Project Management

Scheduling

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Scheduling

- Aims
  - To understand the purpose of project scheduling.
  - To understand the important of project network.
  - To understand the critical path in the project.

- Expected Outcomes
  - Students are able to apply the fundamental of scheduling in the proposed project.
  - Students are able to develop a relationship using AON or AOA.
  - Students are able to identify the critical path based on the defined predecessor.

- References

  - William, R.T. 2013. Project Management. Random Exports
  - Heagney, J. 2012. Fundamentals of Project Management. American Management Association.
  - Richardson and Gary, L. 2010. Project Management theory and practice. Taylor and Francis.

Content

- Project schedule
- Project network
- Critical path method (CPM)

Project schedule

Scheduling is an implementation of project based planning using an ordered sequence of activities with time allotted for each particular activity.

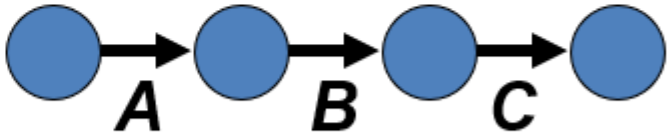
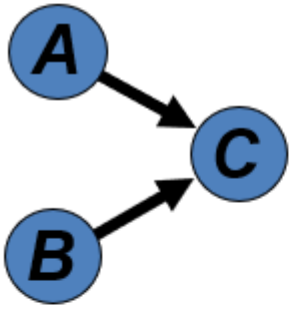
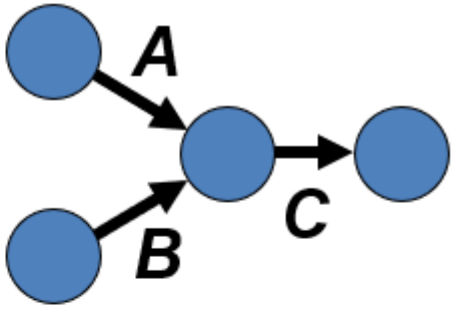
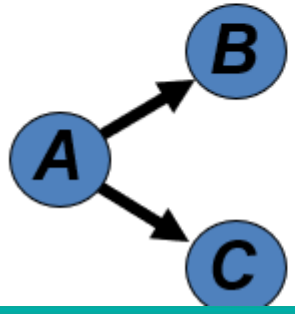
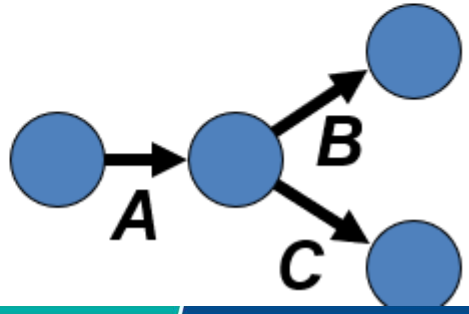
To identify the relationships among activities…

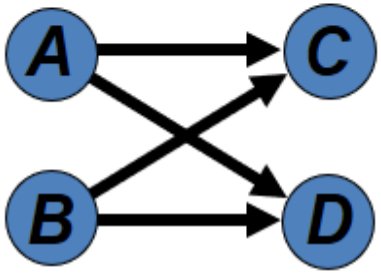
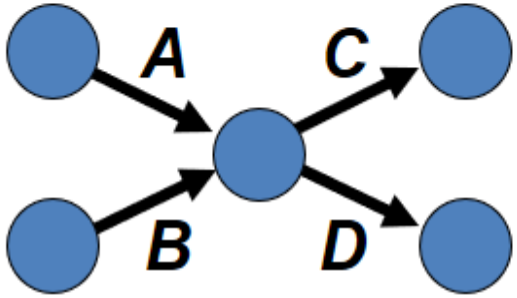
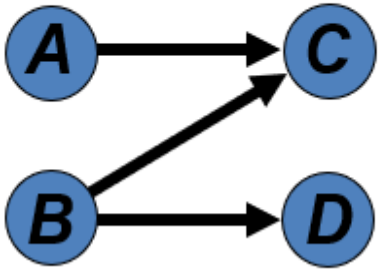
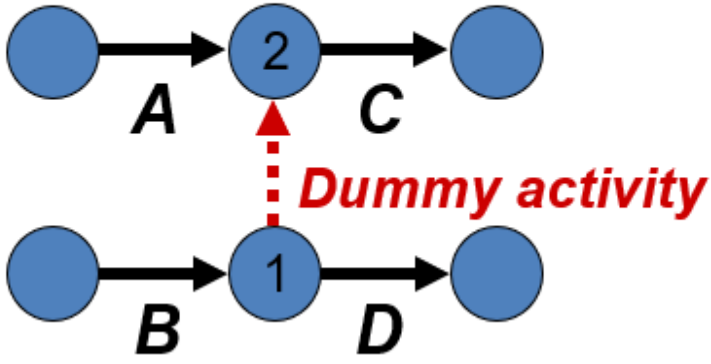
1. Which activities must be finished before the current one can start?
2. What activities may be constructed concurrently with the current one?
3. What activities must follow the current one?

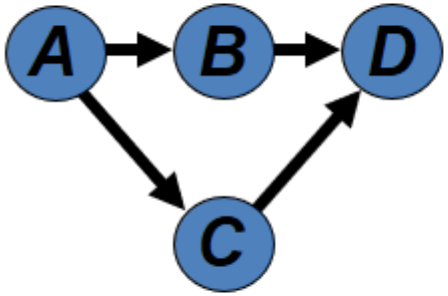
Project Network

There are two ways commonly used to draw a network diagram:

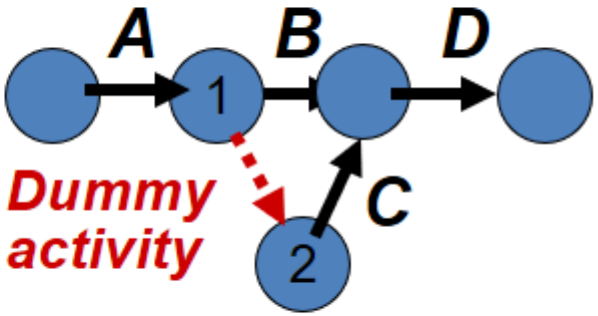
1. *Activity-on-arrow* (AOA) – a network diagram convention in which arrows designate activities.
2. *Activity-on-node* (AON) – a network diagram convention in which nodes designate activities.

Activity on Node (AON)	Activity Meaning	Activity on Arrow (AOA)
(a) 	A comes before B, which comes before C	
(b) 	A and B must both be completed before C can start	
(c) 	B and C cannot begin until A is completed	

Activity on Node (AON)	Activity Meaning	Activity on Arrow (AOA)
(d) 	C and D cannot begin until A and B have both been completed	
(e) 	C cannot begin until both A and B are completed; D cannot begin until B is completed. A dummy activity is introduced in AOA	



B and C cannot begin until A is completed. D cannot begin until both B and C are completed. A dummy activity is again introduced in AOA.



Critical path method (CPM)

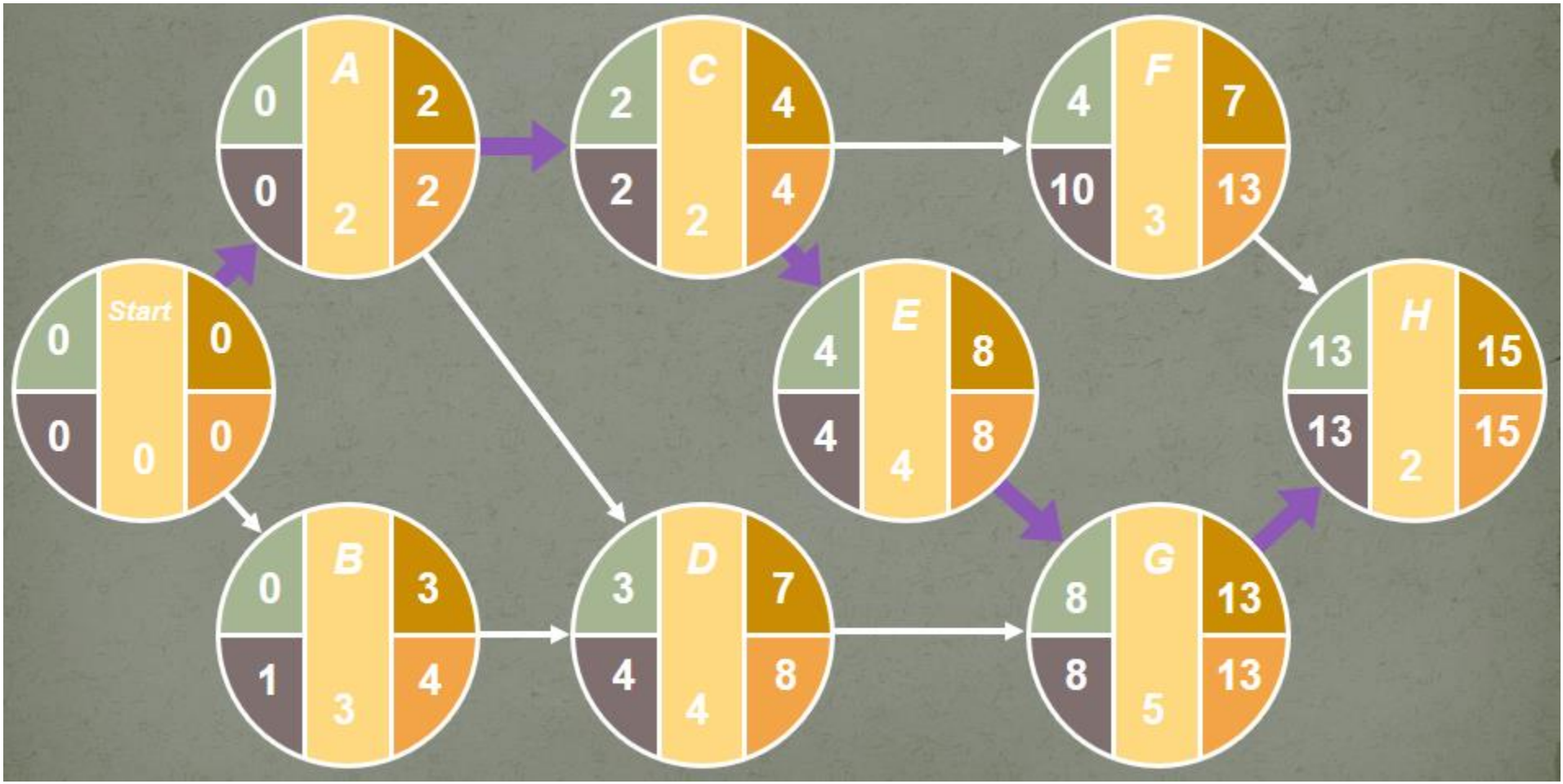
1. Define the project and prepare the work breakdown structure
2. Develop relationships among the activities - decide which activities must precede and which must follow others
3. Draw the network connecting all of the activities
4. Assign time and/or cost estimates to each activity
5. Compute the longest time path through the network – this is called the critical path
6. Use the network to help plan, schedule, monitor, and control the project

AON example

Activity	Description	Immediate Predecessors
A	Build internal components	—
B	Modify roof and floor	—
C	Construct collection stack	A
D	Pour concrete and install frame	A, B
E	Build high-temperature burner	C
F	Install pollution control system	C
G	Install air pollution device	D, E
H	Inspect and test	F, G

Activity	Description	Time (weeks)
A	Build internal components	2
B	Modify roof and floor	3
C	Construct collection stack	2
D	Pour concrete and install frame	4
E	Build high-temperature burner	4
F	Install pollution control system	3
G	Install air pollution device	5
H	Inspect and test	2
	Total Time (weeks)	25

Activity	Earliest Start ES	Earliest Finish EF	Latest Start LS	Latest Finish LF	Slack LS – ES	On Critical Path
A	0	2	0	2	0	Yes
B	0	3	1	4	1	No
C	2	4	2	4	0	Yes
D	3	7	4	8	1	No
E	4	8	4	8	0	Yes
F	4	7	10	13	6	No
G	8	13	8	13	0	Yes
H	13	15	13	15	0	Yes


Start
0
0
0
0
A
0
2
2
2
B
0
3
1
3
C
2
4
2
2
D
3
7
4
4
E
4
8
4
4
F
4
7
10
3
G
8
13
8
5
H
13
15
13
2

Conclusion

- Conclusion #1
  - Students are able to apply the fundamental of scheduling in the proposed project.
- Conclusion #2
  - Students are able to develop a relationship using AON or AOA.
- Conclusion #3
  - Students are able to identify the critical path based on the defined predecessor

Project Management

Lecture 7

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