputs	Main Outputs
Scope Baseline	<ol style="list-style-type: none">1) Activity list2) Activity attributes3) Milestone List

The **WBS Dictionary** describes each component of the **WBS** with milestones, deliverables, activities, scope, and sometimes dates, resources, costs, quality b

Remember:

Scope baseline consists of:

Scope statement- WBS- WBS dictionary

2) Defining Activities (cont'd)

Output 1: Activity List

➤ The **activity list** is a tabulation of activities to be included on a project schedule. The list should include:

- ✓ Activity name
- ✓ Activity identifier or number
- ✓ Brief description of the activity.

WBS ID	Activity Name	Activity ID
1	Planning	PLAN
1.1	Meet with customers	CUSTOMERS
2	Requirements	REQUIREMENTS
2.1	Business requirements	BUSREQ
2.1.1	Compile	BUSCOMP
2.1.2	Review and approve	BUSAPPR
2.2	Functional requirements	FUNCREQ
2.2.1	Compile	FUNCCOMP
2.2.2	Review and approve	FUNCAPPR
3	Design and construct	CONSTRUCT
3.1	Technical design	DESIGN
3.2	Code	CODE
3.3	Unit test	UNIT
4	Deploy	DEPLOY
4.1	System test	SYSTEM
4.2	Train	TRAIN
4.3	Rollout	ROLLOUT

Level 1
Level 2
Level 3

Output 2: Activity Attributes

- Provide **more schedule-related information** about each activity, such as:
- ✓ Predecessors, successors, logical relationships, resource requirements, constraints, imposed dates, and assumptions related to the activity.

توفير المزيد من المعلومات المتعلقة بالجدول الزمني حول كل نشاط ، مثل: المهام السابقة واللاحقة والعلاقات المنطقية والمتطلبات من الموارد والقيود والتواريخ المفروضة والافتراضات المتعلقة بالنشاط.

WBS ID	Activity Name	Activity ID
1	Planning	PLAN
1.1	Meet with customers	CUSTOMERS
2	Requirements	REQUIREMENTS
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4.2	Train	TRAIN
4.3	Rollout	ROLLOUT

Level 1

Level 2

Level 3

The activity list

2) Defining Activities (cont'd)

Output 3: Milestone List الاحداث الرئيسية

- A milestone on a project is a **significant event (most important and visible)** that **normally has no duration**.
- It often takes **several activities to complete a milestone**, but the **milestone** itself is **like a marker** to help in identifying necessary activities.

Examples:

- ✓ Completion and customer signing-off of documents, such as design documents
- ✓ Completion of specific products, such as installation of new hardware

3) Sequencing Activities

- 1) Defining Activities
- 2) **Sequencing Activities**
- 3) Estimating Activity Resources
- 4) Estimating Activity Durations
- 5) Developing the Schedule

➤ **Sequencing activities means**: Determining the **dependencies** and **relationships** among different activities.

تحديد التبعية والعلاقات بين الأنشطة المختلفة.

- Does a certain activity have to be finished before another can start?
- Can the project team do several activities in parallel? Can some overlap?

هل يجب الانتهاء من نشاط معين قبل ان يبدأ آخر ؟

هل يمكن لفريق المشروع القيام بالعديد من الأنشطة بالتوازي ؟

هل يمكن التداخل بين بعض الانشطة ؟

3) Sequencing Activities (cont'd)

Two basic **Reasons** for creating Dependencies

1) **Mandatory dependencies:**

Inherent in the **nature of the work** being performed on a project (referred to as **hard logic**)

Example:

- ✓ You cannot test code until after the code is written.

2) **Discretionary dependencies:** متروكة لتقدير الفريق

Defined by the **project team** (referred to as **soft logic**)

Example:

- ✓ The detailed design of a new system will not begin until the users sign off on all of the analysis work.

3) Sequencing Activities (cont'd)

Network Diagrams:

- A network diagram is a schematic display of the logical relationships among project activities and their sequencing.
- All activities have to be executed to complete the project.

Activities: A - J

Sequencing : arrows

Duration: e.g, A=1

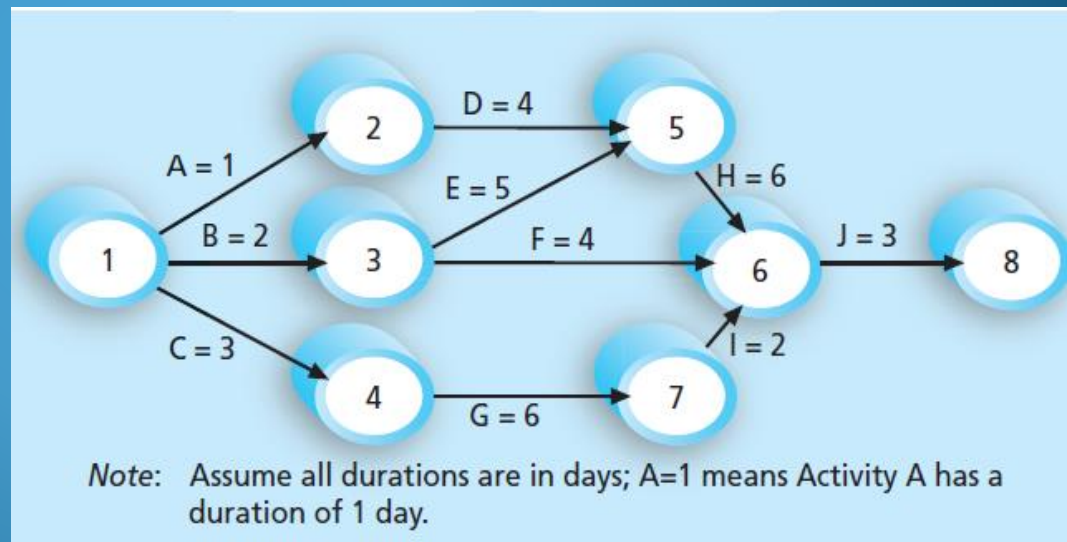
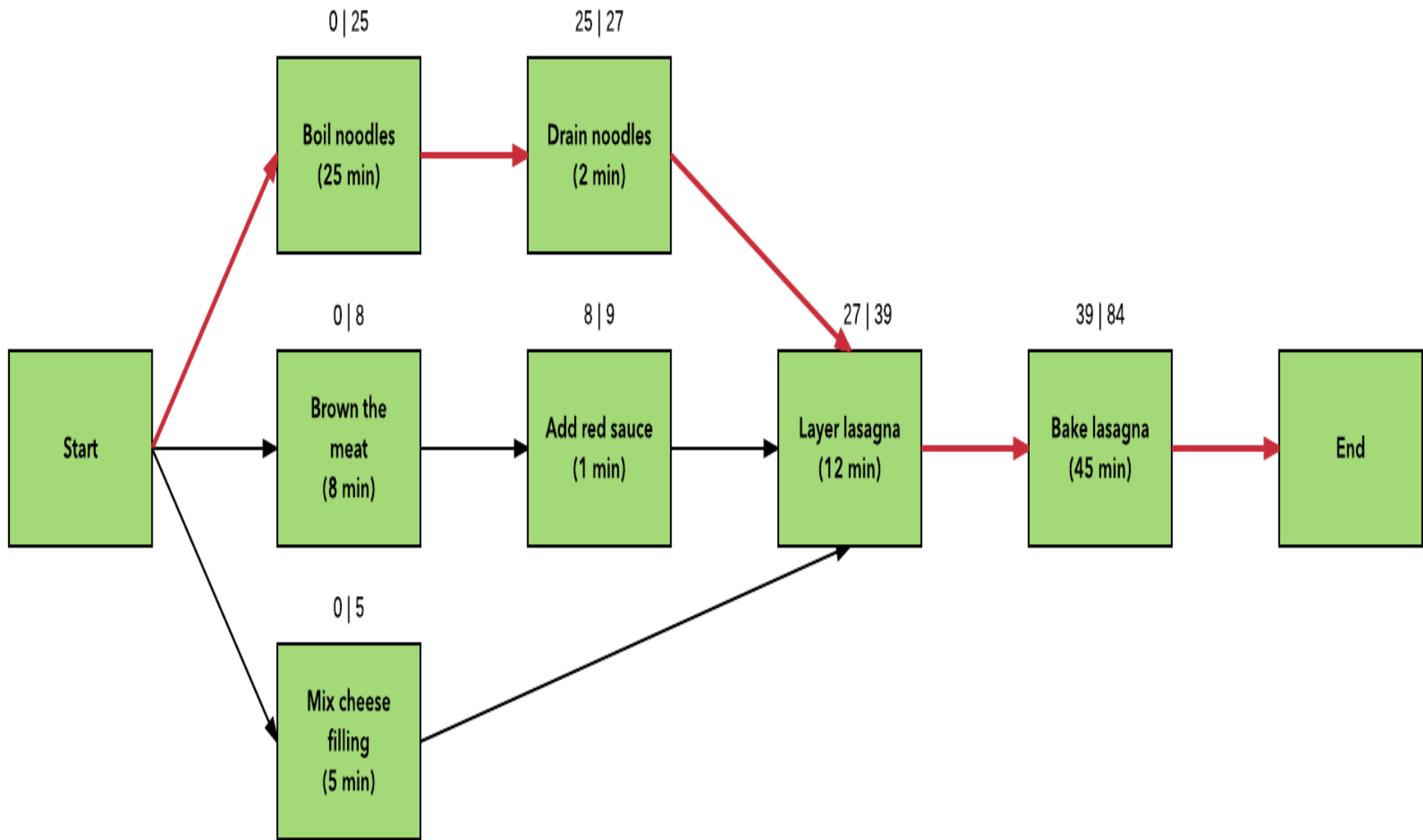


Fig. Network diagram of Project X

- The shown figure is a form of network diagrams called Activity on Arrow (AOA) diagram



Network Diagrams:

3) Sequencing Activities (cont'd)

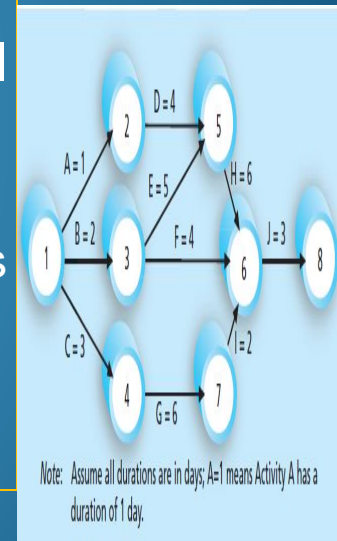
Steps of creating AOA diagrams

1. Find all of the activities that start at Node 1. Draw their finish nodes, and draw arrows between Node 1 and each of the finish nodes. Put the **activity letter or name on the associated arrow** and write its duration.

2. **Continue** drawing the network diagram **from left to right** until all activities are included. Look for bursts and merges.

Bursts: two or more activities **follow** a single node (e.g., Nodes 1,3)

Merge: two or more nodes **precede** a single node (e.g., Nodes 5,6)



➤ Note: All **arrowheads** should face toward the **right**, and no arrows should cross on an AOA network diagram.

3) Sequencing Activities (cont'd)

Exercise (1)

Draw an AOA diagram for the shown data of project Y.

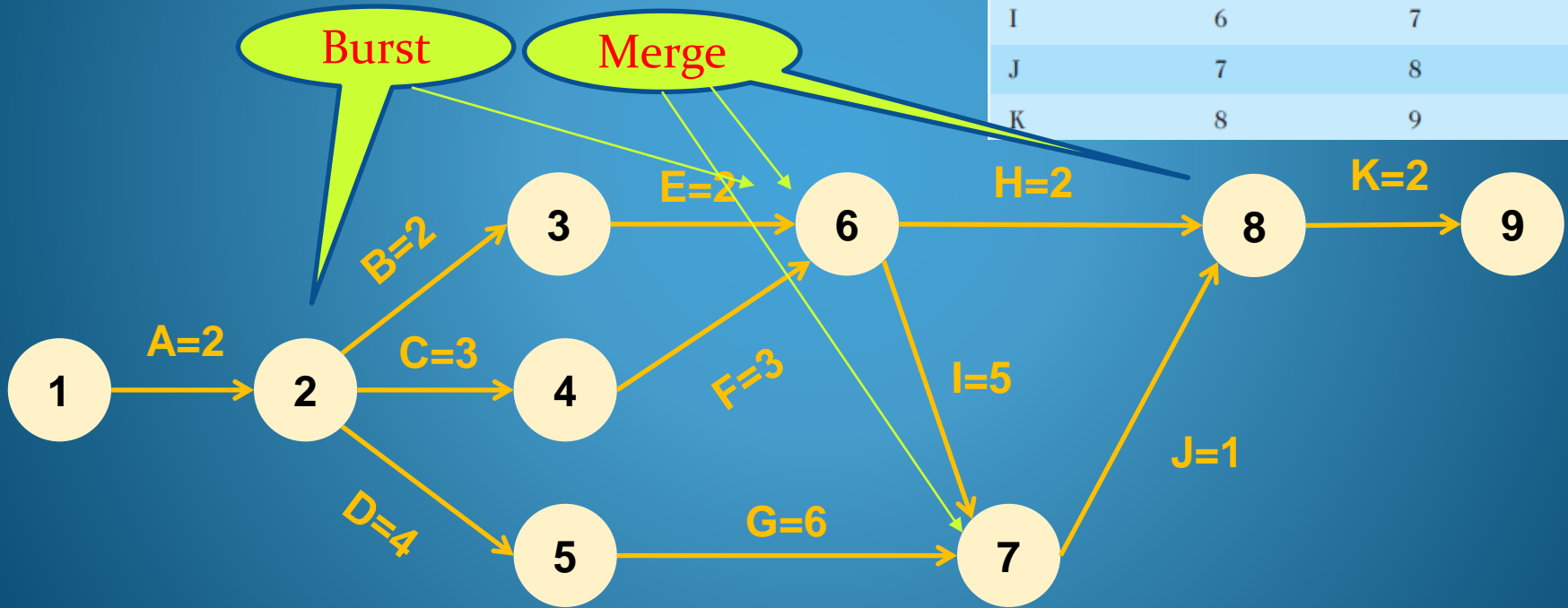
- Find all burst and merge nodes.
- Define the start and end nodes of project Y.

Activity	Initial Node	Final Node	Estimated Duration
A	1	2	2
B	2	3	2
C	2	4	3
D	2	5	4
E	3	6	2
F	4	6	3
G	5	7	6
H	6	8	2
I	6	7	5
J	7	8	1
K	8	9	2

Exercise (1): Solution

AOA of project Y

Activity	Initial Node	Final Node	Estimated Duration
A	1	2	2
B	2	3	2
C	2	4	3
D	2	5	4
E	3	6	2
F	4	6	3
G	5	7	6
H	6	8	2
I	6	7	5
J	7	8	1
K	8	9	2



Burst (Node 2)

Merge (Nodes 6, 7, 8)

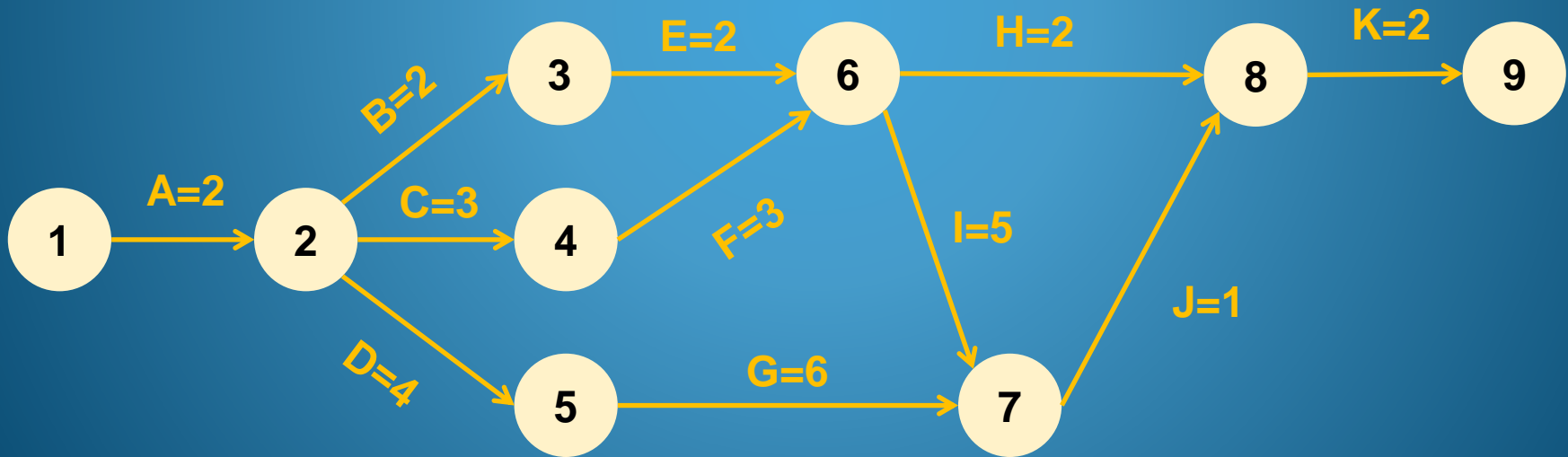
Burst Nodes: 2,6
Merge Nodes: 6,7,8

Start node of project Y: Node 1
End node of project Y: Node 9

Exercise (1): Solution

Draw the network diagram

Activity	Initial Node	Final Node	Estimated Duration
A	1	2	2
B	2	3	2
C	2	4	3
D	2	5	4
E	3	6	2
F	4	6	3
G	5	7	6
H	6	8	2
I	6	7	5
J	7	8	1
K	8	9	2



Burst Nodes: 2,6

Merge Nodes: 6,7,8

Start node of project Y: Node 1

End node of project Y: Node 9

3) Sequencing Activities (cont'd)

Exercise (2)

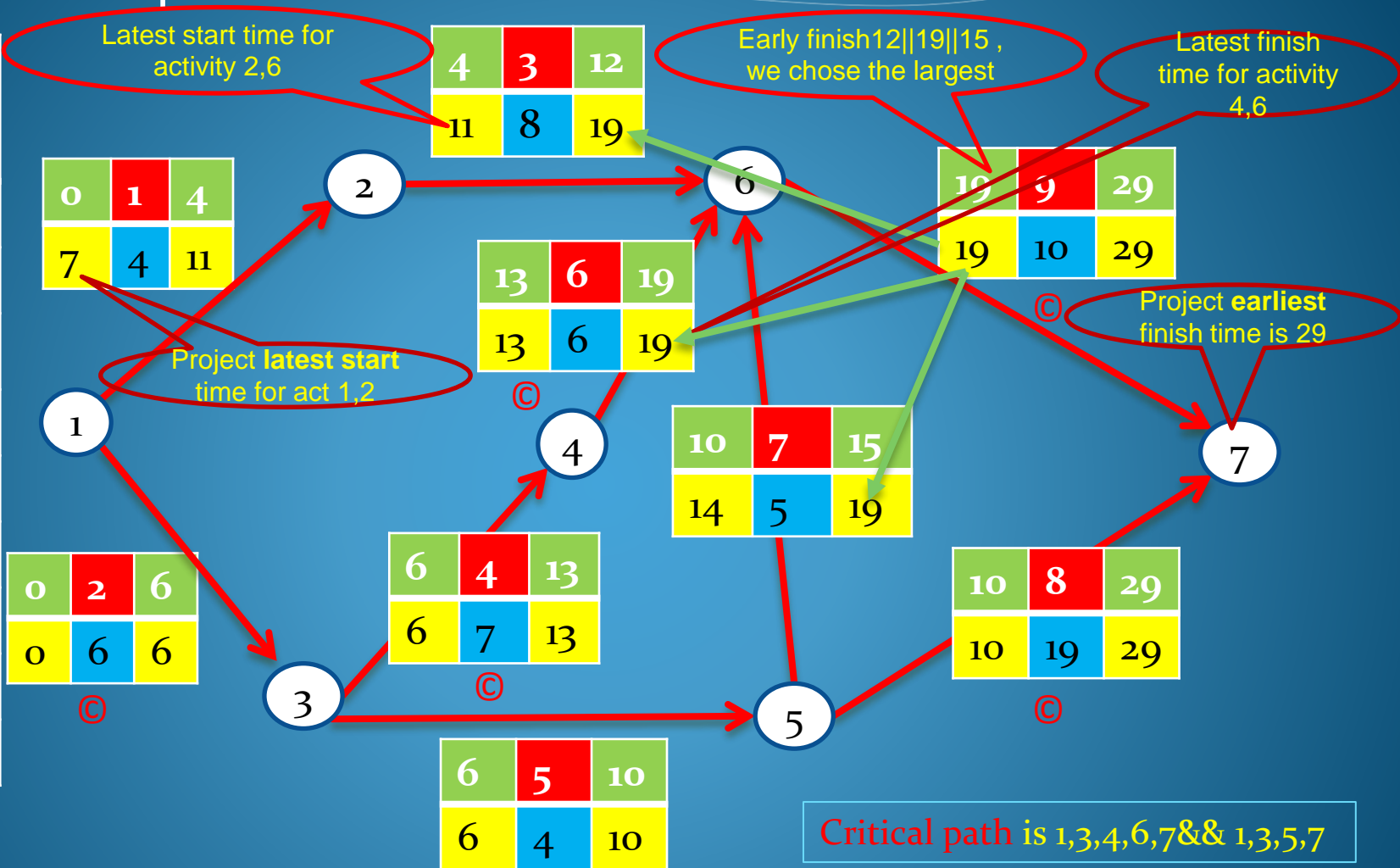
Draw an AOA diagram for the shown data of project Z.

Find all burst and merge nodes

Activity	Initial Node	Final Node	Estimated Duration
A	1	2	10
B	1	3	12
C	1	4	8
D	2	3	4
E	2	5	8
F	3	4	6
G	4	5	4
H	4	6	8
I	5	6	6
J	5	8	12
K	6	7	8
L	7	8	10

Example: Draw the network diagram, obtain the early and late start and completion times and determine the critical activities?

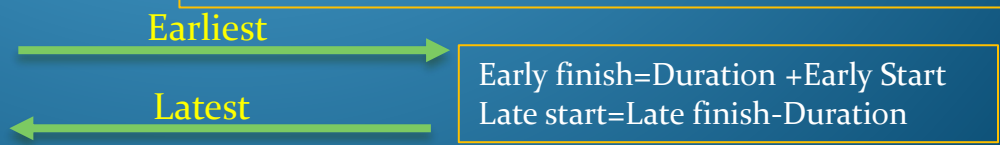
	Acti vity	du ra t i o n
1	1-2	4
2	1-3	6
3	2-6	8
4	3-4	7
5	3-5	4
6	4-6	6
7	5-6	5
8	5-7	19
9	6-7	10



Critical path is 1,3,4,6,7 & 1,3,5,7

© Critical path when Early Start=Late start & Early finish=Late finish

Early Start	Activity	Early finish
Late start	Duration	Late finish



Thanks for Attention