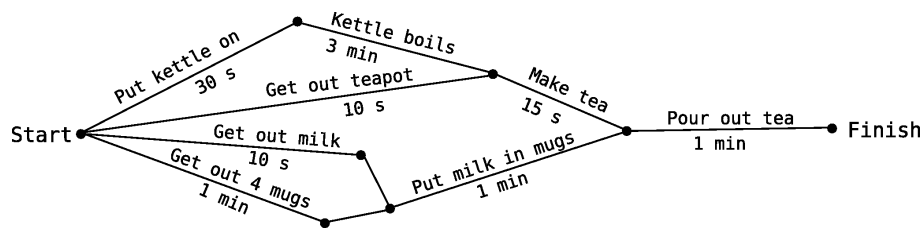# Épreuve de section européenne

Critical Path Analysis (the gourmet section)

In the network below, called a planning network, we are given information about making four mugs of tea. It shows the time taken for each activity and the order in which the activities would be performed. (The times given are not necessarily realistic !)

Once our initial planning network is drawn and we are told how many people are available it has to be redrawn to accommodate this. If there are two people, a possible improved version is shown below. The total time taken is 4 minutes and 45 seconds.
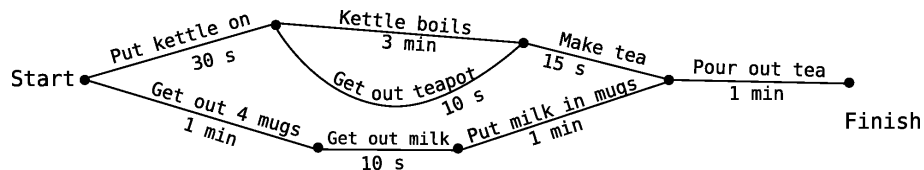
Solving a problem of this type, i.e. finding a path satisfying particular conditions, is called critical path analysis. If we are given a list of activities rather than a diagram we need to produce our own initial planning network. For example, here is a list of activities involved in laying a table : put out the cutlery - put out the plates - put out the glasses - put out the table napkins - lay the table cloth - put out the mats for the glasses [. . .]

Adapted from Bostock & Chandler, *Mathematics to level 10*, Thorn, 1994.

Questions

1. Explain the differences between the two diagrams. What if there was no "get out teapot" branch ? Can you reduce time if there are three people ?

2.   **a.** Draw the planning network of the example of table-laying without consideration of number of people. Try to give the shortest network, knowing that several activities could be done at the same time (if enough people are involved), but that napkins will be put in place at the end.

   b. Here are the times taken for the various activities : cutlery 4 minutes, glasses 3 minutes, cloth 2 minutes, plates 1 minute, napkins 2 minutes, mats 3 minutes. There are three people available. How quick can the table be laid ?

   c. Suppose there is only one person to lay the table. How long will it take ?