

## PERT

1) A project has the following activities and other characteristics:

Activity	Preceding Activity	Time Estimate (in weeks)		
		Optimistic	Most likely	pessimistic
A	-	4	7	16
B	-	1	5	15
C	A	6	12	30
D	A	2	5	8
E	C	5	11	17
F	D	3	6	15
G	B	3	9	27
H	E,F	1	4	7
I	G	4	19	28

- a) Draw the PERT network diagram
  - b) Identify the critical path
  - c) Prepare the activity schedule for the project
  - d) Determine the means project completion time.
  - e) Find the probability that the project is completed in 36 weeks.
- 2) A Project has the following activities and other characteristics.

Activity	Preceding Activity	Time Estimate (in weeks)		
		Optimistic	Most likely	pessimistic
A	NIL	5	8	17
B	NIL	2	6	16
C	A	7	13	31
D	A	3	6	9
E	C	5	12	18
F	D	4	7	16
G	B	4	9	28
H	E,F	2	5	8
I	G	5	20	29

- a) Draw the PERT network diagram
  - b) Identify the critical path
  - c) Find the expected duration and variance for each activity. What is expected project length?
  - d) what is the probability that the project is completed at least 3 weeks prior to scheduled completion?
- 3) Consider the following project.

Activity	Predecessors	Optimistic	Most Likely	Pessimistic
A	None	3	6	9
B	None	2	5	8
C	A	2	4	6
D	B	2	3	10
E	B	1	3	11
F	C,D	4	6	8
G	E	1	5	15

- a) Draw the project network.

- b) Find the critical path and expected completion time.  
 c) What is the probability that the project will be completed by 18 weeks?  
 d) What will be the project duration so that the project manager is confident with 95% that the project will be completed on schedule?

4) A project consists of 8 activities with the following relevant information.

Activity	Preceding Activity	Time Estimate (in weeks)		
		Optimistic	Most likely	Pessimistic
A	----	2	2	8
B	---	2	5	8
C	---	3	3	9
D	A	2	2	2
E	B	3	6	15
F	C	3	6	9
G	D,E	4	7	16
H	F,G	2	3	4

- i) Draw the PERT network and find out the expected project completion time.  
 ii) What duration will have 95% confidence for project completion?  
 (Given area under normal curve from  $z = 0$  to  $z = 1.65$  is 0.45)

5) Details of 9 activities of the project are as follows:

Activity	Time Estimate (in weeks)		
	Optimistic	Most likely	Pessimistic
1-2	2	5	14
1-6	2	5	8
2-3	5	11	29
2-4	1	4	7
3-5	5	11	17
4-5	2	5	14
6-7	3	9	27
5-8	2	2	8
7-8	7	13	31

- a) Draw the network diagram and determine various paths and their duration.  
 b) Calculate the probability of completion of the project in 38 days.  
 c) Calculate the project duration if the probability of project completion is to be 94.5%.

6) Miss BMS have taken up a special project consisting of 8 activities whose three times estimates are listed in the table below:

Activity (i-j)	Time Estimate (in weeks)		
	Optimistic	Most likely	Pessimistic
1-2	1	6	5
1-3	2	4	6
2-5	3	5	7
5-6	5	7	9
4-6	6	8	10

3-6	7	9	11
6-7	2	3	4

- Draw a PERT network and identify the critical path.
- Prepare a chart to show estimated time, standard deviation and variance for each activity from time estimates given as above.
- If 21 weeks deadline is imposed, what is the probability that the project will be finished within that time?
- If the project manager wants to be 99% certain that the project should be completed on schedule what will be the project duration?

7) A Project manager has made the following 3 point time estimates for various activities of a project.

Events	Three point estimates in days		
	Optimistic	Most likely	Pessimistic
1-2	6	6	24
1-3	6	12	18
1-4	12	12	30
2-5	6	6	6
3-5	12	30	48
4-6	12	30	42
5-6	18	30	54

- Draw a PERT network and find out the expected project completion time.
- What project completion will have 90% confidence of completion?
- If there is a huge penalty for exceeding the project completion deadline of 4 days estimated completion time, what is the probability of being penalized.

8) A Small Project consists of seven activities, the details of which are given below:

Activity	Immediate Predecessor	Duration (days)		
		Most Likely time	Optimistic time	Pessimistic time
A	---	3	1	7
B	A	6	2	14
C	A	3	3	3
D	B,C	10	4	22
E	B	7	3	15
F	D,E	5	2	14
G	D	4	4	4

- Draw the network, number the nodes and answer the questions given below:
- What are the expected project completion time and the next most critical path?
- What is the probability that the project would be completed in 30 days?
- What project duration will have 95% confidence of completion?
- If the fixed cost of the project is Rs. 10,00,000/- and variable cost is Rs. 8,000/- per day then find the amount the firm should bid under this policy of 95% confidence of completion? (for the purpose of bidding consider only the cost.)

\*\*\*\*\*THE END\*\*\*\*\*