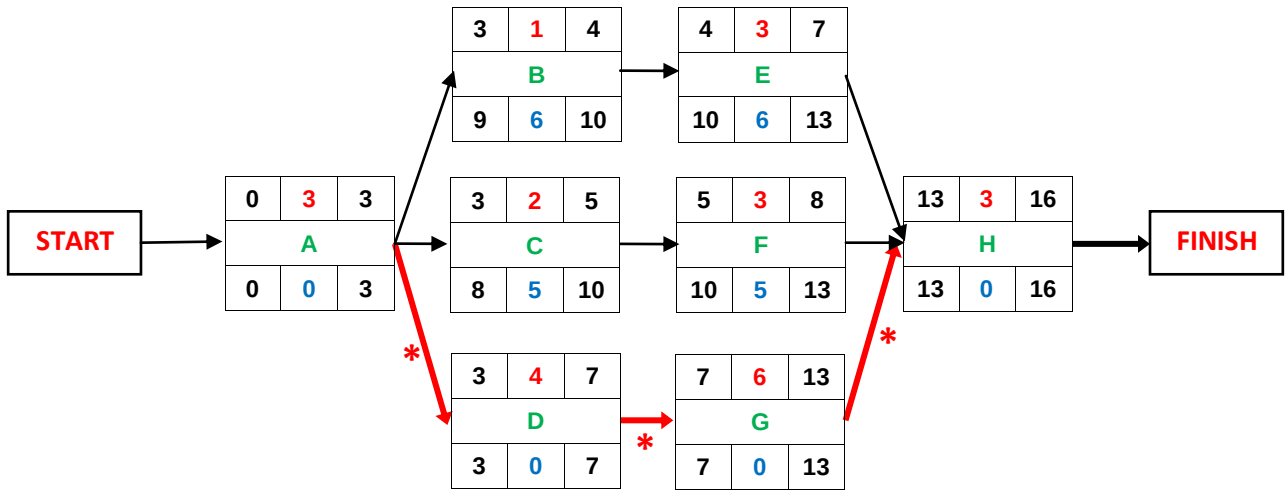
RESOURCE ALLOCATION – 3 EXAMPLES

QUESTION 1:

TABLE 1

ACTIVITY	DURATION (WORKING DAYS)	PRECEDENTS	RESOURCES TYPE
A	3 days	None	System Analyst (SA)
B	1 day	A	System Designer (SD)
C	2 days	A	System Designer (SD)
D	4 days	A	System Designer (SD)
E	3 days	B	Software Coder (SC)
F	3 days	C	Software Coder (SC)
G	6 days	D	Software Coder (SC)
H	3 days	E,F,G	System Analyst (SA)

1.1 Use the information in table 1 to draw **activity-on-node network,** include all the node calculations.



1.2 Produce a **resource table** showing the number of specialists of each type needed on each day of the project.

days	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
SA_1	A	A	A													
SD_1				B												
SD_2				C	C											
SD_3				D	D	D	D									
SC_1					E	E	E									
SC_2						F	F	F								
SC_3								G	G	G	G	G	G			
SA_2														H	H	H
SD's				**3**	**2**	**1**	**1**									
SC's					**1**	**2**	**2**	**2**	**1**	**1**	**1**	**1**	**1**			
SA's	**1**	**1**	**1**											**1**	**1**	**1**

1.3 How many of each type of resource (**minimum**) will need to be recruited for the project as a whole if the earliest finish date is to be preserved?

ANSWER: 1 System Analyst; 3 System Designers and 2 Software Coders

1.4 What impact would there be on the project in table 2 if there were only two system designers?

ANSWER:

days	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
SA_1	A	A	A													
SD_1				B	C	C										
SD_2				D	D	D	D									
SC_1					E	E	E									
SC_2						F	F	F								
SC_3								G	G	G	G	G	G			
SA_2														H	H	H
SD's				**2**	**2**	**1**	**1**									
SC's					**1**	**2**	**2**	**2**	**1**	**1**	**1**	**1**	**1**			
SA's	**1**	**1**	**1**											**1**	**1**	**1**

- So if there were only two system designers, the completion date of the project will still be 16 weeks and the critical path is still the same, **so there's no impact on the completion date.**
- But now we have **5 staff members (1 SA, 2 SD, 2 SC) instead of 6 as before (1 SA, 3 SD, 2 SC) , which could result in reducing the project** expenditure (cost).

1.5 What impact would there be on the project in table 2, if there were only one system designer but you had three software coders?

ANSWER:

days	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
SA_1	A	A	A													
SD_1				D	D	D	D	C	C	B						
SC_1											E	E	E			
SC_2										F	F	F				
SC_3								G	G	G	G	G	G			
SA_2														H	H	H
SD's				**1**	**1**	**1**	**1**	**1**	**1**	**1**						
SC's								**1**	**1**	**2**	**3**	**3**	**2**			
SA's	**1**	**1**	**1**											**1**	**1**	**1**

- So if there were only one system designer but you had three software coders, the completion date of the project still will be **16 weeks, so there's no impact on the completion date.**
- But now we have **5 staff members (1 SA, 1 SD, 3** SC) instead of 6 as before (1 SA, 3 SD, 2 SC), which could result in reducing the project expenditure (cost).
- Also now we have 2 critical paths "start A- D- G-H-finish" and "start A- C- F-H-finish", instead of only one critical path as before "start A- D- G-H-finish".

1.6 Assuming that the systems designers were employed for the duration of the project, what would be the % utilization of the systems designers in the case of both (1.4) and (1.5) above?

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

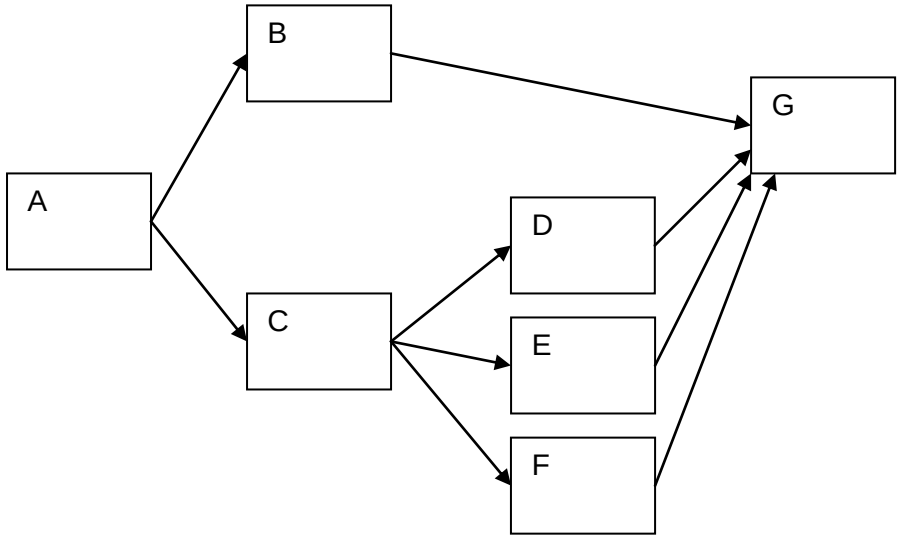
QUESTION 2:

TABLE 2

ACTIVITY	DURATION (WORKING DAYS)	PRECEDENTS	RESOURCES TYPE
A	2 days	None	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

2.1 Draw up an **activity network** for the activities below, identifying the critical path



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

2.2 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.

days	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15-18
SD_1			C	C	B	B	B	B	B	B	B	B	B	B	
SC_1					D	D	E	E	E	F	F				
SA	A	A													G

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

QUESTION 3

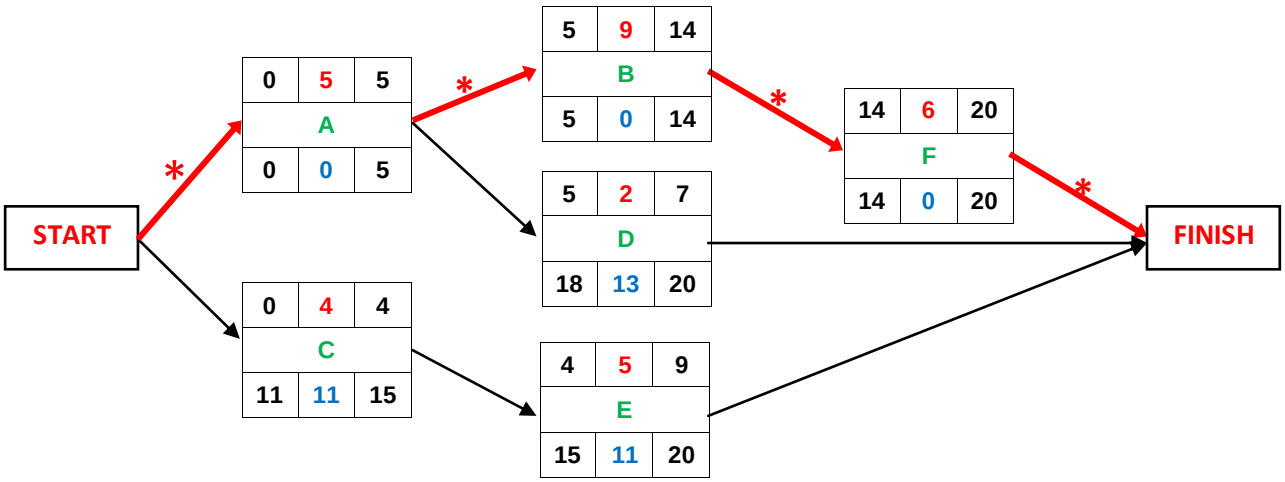
With the information on the table 3, draw an activity-on-node network. Calculate earliest start (ES) and Latest finish (LF).

TABLE 3

Activity	Description	Resources	Duration (working days)	Precedents
A	Requirement analysis	System analyst	5	None
B	System design	System Designer	9	A
C	Programming	Programmer	4	None
D	Hardware installation	Hardware Installer	2	A
E	System testing	Tester	5	C
F	Training and Support	Trainer and supporters	6	B

3.1 One of the final results of resource allocation is **"Resource Schedule"** which shows the dates each resource will be required and the level of the requirement. Table 3 has activity description and resources that are needed per activity.

a) Use the information on table 3 to draw **activity-on-node network,** include all the node calculates.



CRITICAL PATH: A-B-F = 20

b) **Using a bar chart, schedule the resources of this project to the activities plan drawn** (i.e map out the resources indicated in column 3 of table 3 to the activity plan you draw). Other thing being equal, assume all resources are required only once and each activity has been scheduled to start at its earliest start date.

DAYS →

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
A	SYSTEM ANALYST																			
B						SYSTEM DESIGNER														
C	PROGRAMMER																			
D						INSTALLER														
E				TESTER																
F														TRAINER AND SUPPORTERS						

↑ ACTIVITIES

3.2 Why is it important to prioritize activities in projects?

ANSWER:

Allocating a resource to particular activity limits the flexibility for resource allocation and scheduling of other activities. Therefore it is important to prioritize activities so that resources can be allocated to competing activities in some rational order. The priority should always be to allocate resource to critical path activities and then to activities that would most likely affect others.

3.3 Discuss at least two ways of prioritizing activities.

ANSWER:

Total float priority: With this method, activities are ordered according to their total float. Activities with smallest total float have the highest priority. This means that activities are allocated resource in ascending order of total float.

Ordered list priority: this method allows activities that can proceed at the same time to be ordered according to a set of simple criteria.