Project Management - From Theory to Practice
Assignment #1

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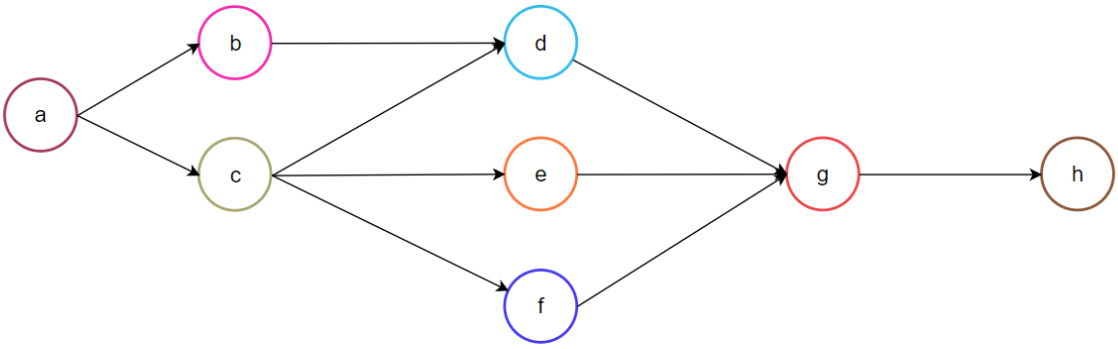
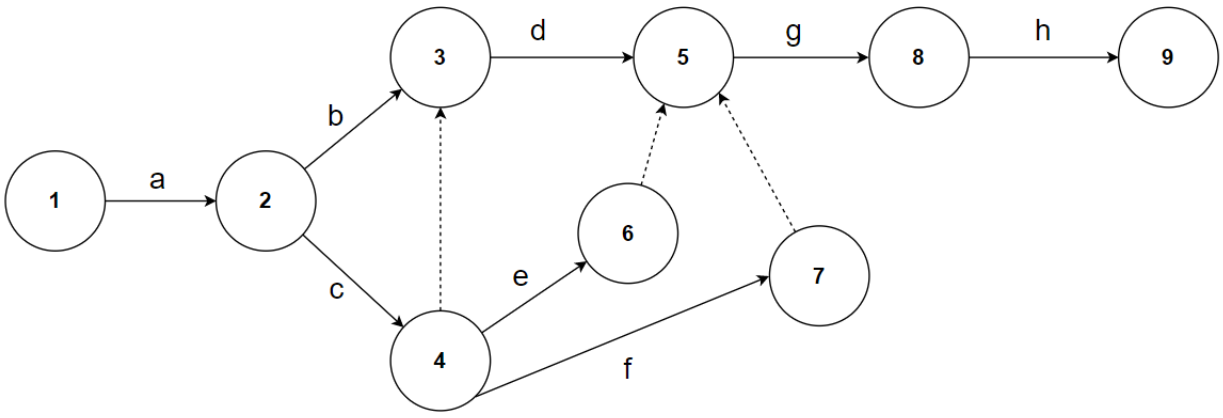
Exercise #1 - Solution

→ **AoN Network:**

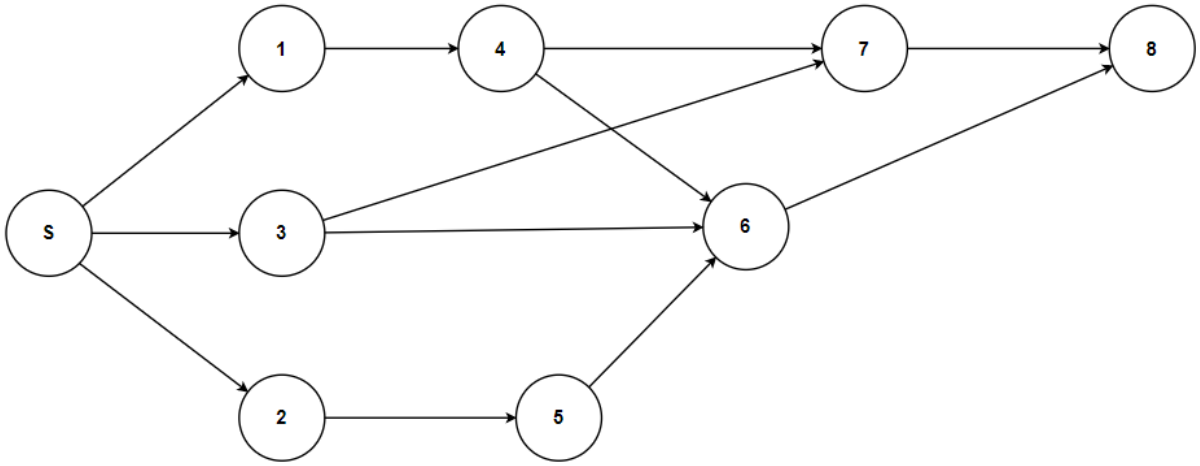


→ **AoA Network:**

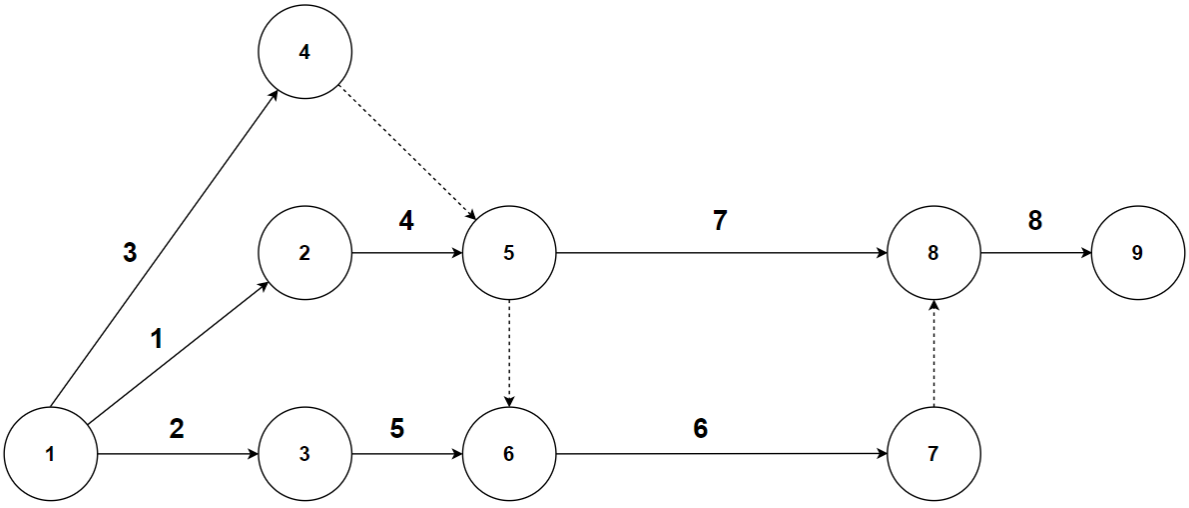


Exercise #2 - Solution

→ **AoN Network:**



→ **AoA Network:**

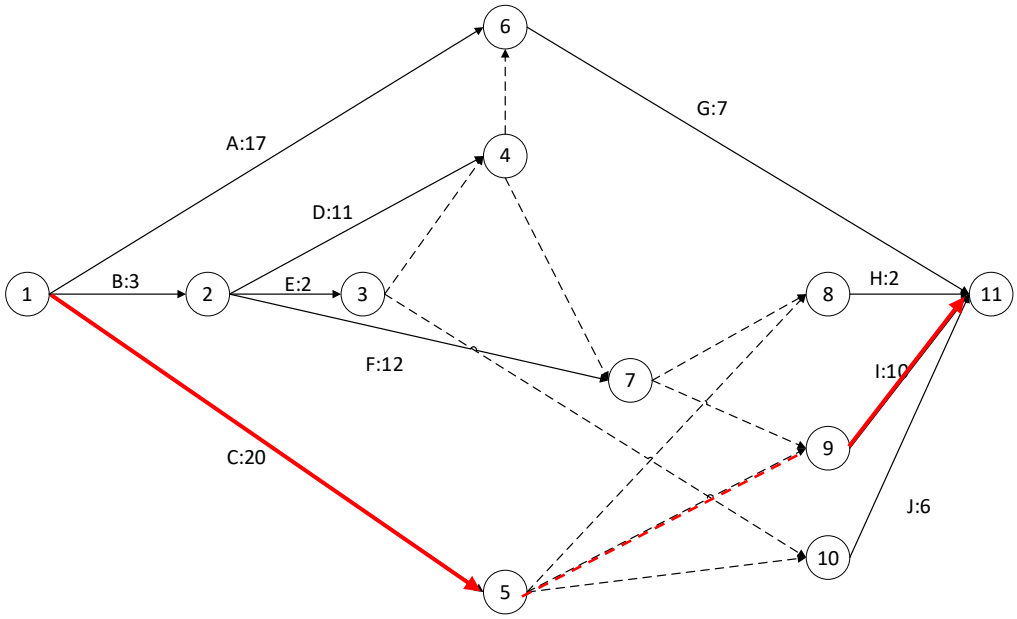


Exercise #3 - Solution

Activity	Immediate predecessors	Duration
A	-	17
B	-	3
C	-	20
D	B	11
E	B	2
F	B	12
G	A, D	7
H	F, C	2
I	F, C	10
J	E, C	6

ES_i	i	EF_i	TF_i
LS_i	di	LF_i	FF_i

Where, i = activity, di= duration of activity i.



0	START	0	0
0	di=0	0	0

0	B	3	5
5	d_i=3	8	0

3	D	14	9
12	d_i=11	23	3

0	A	17	6
6	d_i=17	23	0

0	C	20	0
0	d_i=20	20	0

3	E	5	19
22	d_i=2	24	15

3	F	15	5
8	d_i=12	20	5

20	H	22	8
28	d_i=2	30	8

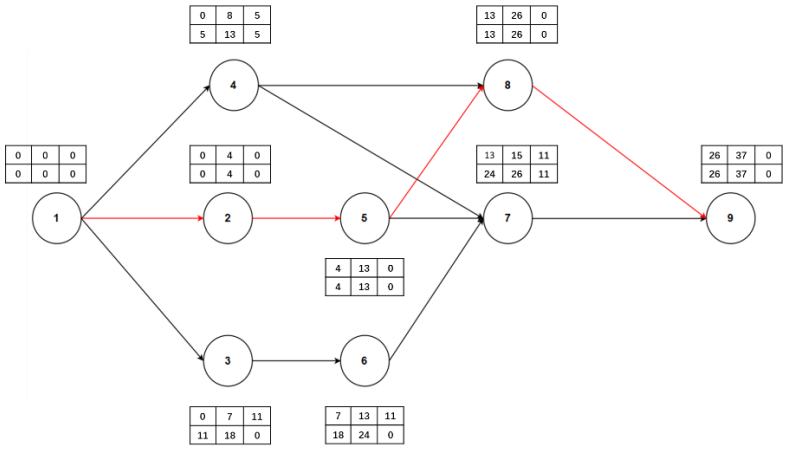
20	J	26	4
24	d_i=6	30	4

17	G	24	6
23	d_i=7	30	6

20	I	30	0
20	d_i=10	30	0

30	END	30	0
30	d_i=30	30	0

Exercise #4 - Solution



Where, i = activity, di= duration of activity i.

0	i=1	0	0
0	d_i=0	0	0

0	2	4	0
0	d_i=4	4	0

0	3	7	11
11	d_i=7	18	0

0	4	8	5
5	d_i=8	13	5

4	5	13	0
4	d_i=9	13	0

7	6	13	11
18	d_i=6	24	0

13	7	15	11
24	d_i=2	26	11

13	8	26	0
13	d_i=13	26	0

26	9	37	0
26	d_i=11	37	0

Exercise #5 - Solution

$$P(T \leq 70) = \varphi\left(\frac{t - T_E}{S}\right).$$

0	1	5.333	0
0	d_i=5.333	5.333	0

5.333	2	11.5	1.833
7.166	d_i=6.167	13.333	0

5.333	3	14.5	0
5.333	d_i=9.167	14.5	0

11.5	4	24.167	1.833
13.333	d_i=12.667	26	0

14.5	5	21.5	12.167
26.667	d_i=7	33.667	5.167

14.5	6	26.667	0
14.5	d_i=12.167	26.667	0

24.167	7	34.834	1.833
26	d_i=10.667	36.667	1.833

26.667	8	32.667	7
33.667	d_i=6	39.667	4

26.667	9	36.667	0
26.667	d_i=10	36.667	0

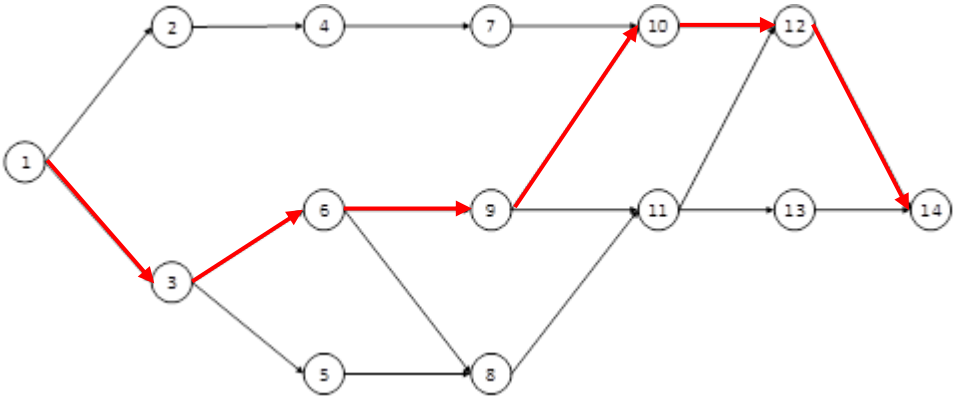
36.667	10	46.334	0
36.667	d_i=9.667	46.334	0

36.667	11	43.334	3
39.667	d_i=6.667	46.334	0

46.334	12	54.667	0
46.334	d_i=8.333	54.667	0

43.334	13	50.667	4
47.334	d_i=7.333	54.667	4

54.667	14	60	0
54.667	d_i=5.333	60	0



Calculation:

Expected time: $t_i = \frac{a + 4m + b}{6}$

Activity$_i$	Expected Time (t_i)
1	5.333
2	6.167
3	9.167
4	12.667
5	7
6	12.167
7	10.667
8	6
9	10
10	9.667
11	6.667
12	8.333
13	7.333
14	5.333

$$\mathbf{T_E = 5.333 + 9.167 + 12.167 + 10 + 9.667 + 8.333 + 5.333 = 60}$$

Variance: $\sigma_i^2 = \frac{(b-a)^2}{36}$

σ_1^2 = 0.444444 σ_9^2= 1 σ_{14}^2 = 1

σ_3^2 = 1.361111 σ_{10}^2 = 1

σ_6^2 = 0.25 σ_{12}^2 = 1

$$\boldsymbol{S = \sqrt{\sigma_1^2 + \sigma_3^2 + \sigma_6^2 + \sigma_9^2 + \sigma_{10}^2 + \sigma_{12}^2 + \sigma_{14}^2}}$$

S = 2.4723

$$\boldsymbol{P(T \leq 70)} = \varphi\left(\frac{t - T_E}{S}\right).$$

$$\boldsymbol{P(T \leq 70)} = \varphi\left(\frac{70 - 60}{2.4723}\right) = \ \varphi\,(4.04) \cong 99.99\%$$