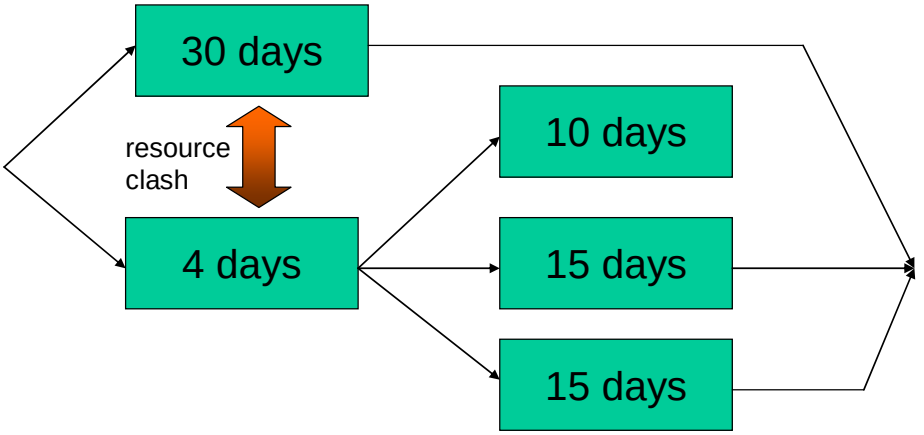
Chapter 8 Resource allocation

Further exercise pointers

1. Burman's priority ordering for allocating resources to activities takes into account the activity duration as well as its total float. Why do you think this is advantageous?

Among other things, sometimes the completion of one small task can release the start of a flock of substantial activities. It is sometimes even advantageous to complete such a small task even if it is not on the critical path. See below



The 30 day activity constitutes the critical path, but it would be better to give priority to the 4 day activity.

2. If you have access to project planning software use it to produce an activity plan for Amanda's project and include the staff resource requirements for each activity. Explore the facilities of your software and answer the following questions.

- *Can you set up resource types and ask the application to allocate individuals to tasks?*
- *Will your software allow you to specify productivity factors for individual members of staff so that the duration of an activity depends upon who is carrying it out?*
- *Will your software carry out resource smoothing or provide a minimum cost solution?*

- *Can you replicate Amanda's resource schedule (see Figure 8.7) – or produce a better one?*

3. On a large project it is often be the responsibility of a team leader to allocate tasks to individuals. Why might it be unsatisfactory to leave such allocations entirely to the discretion of the team leader?

The following might be discussed.
The concern of a team leader could be locked onto the successful accomplishment of the project. There are however organizational concerns to be considered. Several projects, all important, might be running in parallel and using the best staff on one project might be a the expense of some other.
Other concerns might be for staff development: sometimes risks have to be accepted so that staff can be developed in new roles. Allocating the most capable staff member to the most critical activities all the time might lead, in the longer term, to burn-out

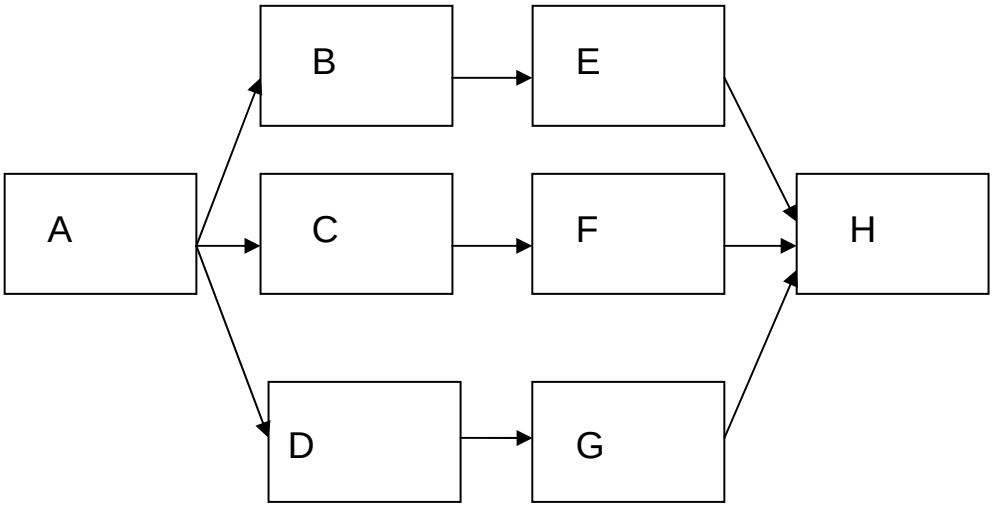
4. In scheduling her project, Amanda ignored the risks of absence due to staff sickness. What might she have done to estimate the likelihood of this occurring and how might she have taken account of the risk when scheduling the project?

Awareness of past sickness rates, particularly if broken done by the time of year, would be helpful.
Short-term absences – which could be for a variety of reasons - might be best catered for by having a buffer at the end of the project.
The possibility of longer term sickness would need a more developed contingency plan, probably to bring in a temporary replacement.

5 (a) Draw up an activity network and calculate the earliest finish for the following project:

activity	***duration***	***depends on***	***resource type***
A	*3 days*		*SA*
B	*1 day*	*A*	*SD*
C	*2 days*	*A*	*SD*
D	*4 days*	*A*	*SD*
E	*3 days*	*B*	*SC*
F	*3 days*	*C*	*SC*
G	*6 days*	*D*	*SC*
H	*3 days*	*E,F,G*	*SA*

SA = Systems analyst; SD = Systems designer; SC = Software coder



activity	ES	duration	EF	LF	LS	float
A	0	3	3	3	0	0
B	3	1	4	10	9	6
C	3	2	5	10	8	5
D	3	4	7	7	3	0
E	4	3	7	13	10	6
F	5	3	8	13	10	5
G	7	6	13	13	7	0
H	13	3	16	16	13	0

The critical path is A,D, G,H

(b) Produce a table showing the number of specialists of each type needed on each day of the project. How many of each type of resource will need to be recruited for the project as a whole if the earliest finish date is to be preserved?

weeks	4	5	6	7	8	9	10	11	12	13
SD1	B									
SD2	C	C								
SD3	D	D	D	D						
SC1		E	E	E						
SC2			F	F	F					
SC3					G	G	G	G	G	G
SDs	**3**	**2**	**1**	**1**						
SCs		**1**	**2**	**2**	**2**	**1**	**1**	**1**	**1**	**1**

Note that the initial 3 week stint by the systems analyst is not shown because of space constraints. Also the numbering of weeks starts at week 1 not week 0. It may be recalled that in relation to activity networks ‘week 0’ really means ‘the beginning of week 1’.

(c) What impact would there be on the project if there were only two systems designers?

weeks	4	5	6	7	8	9	10	11	12	13
SD1	B	C	C							
SD2	D	D	D	D						
SC1		E	E	E						
SC2				F	F	F				
SC3					G	G	G	G	G	G
SDs	**2**	**2**	**2**	**1**						
SCs		**1**	**1**	**2**	**2**	**2**	**1**	**1**	**1**	**1**

Note: no impact on the completion date.

(d) What impact would there be on the project if there was only one system designer, and you had three software coders?

weeks	4	5	6	7	8	9	10	11	12	13
SD1	D	D	D	D	C	C	B			
SC1					G	G	G	G	G	G
SC2							F	F	F	
SC3								E	E	E
SDs	**1**	**1**	**1**	**1**	**1**	**1**	**1**			
SCs					**1**	**1**	**2**	**3**	**3**	**2**

Note: no impact on the completion date

e) Assuming that the systems designers were employed for the duration of the project, what would be the % utilisation of the systems designers in the case of both (c) and (d) above?

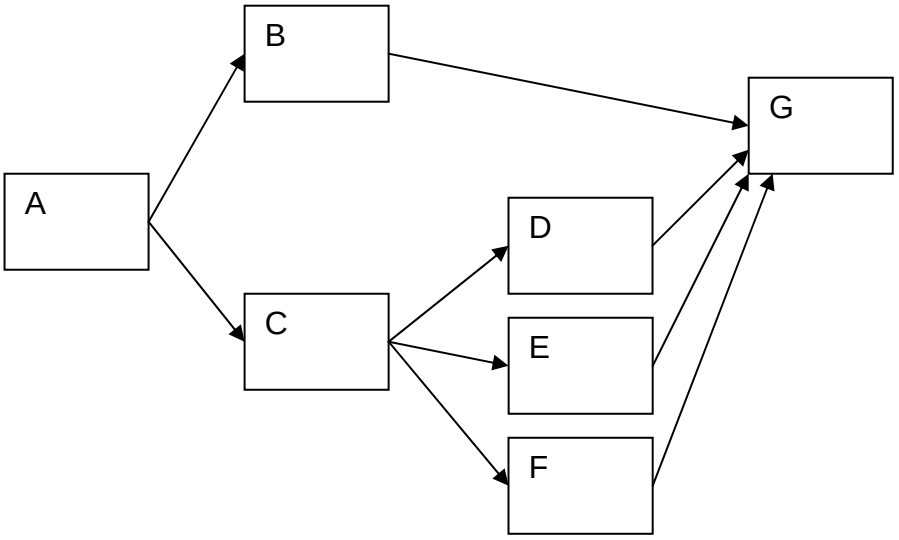
7/(13x2) x100 = 27%
7/13 x 100 = 54%

6. (a) Draw up an activity network for the activities below, identifying the critical path

activity	***duration***	***depends on***	***resource type***
A	*2 days*		*SA*
B	*10 days*	*A*	*SD*
C	*2 days*	*A*	*SD*
D	*2 days*	*C*	*SC*
E	*3 days*	*C*	*SC*
F	*2 days*	*C*	*SC*
G	*4 days*	*B, D,E,F*	*SA*

SA = Systems analyst; SD = Systems designer; SC = Software coder

(b) Draw up a resource table showing the number of each type of resource needed on each day of the project and assuming that there is only one Systems Designer.



activity	ES	duration	EF	LF	LS	float
A	0	2	2	2	0	0
B	2	10	12	12	2	0
C	2	2	4	9	7	5
D	4	2	6	12	10	6
E	4	3	7	12	9	5
F	4	2	6	12	10	6
G	12	4	16	16	12	0

Critical path is A,B,G

(b)

weeks	1-2	3	4	5	6	7	8	9	10	11	12	13	14	15-18
SD1		C	C	B	B	B	B	B	B	B	B	B	B	
SC1				D	D	E	E	E	F	F				
SA	A													G

Note:This illustrates that the best policy is not always to give priority to activities on the critical path when allocating resources.