Universidad Continental

Asignatura:

Investigación operativa

Grupo 3

Docente:

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Cusco - Perú - 2025

Administración de Proyectos con PERT CPM

Actividad	Predecesor (es)	a	m	b	Te	DE	VAR	ES	EF	LS	LF	slack	
A	-	1	3	5	3	2/3	4/9	0	3	0	3	0	✓
B	A	2	3	4	3	1/3	1/9	3	6	3	6	0	✓
C	A	1	2	3	2	1/3	1/9	3	5	8	10	5	
D	B, C	2	4	6	4	2/3	4/9	6	10	10	14	4	
E	B	3	7	11	7	4/3	16/9	6	13	6	13	0	✓
F	C	1	2	3	2	1/3	1/9	5	7	12	14	7	
G	E	1	1	1	1	0	0	13	14	13	14	0	✓
H	G, D, F	5	5	5	5	0	0	14	19	14	19	0	✓
I	F	1	3	11	4	5/3	25/9	7	11	18	22	11	
J	I	2	3	4	3	1/3	1/9	11	14	22	25	11	
K	H	3	6	9	6	1	1	19	25	19	25	0	✓
Fin	K, J	0	0	0	0	0	0	25	25	25	25	0	✓

$$Slack = \boxed{LS - ES} = \boxed{LF - EF}$$

$$Te = \frac{(a + 4m + b)}{6}$$

$$DE = \frac{(b - a)}{6}$$

$$VAR = (DE)^2$$

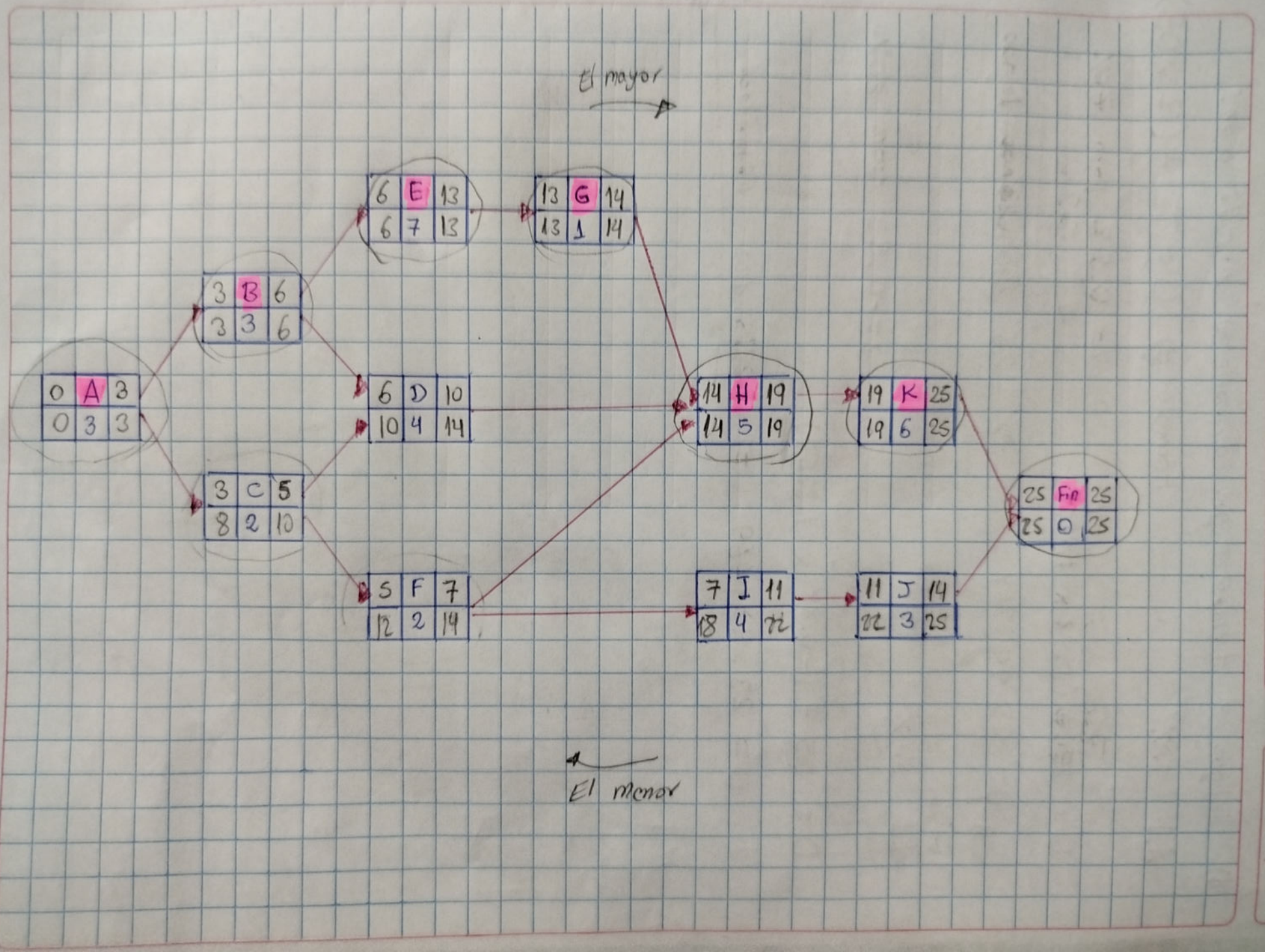
$$Var = \sum \frac{4}{9} \frac{1}{9} \frac{16}{9} + 0 + 0 + \frac{1}{9} + 0$$

$$Var = \frac{10}{3}$$

$$DE = \sqrt{Var} \Rightarrow \sqrt{\frac{10}{3}}$$

$$DE = 1.825\,741\,858\,35$$

$$DE = 1.83$$


El mayor
El menor

Probabilidad

Datos: Valor Dato = ?
Tepoy = 25
Depoy = 1.8257

$$V_{Tabla} = \frac{Valor\ Dato - Tepoy}{DEpoy}$$

Usamos la tabla

C.1 22 días

$$V_T = \left(\frac{22-25}{1.8257}\right) \Rightarrow V_T = -1.6932 \approx -1.64$$

0.0505 x 100
5.05 %

C.2 24 días

$$V_T = \left(\frac{24-25}{1.8257}\right) \Rightarrow V_T = -0.5477 \approx -0.54$$

0.2946 x 100
29.46 %

C.3 25 días

$$V_T = \left(\frac{25-25}{1.8257}\right) \Rightarrow V_T = 0$$

0.5000 x 100
50 %

C.4 29 días

$$V_T = \left(\frac{29-25}{1.8257}\right) \Rightarrow V_T = 2.1909 = 2.19$$

0.9857 x 100
98.57 %

C.5 Entre los días 25 y 30

$V_{T25} = 0$

$$V_T = \left(\frac{30-25}{1.8257}\right) \Rightarrow V_{T30} = 2.7386 \approx 2.73$$

0.5000 x 100
50 %

0.9968 x 100
99.68 %

99.68 % - 50 %

para 25 y 30 días 49.68 %

d) Indique el tiempo en que demoraría el proyecto en:

d.1 70%

Formula ⇒ $D = Te + (Z \times DE)$

$Z = 0.52$ para 70%.

$D = 25 + (0.52 \times 1.8257)$

$D = 25.949364$ ⇒ 26 días Redondeado

d.1 20%

$Z = -0.83$ para 20%.

$D = 25 + (-0.83 \times 1.8257)$

$D = 23.484669$ ⇒ 23.5 días Redondeado

Actividad	Predecesor(es)	(a)	m	(b)	Te	DE	VAR	ES	EF	LS	LF	Slack
A	-	1	3	11	4	5/3	25/9	0	4	1	5	1
B	-	2	5	14	6	2	4	0	6	0	6	0
C	A,B	2	3	4	3	1/3	1/9	6	9	9	12	3
D	A	1	4	7	4	1	1	4	8	5	9	1
E	B	2	3	4	3	1/3	1/9	6	9	6	9	0
F	C,D	2	2	2	2	0	0	9	11	12	14	3
G	D	2	4	6	4	2/3	4/9	8	12	10	14	2
H	D,E	4	5	6	5	1/3	1/9	9	14	9	14	0
I	F,G,H	2	7.5	10	7	4/3	16/9	14	21	14	21	0
J	H	5	6	7	6	1/3	1/9	14	20	15	21	1
K	I,J	4	5	6	5	1/3	1/9	21	26	23	28	2
L	I,J	7	7	7	7	0	0	21	28	21	28	0

$$Slack = |LS - ES| = |LF - EF|$$

B - E - H - I - L

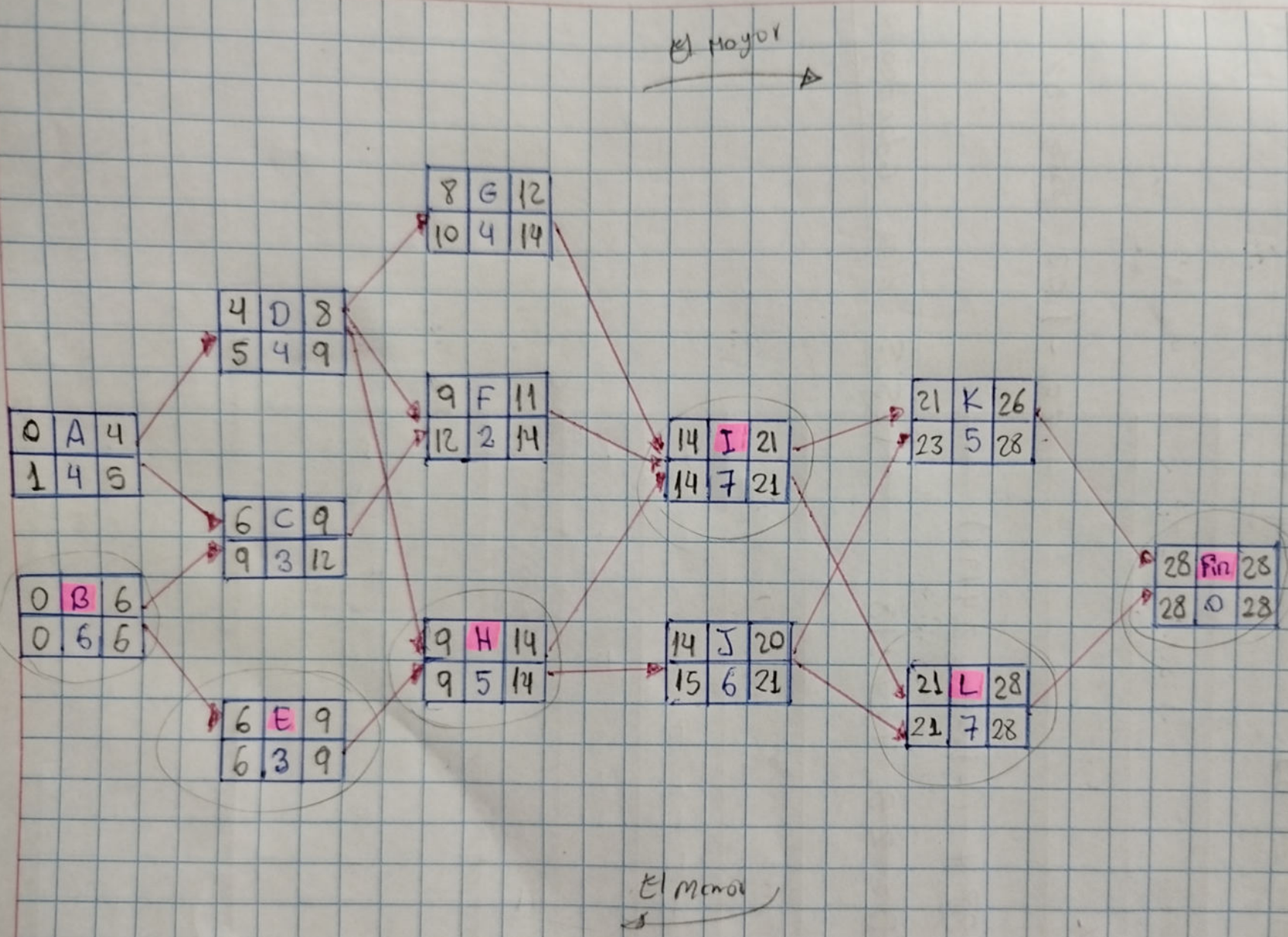
$$Var = \Sigma \quad 4 + \frac{1}{9} + \frac{1}{9} + \frac{16}{9} + 0$$

$$Var = 6$$

$$DE = \sqrt{Var} \Rightarrow \sqrt{6}$$

$$DE = 2.449489742 78$$

$$2.4494$$


El mayor
0 A 4
1 4 5
0 B 6
0 6 6
4 D 8
5 4 9
6 C 9
9 3 12
6 E 9
6 3 9
8 G 12
10 4 14
9 F 11
12 2 14
9 H 14
9 5 14
14 I 21
14 7 21
14 J 20
15 6 21
21 K 26
23 5 28
21 L 28
21 7 28
28 Fin 28
28 0 28
El menor

Probabilidad

Datos: Vala Dato = ?
Tepoy = 28
DE proy = 2.4494

$$V_{Tablo} = \frac{Vala\ Dato - Tepoy}{DEproy}$$

usamos tablo

C.1 24 días

$$V_T = \left(\frac{24-28}{2.4494}\right) \Rightarrow V_T = -1.6330 \approx -1.63$$

0.0516 x 100
5.16%

C.2 27 días

$$V_T = \left(\frac{27-28}{2.4494}\right) \Rightarrow V_T = -0.4082 \approx -0.41$$

0.3409 x 100
34.09%

C.3 28 días

$$V_T = \left(\frac{28-28}{2.4494}\right) \Rightarrow V_T = 0$$

0.5000 x 100
50%

C.4 31 días

$$V_T = \left(\frac{31-28}{2.4494}\right) \Rightarrow V_T = 1.2247 \approx 1.23$$

0.8907 x 100
89.07%

C.5 Entre 25 y 30 días

$$V_T = \left(\frac{25-28}{2.4494}\right) \Rightarrow V_T = -1.2247 \approx -1.22$$

0.1112 x 100
11.12%

$$V_T = \left(\frac{30-28}{2.4494}\right) \Rightarrow V_T = 0.8165 \approx 0.81$$

0.7910 x 100
79.10%

79.10% - 11.12%
67.98%

Rpta: 25 y 30 días

d) Indique el tiempo d que demorara el proyecto con:

d.1 75%.

Formula ⇒ D = Te + (Z × DE)

D = 28 + (0.66 × 2.4494)

Z = 0.66 para 75%.

D = 29.61

29.6 Dias redondeado

d.2 15%.

Z = -1.03 para 15%.

D = 28 + (-1.03 × 2.4494)

D = 25.477118

25.5 dias redondeado