

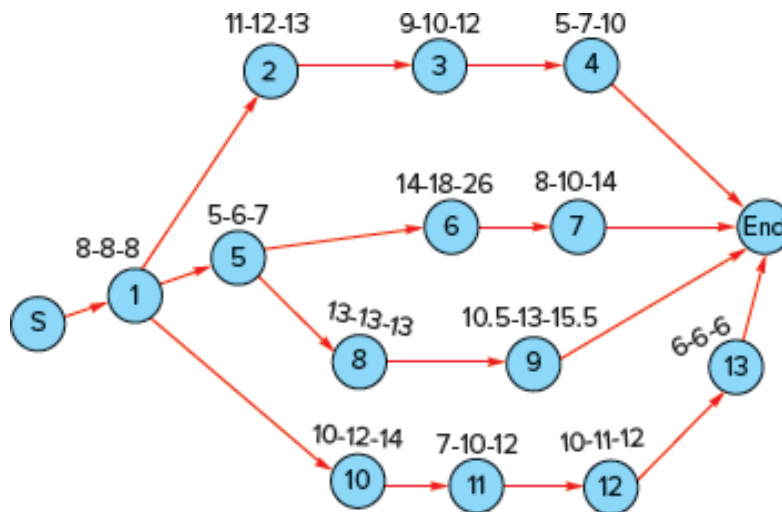
Problem 1. A company builds custom equipment. It has landed a contract with a major customer. Relevant data are shown below. The complication is that the delivery has been promised in 32 weeks and the company will have to pay a penalty of \$375 for each week the equipment is late.

Activity	Precedes	Normal Duration (weeks)	Crashing Costs	
			1st Week	2nd Week
K	L, N	9	\$410	\$415
L	M	7	125	—
N	J	5	45	45
M	Q	4	300	350
J	Q	6	50	—
Q	P, Y	5	200	225
P	Z	8	—	—
Y	End	7	85	90
Z	End	6	90	—

Develop the minimum cost crashing schedule.

Problem 2. The following precedence network displays the 3-point estimates for each activity of a project. Determine:

- The expected duration for each path and its variance.
- The probability that the project will require more than 49 weeks.
- The probability that the project can be completed in 46 weeks or less.



Problem 3. Consider the construction of a research building for Eli Lilly & Co., a pharmaceutical company, a few years ago. This 550,000 ft², 4-story (in 3 wings), \$135 million building was planned to be completed in five years. It required special ventilation for 162 labs, purified water, and special drainage. Consider the following list of major activities/work packages (as seen by Eli Lilly), their expected duration, and their relationship to other activities/work packages for the Eli Lilly building.

Activity	Duration (In months)	Immediate Predecessor
A. project approval	3	—
B. decide general requirements	6	A
C. choose A/E firm	2	A
D. preliminary design	3	B, C
E. choose project management firm	2	B
F. decide detailed requirements	6	D, E
G. finalize design	6	F
H. schedule, budget, manual	4	F
I. start bid packages	2	G, H
J. excavate, foundation, steel structure	10	I
K. put up enclosures	7	J
L. HVAC, fire protection, plumbing	6	J
M. Electrical	5	J
N. Interior finishes	12	K, L, M
O. close out project	2	N

- Draw the precedence network.
- Determine the ES, EF, LF, and LS times.
- What is the project duration?
- What are the critical activities?