20 A series of activities must be completed in a coordinated fashion to complete a landscaping overhaul. The following table shows the activities; their optimistic, most likely, and pessimistic durations; and their immediate predecessors.

ACTIVITY	DAYS			IMMEDIATE PREDECESSORS
	a	m	b	
A	4	8	12	—
B	4	10	13	A
C	7	14	18	B
D	9	16	20	B
E	6	9	12	B
F	2	4	6	D, E
G	4	7	13	C, F
H	3	5	7	G
I	2	3	4	G, H

(a) Determine the expected times and variances for each activity.

(b) Construct a project network for this problem.

(c) Determine the EST, EFT, LST, LFT, and slack for each activity. Also determine the critical path and project completion time.

(d) What is the probability that the project will be finished in less than 57 days?

(e) What is the probability that the project will need at least 50 days?

21 LeBron Woods is responsible for developing a leadership training program for his organization. The following table describes the relationships between the activities that need to be completed.

ACTIVITY	DAYS			IMMEDIATE PREDECESSORS
	a	m	b	
A	3	7	14	—
B	5	10	15	—
C	3	5	10	A, B
D	5	12	13	C
E	2	5	8	C
F	2	5	14	E
G	5	8	11	F
H	6	10	14	D
I	3	4	8	F, H
J	4	7	10	G, I

(a) Determine the expected times and variances for each activity.

(b) Construct a project network for this problem.

(c) Determine the EST, EFT, LST, LFT, and slack for each activity. Also determine the critical path and project completion time.

(d) What is the probability that the project will be finished in less than 49 days?

(e) What is the probability that the project will need at least 54 days?

22 The expected project completion time for the construction of a pleasure yacht is 21 months, and the project variance is 6. What is the probability that the project will

(a) require at least 17 months?

(b) be completed within 20 months?

(c) require at least 23 months?

(d) be completed within 25 months?

23 The Coogan Construction Company has determined that the expected completion time for its most popular model home follows the normal probability distribution with a mean of 25 weeks and a standard deviation of 4 weeks.

(a) What is the probability that the next home will be completed within 30 weeks?

(b) What is the probability that the next home will be completed within 22 weeks?

(c) Find the number of weeks within which Coogan is 99% sure the next home will be completed.

(d) Find the number of weeks within which Coogan is 85% sure the next home will be completed.

24 The General Foundry air pollution project discussed in this chapter has progressed over the past several weeks, and it is now the end of week 8. Lester Harky would like to know the value of the work completed, the amount of any cost overruns or underruns for the project, and the extent to which the project is ahead of schedule or behind schedule by developing a table like the one in Table 7. The current project status is shown in the following table.

ACTIVITY	PERCENTAGE COMPLETED	ACTUAL COST
A	100	$20,000
B	100	$36,000
C	100	$26,000
D	100	$44,000
E	55	$29,000
F	55	$12,000
G	10	$5,000
H	13	$1,800

25 Fred Ridgeway has been given the responsibility of managing a training and development program. He knows the EST and LST (both in months), and the total costs for each activity. This information is given in the table at the top of the next page.

(a) Using ESTs, determine Fred's total monthly budget.

(b) Using LSTs, determine Fred's total monthly budget.