

## Guidelines for drawing a CPM network

- Nodes (vertices) represent points in time.
- Arrows (edges) represent activities.
- One node represents the beginning of the project.
- Every activity gets its own end node.
- An activity with no predecessors should point outward from the start node.
- An activity with exactly one immediate predecessor should point outward from that predecessor's end node.
- An activity with more than one immediate predecessor should have its own start node, with dummy edges from its predecessors' end nodes to its start node.
- At the end, there should be a single node representing the completion of the project.  
If there are several activity end nodes that are sinks (no outgoing edges), make a new node representing the end of the project and join all of the sinks to this end node with dummy edges.

Activity	Immediate predecessors	(Days)		Cost per day to speed up
		Usual time	Crash time	
A	—	2	—	—
B	—	6	3	\$180
C	A	4	2	\$150
D	B	2	1	\$200
E	B	4	1	\$75
F	C, D	3	1	\$250
G	D	1	—	—
H	F	3	2	\$100
I	E, F, G	4	1	\$140

- (a) Draw a CPM network.
- (b) Using the usual times:
- Determine the earliest and latest times for each node.
  - Determine the float for each activity.
  - Determine the critical path.
- (c) Formulate a linear program to determine the least expensive way to reduce the length of the project by 4 days.
- (d) Formulate a linear program to determine the shortest possible completion time that can be achieved with a budget of \$900.