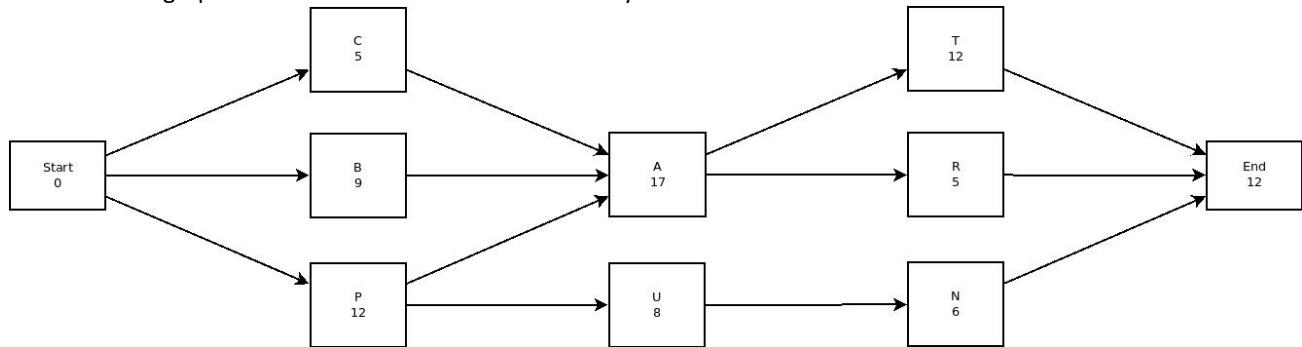
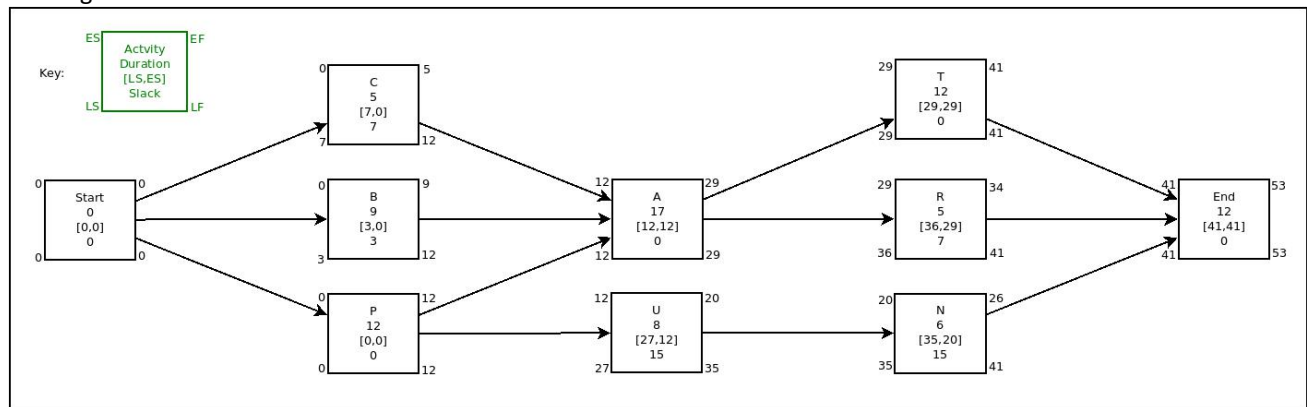


Question 1

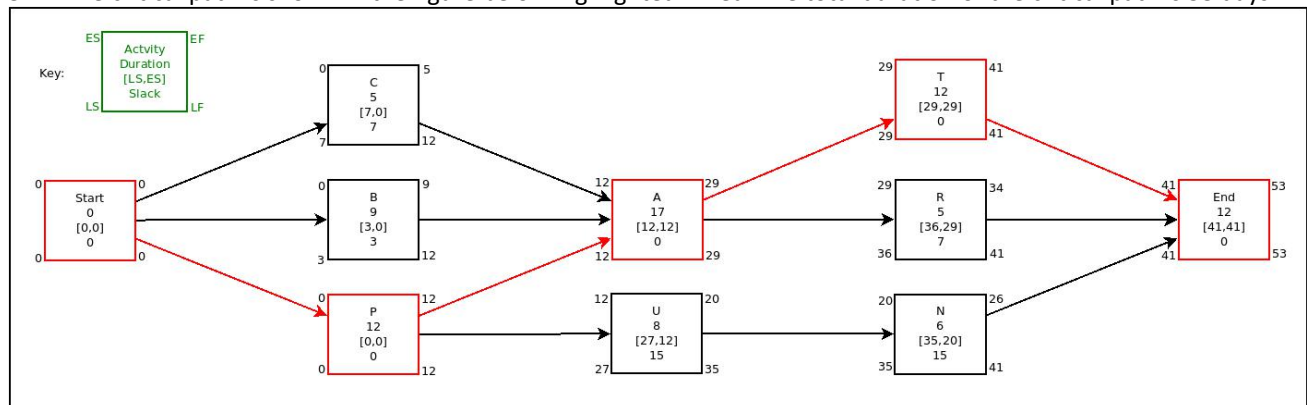
1. Directed graph of activities. Each box has the activity name and the duration.



2. Applying the critical path method to the graph and adding the [LS, ES] to each activity and then calculating the slack produces the following graph. The graph contains a key explaining the meaning of the content inside the boxes. First the ES and EF times were calculated from left to right, then the LS and LF times were calculated from right to left.



3. The critical path is shown in the figure below highlighted in red. The total duration of the critical path is 53 days.



4.

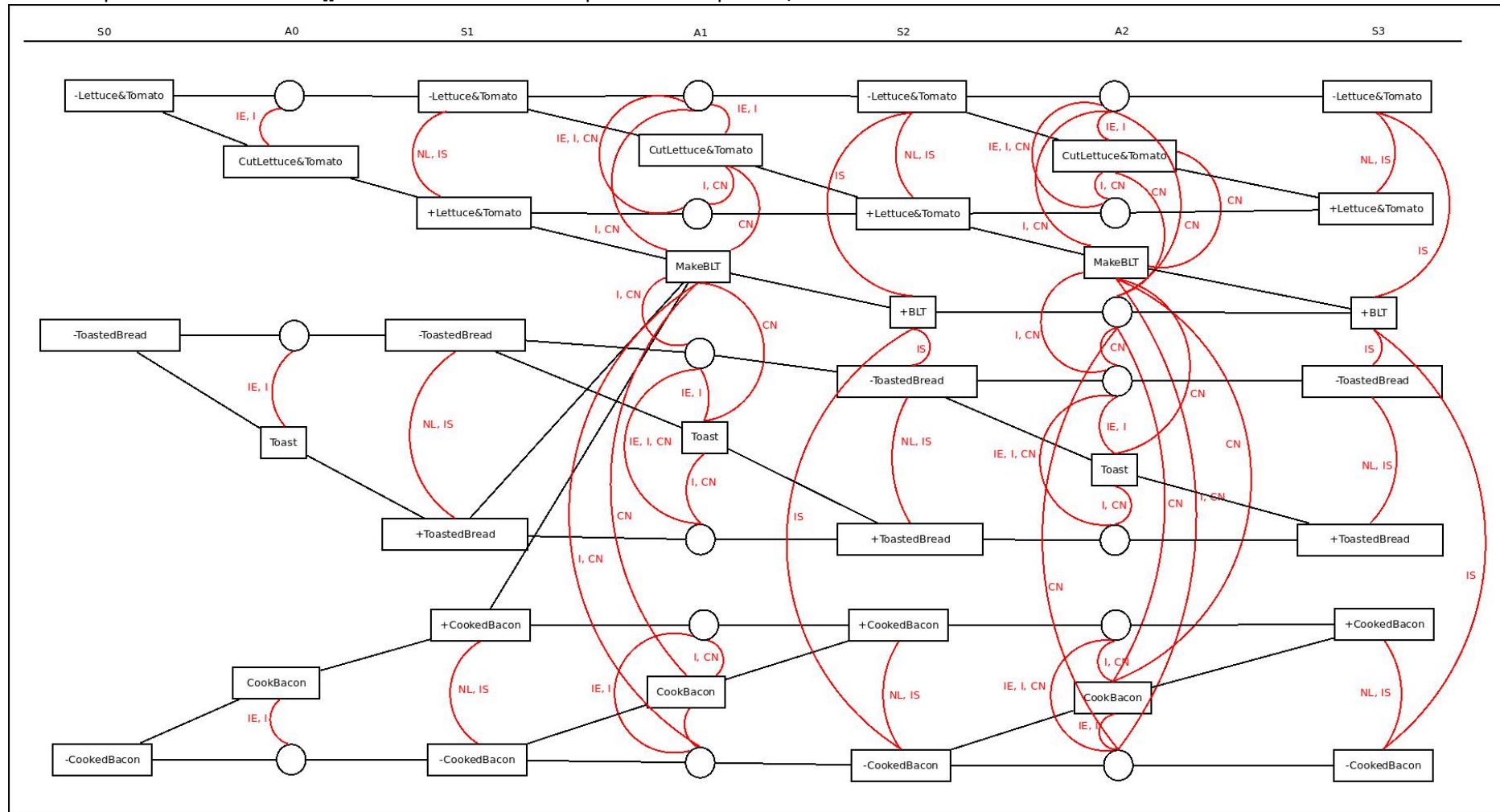
- If every activity starts at their ES time but activity P takes 5 extra days to finish then estimated, because P is on the critical path it would delay the completing of the project by 5 days.
- If activity R takes half a day longer than the estimated time then it would not make any difference to the project duration because it has a slack of 7 which allows this activity to be delayed by up to 7 days without affecting the project time.

Question 2

The first problem is described in the file **Q2_Problem1.txt** located in the Assign4 folder. The graph plan for this is displayed below. The red lines indicate mutexes and the labels next to each arc indicates the type of mutex connecting the two components. The graph plan was continued until the last two state layers s2 and s3 were the same and the graph was no longer evolving. The solution to this problem is :

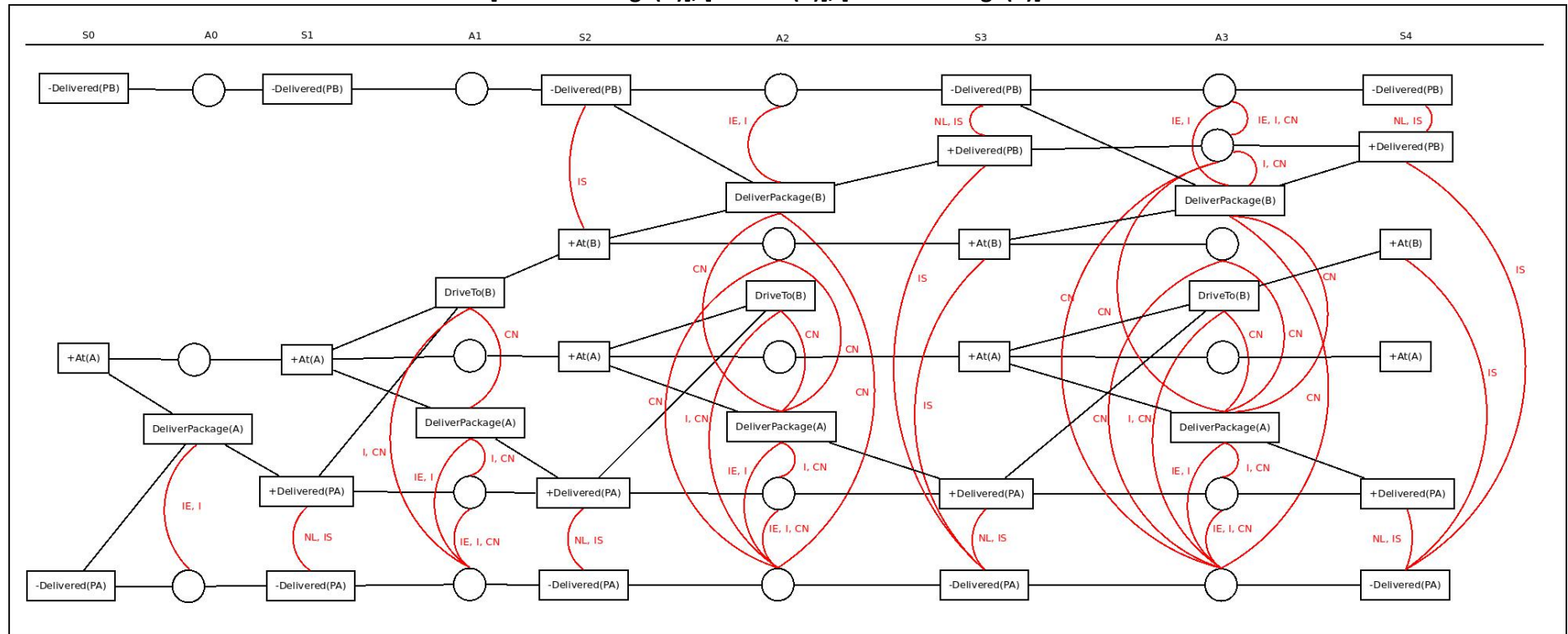
[Toast, CutLettuce&Tomato, CookBacon], [MakeBLT]

Multiple actions within the '[' means these actions are performed in parallel/at the same time.



The first problem is described in the file **Q2_Problem2.txt** located in the Assign4 folder. The graph plan for this is displayed below. The red lines indicate mutexes and the labels next to each arc indicates the type of mutex connecting the two components. The graph plan was continued until the last two state layers s2 and s3 were the same and the graph was no longer evolving. The solution to this problem is :

[DeliverPackage(A)], [DriveTo(B)], [DeliverPackage(B)]



Question 3

The graph plan program is located in the folder **Assign4** in the file name 'GraphPlanGenerate.py'. The specific instructions to use this program are located in the README.md located in the **Assign4** folder.

Question 4

The graph plan program to extract the solution from the graph plan is located in the **Assign4** in the file name 'GraphPlanExtract.py'. The instructions on how to use this program are located in the file README.md located in the **Assign4** folder.