

1. What is meant by a *critical path*? [5 marks]

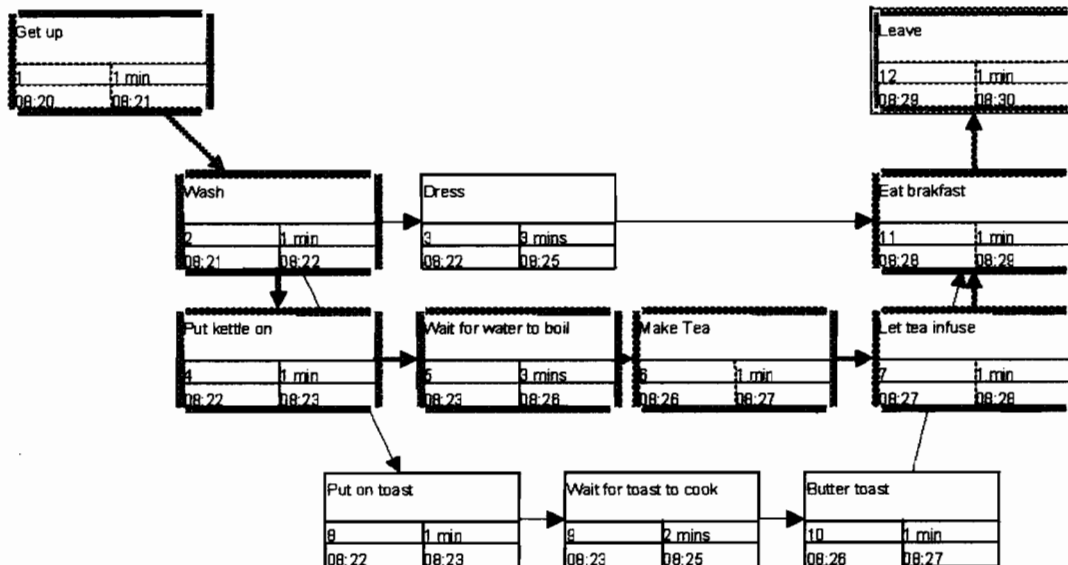
Draw a PERT diagram for the process of getting up in the morning, making breakfast (tea, toast), and leaving for lectures. Show the critical path. [5 marks]

Derive the GANTT chart. What is the latest time to get up, if you must leave at 08:30? Comment on resource conflicts [5 marks]

Does extra capital plant, (such as an automatic tea-maker), allow you to get up earlier, and by how much? What other process improvements might there be? [5 marks]

**Answer:**

The *critical path* is the path longest in time from start to finish in a PERT diagram directed graph. It joins tasks with no *slack*, which is where the earliest and latest possible start times are the same. Any slippage of tasks on the critical path will cause the entire project to slip



ID	Task Name	Duration	Start	Finish	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
1	Get up	1 min	08:20	08:21	■														
2	Wash	1 min	08:21	08:22		■													
3	Dress	3 mins	08:22	08:25			■	■	■										
4	Put kettle on	1 min	08:22	08:23		■													
5	Wait for water to boil	3 mins	08:23	08:26				■	■	■									
6	Make Tea	1 min	08:26	08:27					■										
7	Let tea infuse	1 min	08:27	08:28						■									
8	Put on toast	1 min	08:22	08:23		■													
9	Wait for toast to cook	2 mins	08:23	08:25				■	■										
10	Butter toast	1 min	08:25	08:26						■									
11	Eat breakfast	1 min	08:28	08:29									■						
12	Leave	1 min	08:29	08:30											■				

The Get-up task must be completed by 08:21.

The charts above show resource conflicts by making the assumption that you can do several things at the same time, for example dress, put on the kettle and toast at 08:22. However, dressing, being a non-critical task can be delayed by 1 minute to be completed while waiting for the kettle to boil and the toast to cook. This still leaves putting on the kettle and making to toast both to be completed by 08:23, or the whole project will slip.

The addition of an automatic tea-maker saves 1 minute (making toast becomes the critical path). An automatic timer for the toast, or putting it on before washing saves additional time, as might be the possibility of either skipping breakfast or eating while travelling.