

PERT. EXERCISE 1

We are a contractor that is developing a tender for a construction work. We analyse the activities of our programme and obtain different results for the duration of works (in days). This way, we make a list and establish the optimum, the most likely and the pessimistic duration for each one (table 1).

Activity	d_o	d_m	d_p
1-2	5	7	10
1-3	10	14	16
1-4	8	12	20
2-5	22	28	41
2-6	9	11	12
3-7	12	16	19
4-8	9	13	15
5-9	18	25	33
6-9	3	6	10
7-10	11	16	18
8-10	6	9	14
9-11	15	19	24
10-11	7	14	19
11-12	7	10	12

With this information, we want to calculate:

- The most likely average duration of the whole works
- The probability to finish these works in 100 days
- The probability to finish these works in 85 days
- The duration in which we have 90% of probability to finish these works

Activity	d _o	d _m	d _p	d _e	V _{de}	σ _{de}
1-2	5	7	10	7.17	0.83	0.69
1-3	10	14	16	13.67	1.00	1.00
1-4	8	12	20	12.67	2.00	4.00
2-5	22	28	41	29.17	3.17	10.03
2-6	9	11	12	10.83	0.50	0.25
3-7	12	16	19	15.83	1.17	1.36
4-8	9	13	15	12.67	1.00	1.00
5-9	18	25	33	25.17	2.50	6.25
6-9	3	6	10	6.17	1.17	1.36
7-10	11	16	18	15.5	1.17	1.36
8-10	6	9	14	9.33	1.33	1.78
9-11	15	19	24	19.17	1.50	2.25
10-11	7	14	19	13.67	2.00	4.00
11-12	7	10	12	9.83	0.83	0.69

In 100 days

$$\frac{100 - 90.51}{4.46} = 2.13 \gg \gg 98\%$$

In 85 days

$$\frac{85 - 90.51}{4.46} = -1.24 \gg \gg 10.5\%$$

90% probability

$$\frac{x - 90.51}{4.46} = 1.3 \gg \gg x = 96.31 \text{ days}$$

