

Project Network

- Event
 - Signals the beginning or ending of an activity
 - Designates a point in time
 - Represented by a circle (node)
- Network
 - Shows the sequential relationships among activities using nodes and arrows
- ♦ Activity-on-node (AON)
 - nodes represent activities, and arrows show precedence relationships
- ♦ Activity-on-arrow (AOA)
 - arrows represent activities and nodes are events for points in time

Project Network

- Network analysis is the general name given to certain specific techniques which can be used for the planning, management and control of projects
- Use of nodes and arrows
 - Arrows → An arrow leads from tail to head directionally
 - Indicate **ACTIVITY**, a time consuming effort that is required to perform a part of the work.
 - Nodes ● A node is represented by a circle
 - Indicate **EVENT**, a point in time where one or more activities start and/or finish.
- Activity
 - A task or a certain amount of work required in the project
 - Requires time to complete
 - Represented by an arrow
- Dummy Activity
 - Indicates only precedence relationships
 - Does not require any time of effort

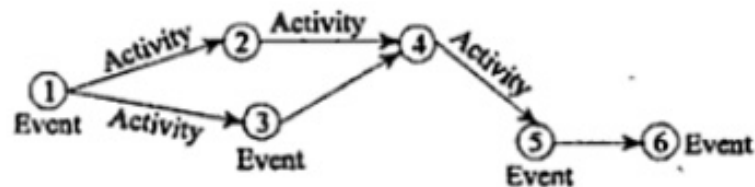
TERMINOLOGY OF NETWORK ANALYSIS

1. **Activity** - An activity represents some action as such it is a time consuming part of a project. It requires both time and resources. An activity is represented by an arrow. ① $\xrightarrow{\text{Activity}}$ ② $\xrightarrow{\text{Activity}}$ ③.

2. **Event** - An event represents the start or completion of some activity and as such it consumes no time. It has no time duration and does not consume any resources. It is also known as a node. An event is represented by a circle. Event ① \longrightarrow ② $\xrightarrow{\text{Event}}$ ③ Event

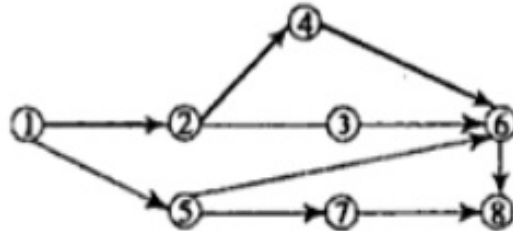
3. **Network diagram** - It is a pictorial presentation of the various events and activities concerning a project. In a network diagram each arrow represents an activity and each circle an event. The event which is the ending point of two or more activities is called node.

Network diagram



4. **Critical path** - Critical path is the longest path in a **network**. It is the sequence of activities that requires the maximum time for completion. It is called critical path because the length determines the minimum time in which the project may be completed. The critical path is denoted by darker or double lines to distinguish it from the other non-critical path.

Network diagram



Longest path

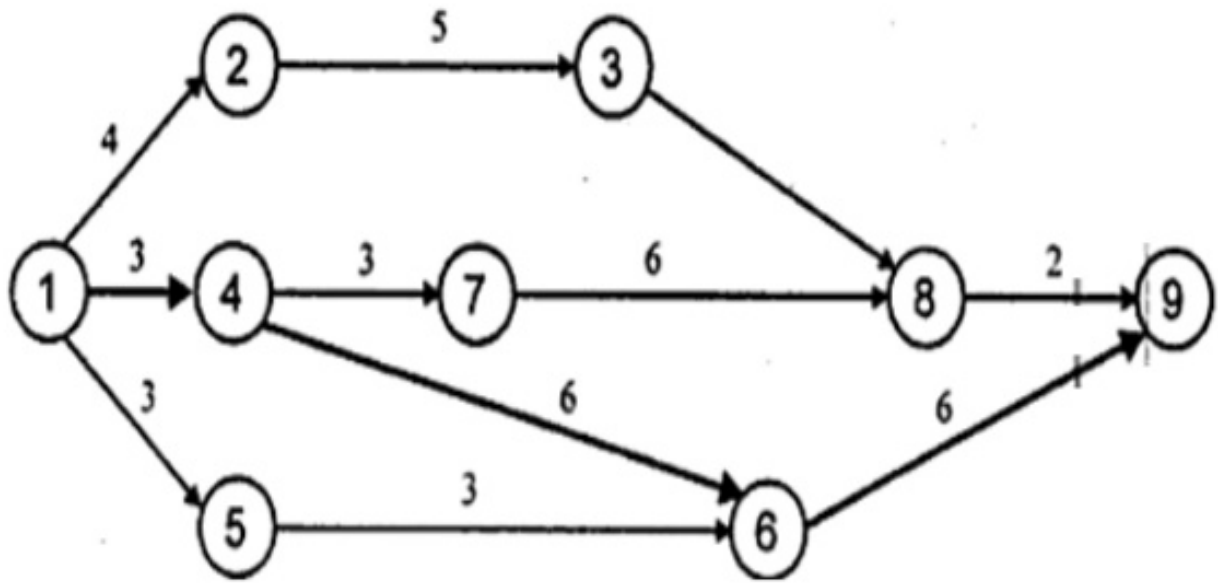
1 — 2 — 4 — 6 — 8 critical path.

5. **Critical activities** - All the activities associated with the critical path are called critical or bottleneck activities such as activities. Such activities require special attention.

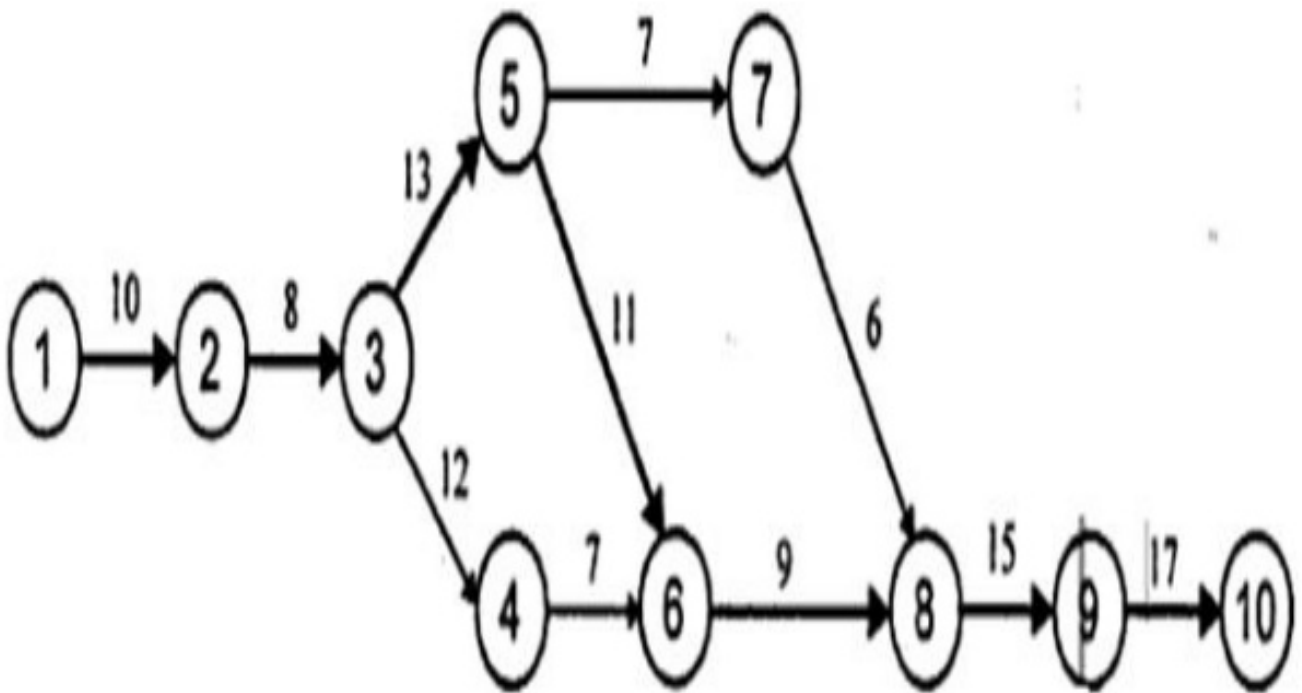
Draw a network from the following activities and find a critical path and total project

duration.

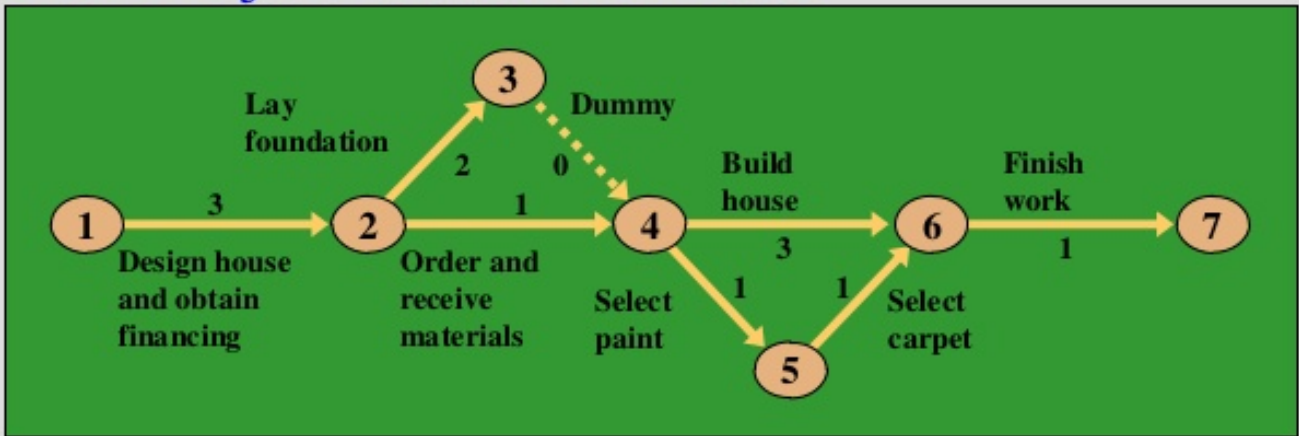
<i>Activity</i>	<i>Duration (Weeks)</i>	<i>Activity</i>	<i>Duration (Weeks)</i>
1-2	4	4-7	3
1-4	3	5-6	3
1-5	3	6-9	6
2-3	5	7-8	6
3-8	1	8-9	2
4-9	6		



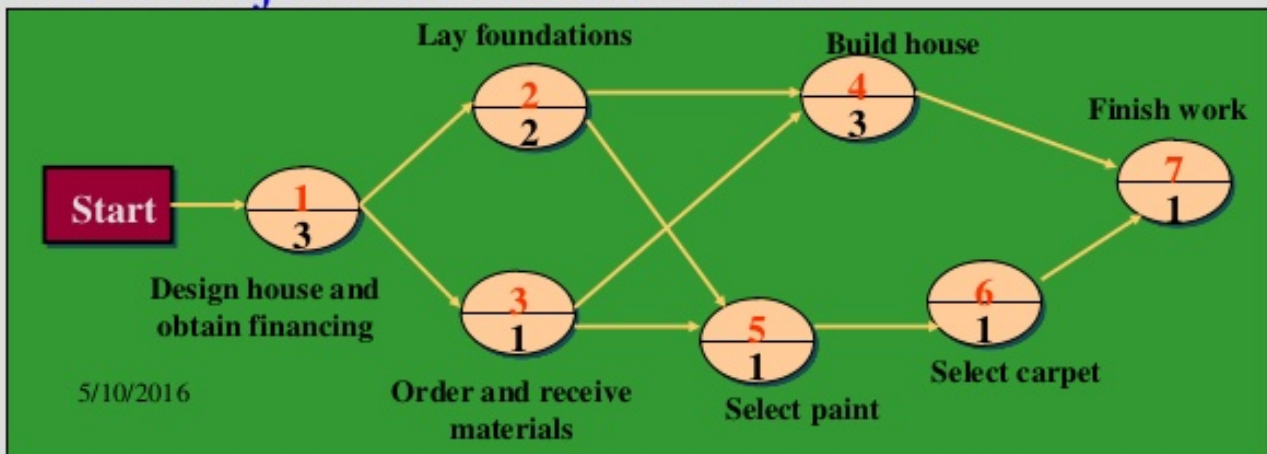
Activity	Duration (days)	Activity	Duration (Days)
1-2	10	5-7	7
2-3	8	6-8	9
3-4	12	7-8	6
3-5	13	8-9	15
4-6	7	9-10	17
5-6	11		



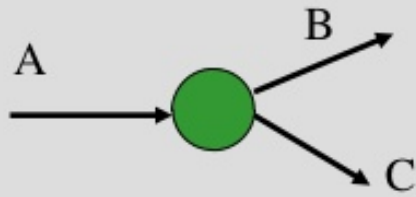
AOA Project Network for House



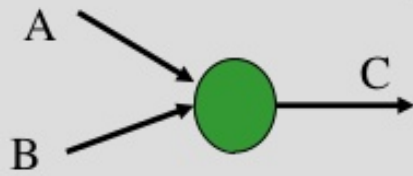
AON Project Network for House



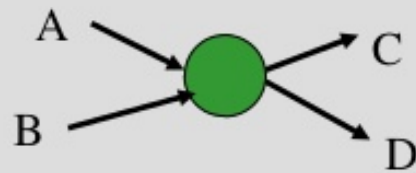
Situations in network diagram



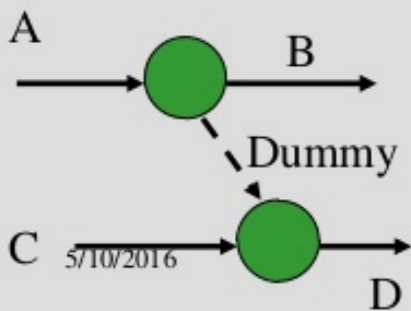
A must finish before either B or C can start



both A and B must finish before C can start



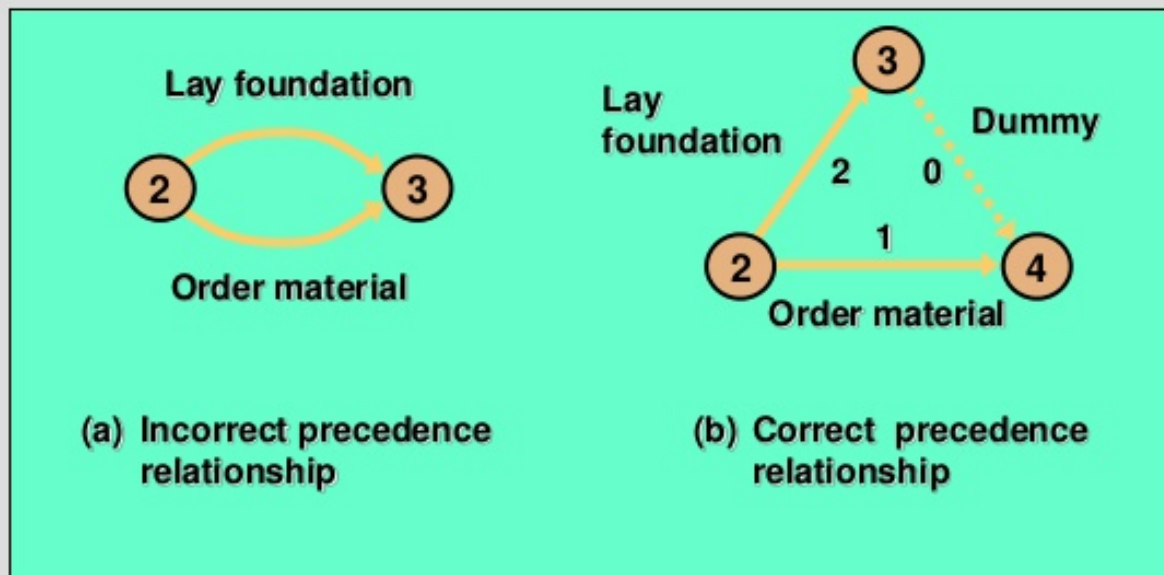
both A and B must finish before either of C or D can start



A must finish before B can start

both A and C must finish before D can start

Concurrent Activities



Network example

Illustration of network analysis of a minor redesign of a product and its associated packaging.

The key question is: How long will it take to complete this project ?

Activity number		Completion time (weeks)
1	Redesign product	6
2	Redesign packaging	2
3	Order and receive components for redesigned product	3
4	Order and receive material for redesigned packaging	2
5	Assemble products	4
6	Make up packaging	1
7	Package redesigned product	1
8	Test market redesigned product	6
9	Revise redesigned product	3
10	Revise redesigned packaging	1
11	Present results to the Board	1

For clarity, this list is kept to a minimum by specifying only immediate relationships, that is relationships involving activities that "occur near to each other in time".

Activity number		Activity number
1	must be finished before	3
2		4
3		5
4		6
5, 6		7
7		8
8		9
8		10
9, 10		11

Questions to prepare activity network

- Is this a Start Activity?
- Is this a Finish Activity?
- What Activity Precedes this?
- What Activity Follows this?
- What Activity is Concurrent with this?

