Refurbishing a room

Many companies use **critical path analysis** to help them plan projects in a way that will make efficient use of the time and resources that are available.

These activities show you how **networks** are used in critical path analysis.

To do

Imagine you are planning to decorate and re-furnish a bedroom.
The bedroom has old furniture and wallpaper to be removed. You have bought paint for the walls and woodwork, new curtains, a new carpet, furniture and some posters.

Task A

Continue the table below, listing the jobs you need to do. Assume that you plan to give the walls two coats of paint, but that the woodwork needs only one coat.

Think about…

How long each job is likely to take

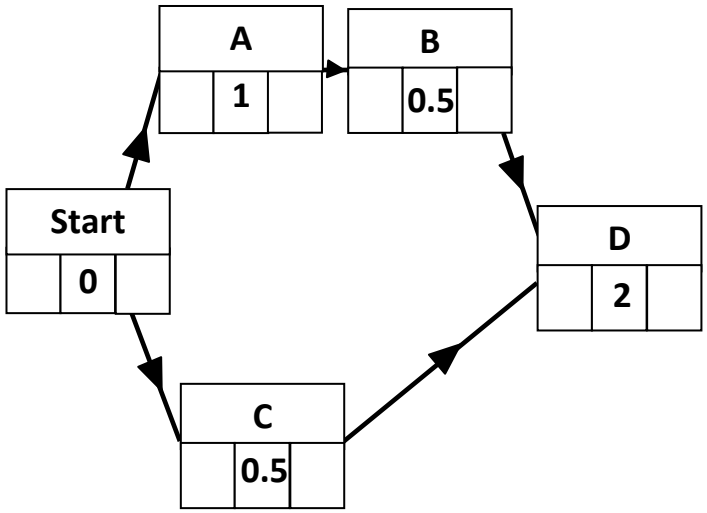
Which jobs need to be done before others. Record this in the last column.

	Activity	**Time (h)**	**Preceding activity**
A	Remove the old furniture	1	-
B	Remove the old carpet	0.5	A
C	Take down the curtains and rail	0.5	-
D	Remove the old wallpaper	2	B C

Task B

The **activity** (or **precedence**) **network** below shows activities A, B, C and D.

Use your table to complete this activity network.



Task C

Carry out a **forward pass** to find the **earliest possible start time** for each activity.

Task D

Carry out a **reverse pass** to find the **latest possible finish time** for each activity.

Critical activities and critical paths

The **critical activities** are those for which:

latest finish time = earliest start time + duration

Critical activities must start and finish on time if the project is to take the minimum amount of time.

A **critical path** is a path through the network that is made up of critical activities. Activity networks always have at least one critical path.

A list of critical activities has been started below (with starting times given from the beginning of the project).

Task E

Use your activity network to complete this list and identify a critical path.

A Furniture removal must start at 0 hours

B Carpet removal must start at 1 hours

D Wallpaper removal must start at 1.5 hours

… ……

… ……

… ……

… ……

… ……

… ……

… ……

… ……

… ……

… ……

… ……

Critical path is ……

The other activities have some flexibility, called a **float**, in the times at which they start.

Float = latest finish time – (earliest start time + duration)

For example, for activity C, removing curtain and rail:

float = 1.5 – (0 + 0.5) = 1 hour

Task F

Use your activity network to complete the table below, listing those activities which have float.

Activity		Earliest start	Duration	Latest finish	Float
C	Remove curtains and rail	0	0.5	1.5	1 h

Reflect on your work

Summarise the steps in working out a critical path.

Describe what is meant by 'float'.

What effect will the number of helpers involved have on the minimum completion time?

When on your finished network, will there need to be at least one helper to allow some of the activities to take place simultaneously?

What practical considerations need to be taken into account when working out the minimum completion time?