Topological Order & Task Networks

1. Consider the following activity table for software research project.

Id	Activity	Duration (weeks)	Precedents
A	Extend Language Implementation	5	
B	Test Language Extension	2	A
C	Construct Demonstrator 1	2	
D	Construct Demonstrator 2	5	
E	Evaluate Demonstrator 1	1	C
F	Evaluate Demonstrator 2	1	D
G	Write Report	2	B,E,F

a)
i) Construct a PERT graph for the project, showing earliest start time, earliest finish time and latest finish time and slack for each event.

b) From your graph, identify the following properties of the project:
i) The project finish time, i.e. minimum duration.
ii) The critical path(s).

c) From your graph, identify the following orders.
i) Two topological orders of the vertices.
ii) Two lists of vertices that are not topological orders.

d) Starting in each case with the original PERT graph for the project give project finish time, critical path(s), and a brief explanation if the durations of the following activities change.
i) Activity A takes 6 weeks
ii) Activity C takes 3 weeks.
iii) Activity D takes 6 weeks.

e) By week 5 the project is on schedule with activities A, C, D and E completed.
i) Management requests that the project is completed 1 week early. Identify activities whose duration could be reduced, and for each activity recommend by how much the duration should be reduced

ii) Management enquires whether the project could be completed 2 weeks early. Indicate if this is possible, and if so identify activities whose duration could be reduced, and for each activity recommend by how much the duration should be reduced