

**Contoh Soal Network Program Evaluation and Review Technique (PERT) (Kegiatan Proyek)**

- Spesifikasi kegiatan sebuah proyek diperlihatkan pada Tabel 1.

**Tabel 1. Aktivitas/Kegiatan Proyek untuk Network PERT**

Aktivitas/Kegiatan	Kegiatan pengikut	a (wkt optimis/hr)	m (wkt normal/hr)	b (wkt pesimis/hr)	Mean $\bar{D} = \frac{a+4m+b}{6}$	Var $\bar{V} = \left(\frac{b-a}{6}\right)^2$
A*	B, C, D	2	3	4	$(2+4*3+4)/6 = 3$	$((4-2)/6)^2 = 0,11$
B	E	1	1	1	1	0,00
C*	F	6	8	10	8	0,44
D	G	3	4	5	4	0,11
E	G	2	3	10	4	1,78
F*	G	5	7	9	7	0,44
G*	---	4	7	10	7	1,00

- Langkah-langkah metode PERT :
  - Langkah 1**  
Hitung mean dan variance dari masing-masing kegiatan.
  - Langkah 2**  
Gunakan mean waktu kegiatan pada Langkah 1, selanjutnya buatlah network PERT, jalur kritis, dan SPC<sub>i</sub>, SPC<sub>j</sub>, SPL<sub>i</sub>, SPL<sub>j</sub>.
  - Langkah 3**  
Mean waktu penyelesaian proyek = jumlah rata-rata dari kegiatan kritis.  
Variance dari waktu jalur kritis = jumlah variance kegiatan kritis.

Jumlah rata-rata (mean) dari aktivitas kritis, yaitu :  $3 + 8 + 7 + 7 = 25$  (A – C – F – G)

**Variance proyek :**

$$\sigma_p^2 = \sum (\text{variance kegiatan pada jalur kritis})$$

$$= 0,11 + 0 + 1,78 + 0,44$$

$$= 2,33$$

$$\sigma_p = \sqrt[2]{2,33} = 1,526 = 1,53 \text{ (deviasi standar)}$$

○ **Langkah 4**

Hitung probabilitas waktu penyelesaian proyek, apabila proyek direncanakan selesai dalam 27 hari.

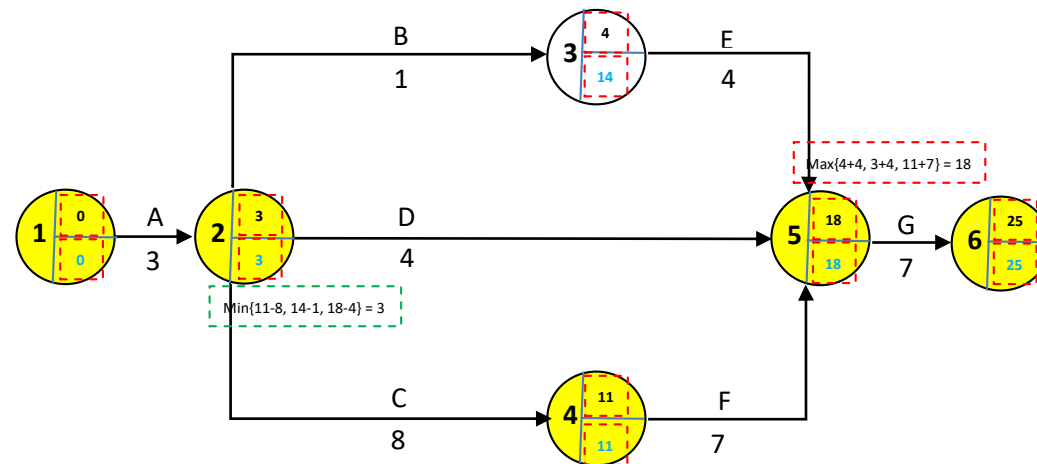
$$P\{\mu_i \leq ST_i\} = P\left\{\frac{\mu_i - E\{\mu_i\}}{\sqrt{\text{var}\{\mu_i\}}} \leq \frac{ST_i - E\{\mu_i\}}{\sqrt{\text{var}\{\mu_i\}}}\right\} = P\{Z \leq K_i\} = P\left\{Z \leq \frac{27-25}{\sqrt[2]{2,33}}\right\} = P\left\{Z \leq \frac{2}{1,53}\right\} = P\{Z \leq 1,31\} = 0,9049 = 90,49\%$$

Hitung probabilitas waktu penyelesaian proyek, apabila proyek direncanakan selesai dalam 30 hari.

$$P\{\mu_i \leq ST_i\} = P\left\{\frac{\mu_i - E\{\mu_i\}}{\sqrt{\text{var}\{\mu_i\}}} \leq \frac{ST_i - E\{\mu_i\}}{\sqrt{\text{var}\{\mu_i\}}}\right\} = P\{Z \leq K_i\} = P\left\{Z \leq \frac{30-25}{\sqrt[2]{2,33}}\right\} = P\left\{Z \leq \frac{5}{1,53}\right\} = P\{Z \leq 3,27\} = 0,9995 = 99,95\%$$

Tabel 1. Aktivitas/Kegiatan Proyek untuk Network PERT

Aktivitas/Kegiatan	Kegiatan pengikut	a (wkt optimis/hr)	m (wkt normal/hr)	b (wkt pesimis/hr)	Mean $\bar{D} = \frac{a+4m+b}{6}$	Var $\bar{V} = \left(\frac{b-a}{6}\right)^2$
A	B, C D	2	3	4	$(2+4*3+4)/6 = 3$	$((4-2)/6)^2 = 0,11$
B	E	1	1	1	1	0
C	F	6	8	10	8	0,44
D	G	3	4	5	4	0,11
E	G	2	3	10	4	1,78
F	G	5	7	9	7	0,44
G	---	4	7	10	7	1



Jalur kritis : A – C – F - G (= 3 + 8 + 7 + 7 = 25)

Gambar 1. Diagram Network (AOA) dari Tabel 1

Tabel 2. Aktivitas/Kegiatan Proyek Konstruksi

Kegiatan	Antara peristiwa/pentol	Lama kegiatan (hari)	SPC <sub>i</sub>	SPC <sub>j</sub>	SPL <sub>i</sub>	SPL <sub>j</sub>	Slack i                  j	
A*	1 - 2	3	0	0+3=3	3-3=0	3	0-0=0	3-3=0
B	2 - 3	1	3	3+1=4	14-1=13	14	13-3=10	14-4=10
C*	2 - 4	8	3	3+8=11	11-8=3	11	3-3=0	11-11=0
D	2 - 5	4	3	3+4=7	18-4=14	18	14-3=11	18-7=11
E	3 - 5	4	4	4+4=8	18-4=14	18	14-4=10	18-8=10
F*	4 - 5	7	11	11+7=18	18-7=11	18	11-11=0	18-18=0
G*	5 - 6	7	18	18+7=25	25-7=18	25	18-18=0	25-25=0

= SPL<sub>i</sub> - SPC<sub>i</sub> (kritis)= SPL<sub>j</sub> - SPC<sub>j</sub> (kritis)**Keterangan :**

Tanda bintang = \* = kritis

Slack = SPL<sub>i</sub> - SPC<sub>i</sub> = SPL<sub>j</sub> - SPC<sub>j</sub>

Tabel Probabilitas Normal										
Z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
.00	.5000	.5040	.5080	.5120	.5160	.5199	.5239	.5279	.5319	.5358
.10	.5398	.5438	.5478	.5517	.5557	.5596	.5636	.5675	.5714	.5753
.20	.5792	.5832	.5871	.5910	.5948	.5987	.6026	.6064	.6103	.6141
.30	.6179	.6217	.6255	.6293	.6331	.6368	.6406	.6443	.6480	.6517
.40	.6554	.6591	.6628	.6664	.6700	.6736	.6772	.6808	.6844	.6879
.50	.6915	.6950	.6985	.7019	.7054	.7088	.7123	.7157	.7190	.7224
.60	.7257	.7291	.7324	.7356	.7389	.7422	.7454	.7486	.7517	.7549
.70	.7580	.7611	.7642	.7673	.7704	.7734	.7764	.7794	.7823	.7852
.80	.7881	.7910	.7939	.7967	.7995	.8023	.8051	.8078	.8106	.8133
.90	.8159	.8186	.8212	.8238	.8264	.8289	.8315	.8340	.8364	.8389
1.00	.8413	.8438	.8461	.8485	.8508	.8531	.8554	.8577	.8599	.8621
1.10	.8643	.8665	.8686	.8708	.8728	.8749	.8770	.8790	.8810	.8830
1.20	.8849	.8869	.8888	.8906	.8925	.8944	.8962	.8980	.8997	.9015
1.30	.9032	.9049	.9066	.9082	.9099	.9115	.9131	.9146	.9162	.9177
1.40	.9192	.9207	.9222	.9236	.9251	.9265	.9278	.9292	.9306	.9319
1.50	.9332	.9345	.9357	.9370	.9382	.9394	.9406	.9418	.9429	.9441
1.60	.9452	.9463	.9474	.9484	.9495	.9505	.9515	.9525	.9535	.9545
1.70	.9554	.9564	.9573	.9582	.9591	.9599	.9608	.9616	.9625	.9633
1.80	.9641	.9648	.9656	.9664	.9671	.9678	.9686	.9692	.9699	.9706
1.90	.9713	.9719	.9726	.9732	.9738	.9744	.9750	.9756	.9761	.9767
2.00	.9772	.9778	.9783	.9788	.9793	.9798	.9803	.9808	.9812	.9817
2.10	.9821	.9826	.9830	.9834	.9838	.9842	.9846	.9850	.9854	.9857
2.20	.9861	.9864	.9868	.9871	.9874	.9878	.9881	.9884	.9887	.9890
2.30	.9893	.9896	.9898	.9901	.9904	.9906	.9909	.9911	.9913	.9916
2.40	.9918	.9920	.9922	.9924	.9926	.9928	.9930	.9932	.9934	.9936
2.50	.9938	.9940	.9941	.9943	.9944	.9946	.9948	.9949	.9951	.9952
2.60	.9953	.9955	.9956	.9957	.9958	.9960	.9961	.9962	.9963	.9964
2.70	.9965	.9966	.9967	.9968	.9969	.9970	.9971	.9972	.9973	.9974
2.80	.9974	.9975	.9976	.9977	.9977	.9978	.9979	.9979	.9980	.9981
2.90	.9981	.9982	.9982	.9983	.9984	.9984	.9985	.9985	.9986	.9986
3.00	.9986	.9987	.9987	.9988	.9988	.9988	.9988	.9989	.9990	.9990
3.10	.9990	.9991	.9991	.9991	.9992	.9992	.9992	.9992	.9993	.9993
3.20	.9993	.9993	.9994	.9994	.9994	.9994	.9994	.9995	.9995	.9995
3.30	.9995	.9995	.9996	.9996	.9996	.9996	.9996	.9996	.9996	.9996
3.40	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9998
3.50	.9998	.9998	.9998	.9998	.9998	.9998	.9998	.9998	.9998	.9998
3.60	.9998	.9998	.9998	.9998	.9999	.9999	.9999	.9999	.9999	.9999