

PERT. EXERCISE 2

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	10	12	18
1-3	10	20	29
2-4	25	31	41
3-5	7	9	11
3-6	29	35	46
4-7	15	18	22
4-8	21	25	34
5-9	5	8	10
6-10	46	56	70
7-11	15	17	22
8-11	9	13	16
9-12	9	11	12
10-12	16	20	22
11-13	7	8	10
12-14	28	32	36
13-15	11	16	22
14-15	9	12	15
Dummy relationships			
4-9			

With this information, we want to calculate:

- The most likely average duration of the whole works
- The probability to finish these works in 180 days
- The probability to finish these works in 165 days
- The duration in which we have 80% of probability to finish these works

Activity	d _o	d _m	d _p	d _e	V _{de}	σ _{de}
1-2	10	12	18	12,7	1,33	1,78
1-3	10	20	29	19,8	3,17	10,03
2-4	25	31	41	31,7	2,67	7,11
3-5	7	9	11	9,0	0,67	0,44
3-6	29	35	46	35,8	2,83	8,03
4-7	15	18	22	18,2	1,17	1,36
4-8	21	25	34	25,8	2,17	4,69
5-9	5	8	10	7,8	0,83	0,69
6-10	46	56	70	56,7	4,00	16,00
7-11	15	17	22	17,5	1,17	1,36
8-11	9	13	16	12,8	1,17	1,36
9-12	9	11	12	10,8	0,50	0,25
10-12	16	20	22	19,7	1,00	1,00
11-13	7	8	10	8,2	0,50	0,25
12-14	28	32	36	32,0	1,33	1,78
13-15	11	16	22	16,2	1,83	3,36
14-15	9	12	15	12,0	1,00	1,00

In 180 days

$$\frac{180 - 176}{3.65} = 1.096 \gg \gg 98\%$$

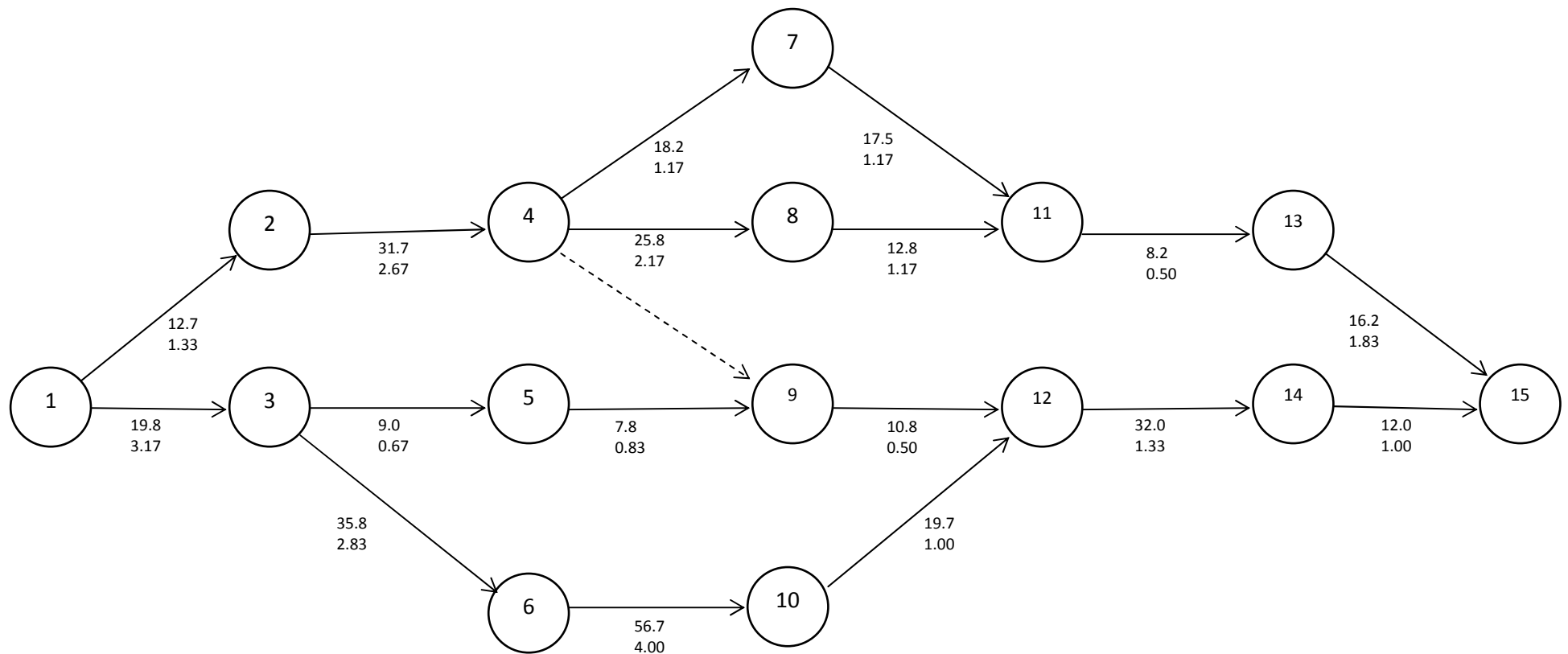
In 165 days

$$\frac{165 - 176}{3.65} = -3.01 \gg \gg \text{less than } 5\%$$

80% probability

$$\frac{x - 176}{3.65} = 0.85 \gg \gg x = 179.1 \text{ days}$$

The existing variability between d_o and d_p (the standard deviation) is short, so the margin of probability is also short. The statistical graph is moving between 166 – 180 days.



$d_e = 176$ days

$V_{de} = 13.33$

$\sigma_{de} = 3.65$