

Dummy Activity

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When drawing networks for problems involving critical paths, the following conventions are used:

- The edges (or arcs) represent the activities.
- The vertices (or nodes) represent events.
- The start/finish of one or more activities is called an event.
- An edge should lead from a start vertex to represent each activity that has no predecessors.
- A vertex (called the finish node) representing the completion of the project should be included in the network.
- An activity should not be represented by more than one edge in the network.
- Two nodes can be connected directly **by, at most, one edge**.

In order to satisfy the final two conventions, it is sometimes necessary to introduce a **dummy activity** that takes zero time. Following these conventions, the weighted digraph can be redrawn as shown.

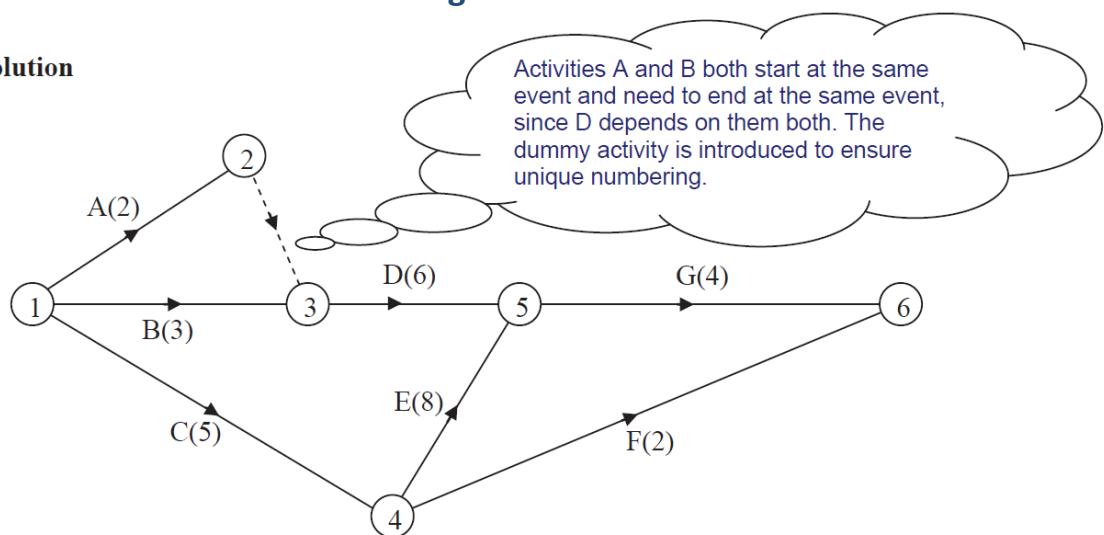
Example.1

Consider the following **activity chart**:

Activity	Duration (days)	Immediate predecessors
A	2	-
B	3	-
C	5	-
D	6	A, B
E	8	C
F	2	C
G	4	D, E

Task.1 Construct a network diagram.

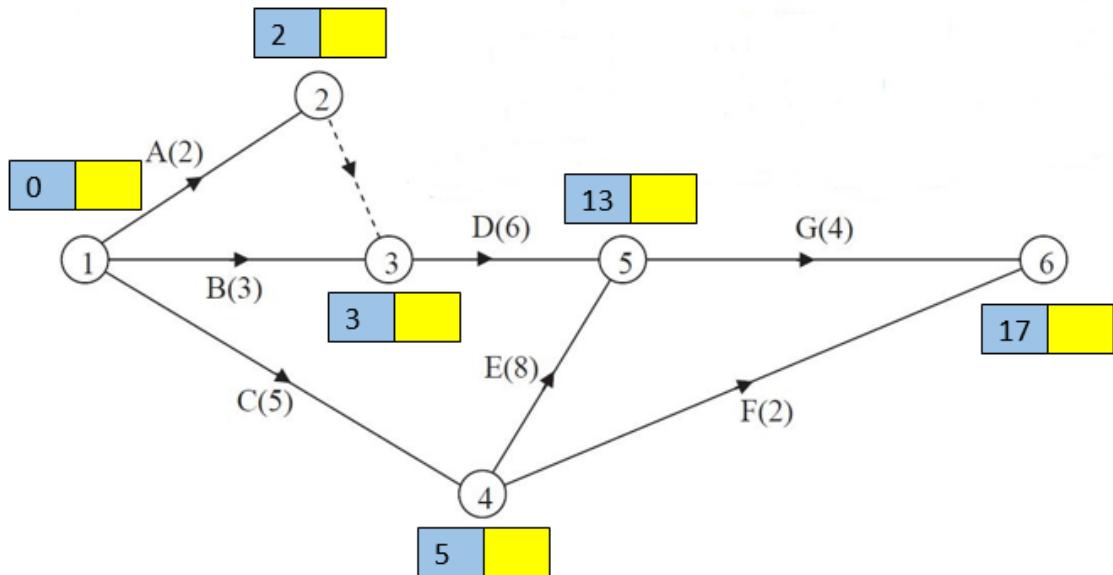
Solution



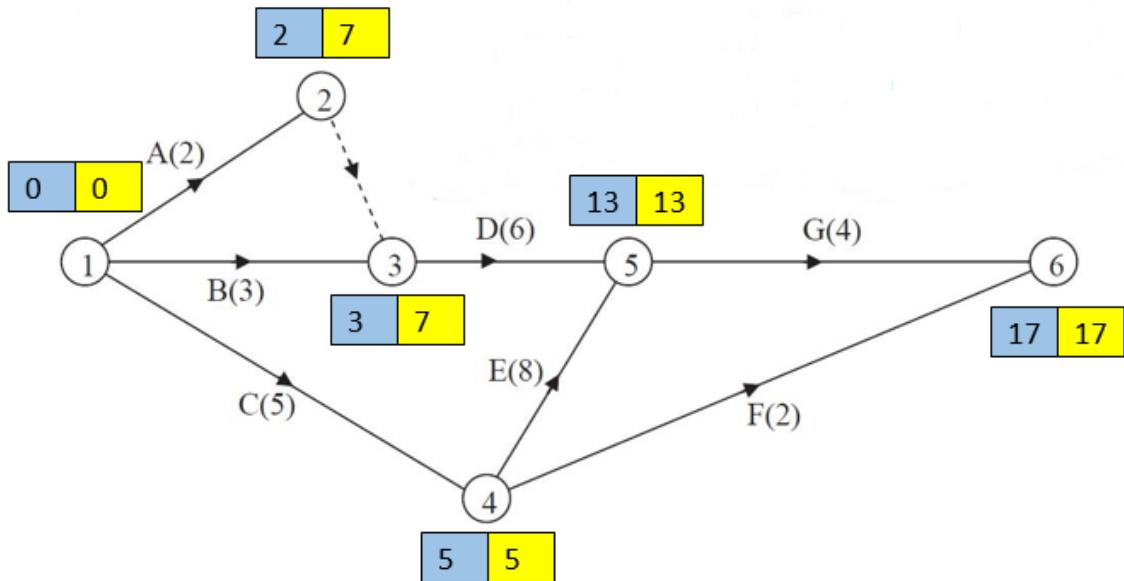
NB: Activities A & B cannot both be predecessors for activity D without the addition of a **dummy activity**

Recall: Two nodes can be connected directly by, at most, one edge.

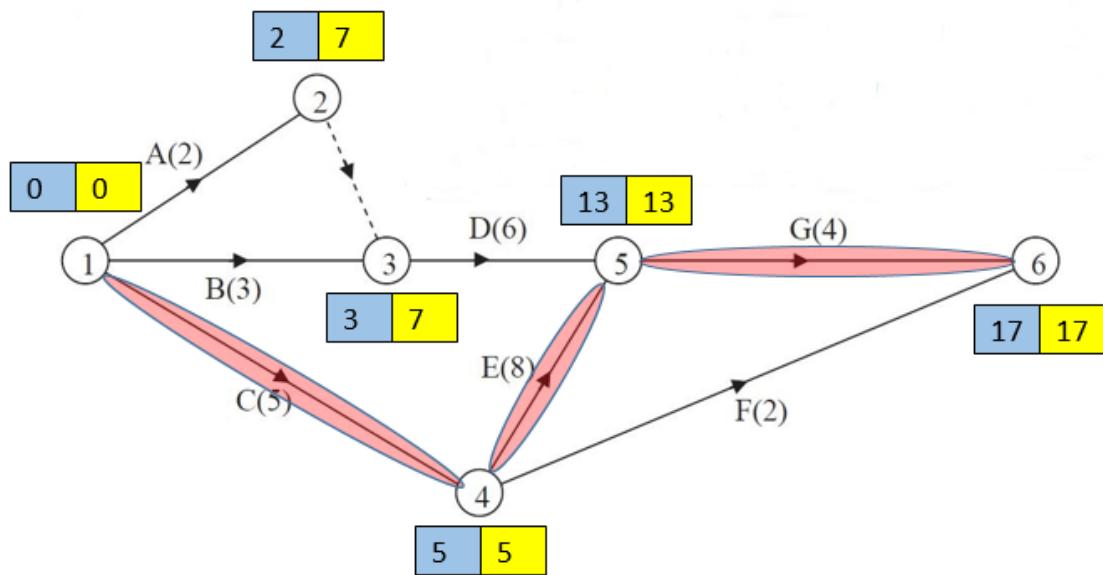
Task.2 Perform a **forward scan** of the network diagram.



Task.3 Perform a **backwards scan** of the network diagram.



Task.4 Identify the **critical path** within the network diagram.

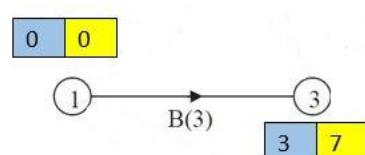


The critical path for this network is **C - E - G**

Task.5 Determine the **float** for each of the above activities.

- Step 1 Subtract the earliest starting time for an activity from its latest completion time
 Step 2 Subtract the activity duration from the previous value calculated

Eg. Float time for activity B = $(7 - 0) - 3 = 4$



Activity	Latest Completion Time	Earliest Starting Time	Activity Duration	Float
A	7	0	2	$(7-0)-2 = 5$
B	7	0	3	$(7-0)-3 = 4$
C	5	0	5	$(5-0)-5 = 0$
D	13	3	6	$(13-3)-6 = 4$
E	13	5	8	$(13-5)-8 = 0$
F	17	5	2	$(17-5)-2 = 10$
G	17	13	4	$(17-13)-4 = 0$

NB: Activities C, E and G form the critical path and all have a float time of 0.