

Further Mathematics
Advanced
Paper 3D: Decision Mathematics 1

Monday 24 June 2019 – Morning

Diagram Book

In the boxes below, write your name, centre number and candidate number.

Surname					
Other names					
Centre Number					
Candidate Number					

INSTRUCTIONS

There are two copies of all diagrams in case you need them.

**THIS DIAGRAM BOOK MUST BE RETURNED WITH THE
ANSWER BOOK AT THE END OF THE EXAMINATION.**

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Diagram 1

[The total weight of the network is 370]

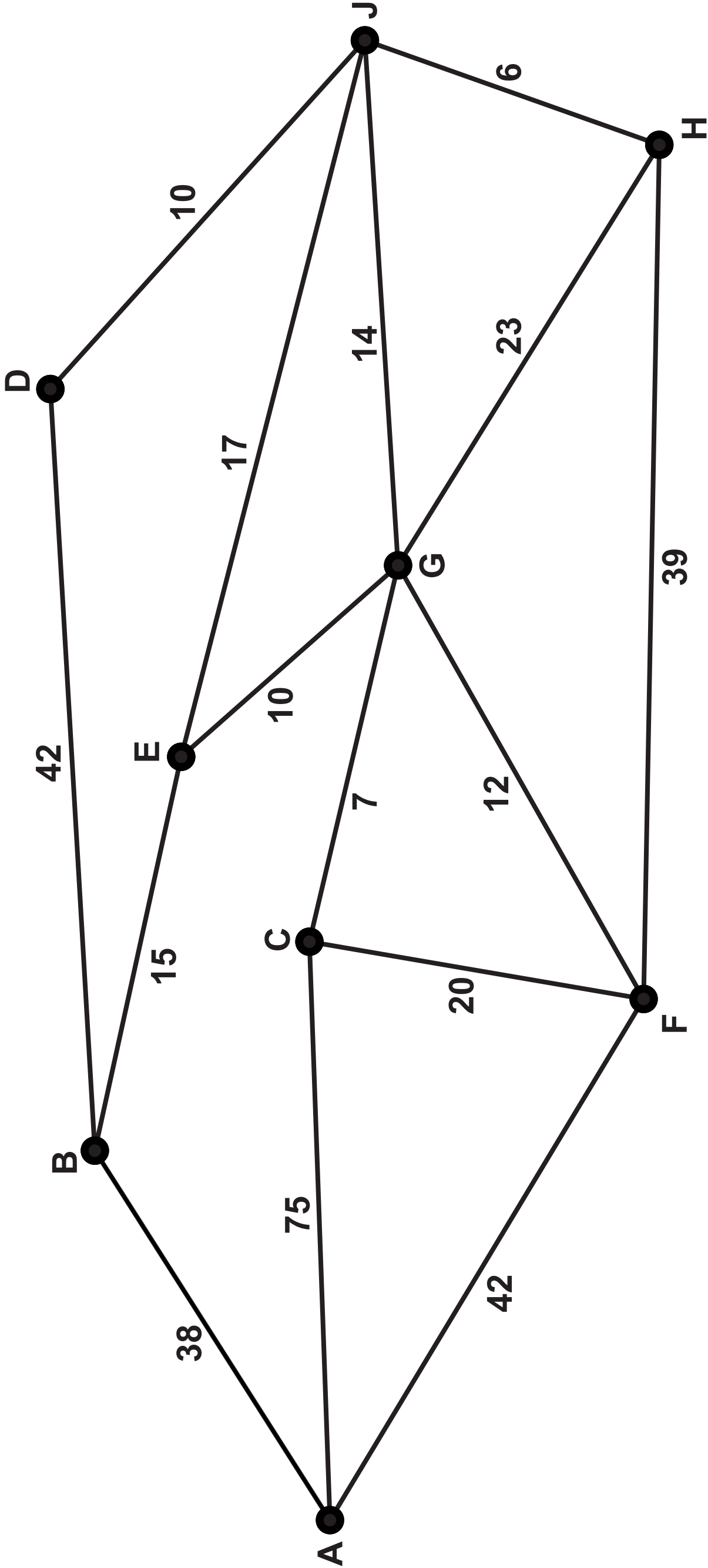


Diagram 1

[The total weight of the network is 370]

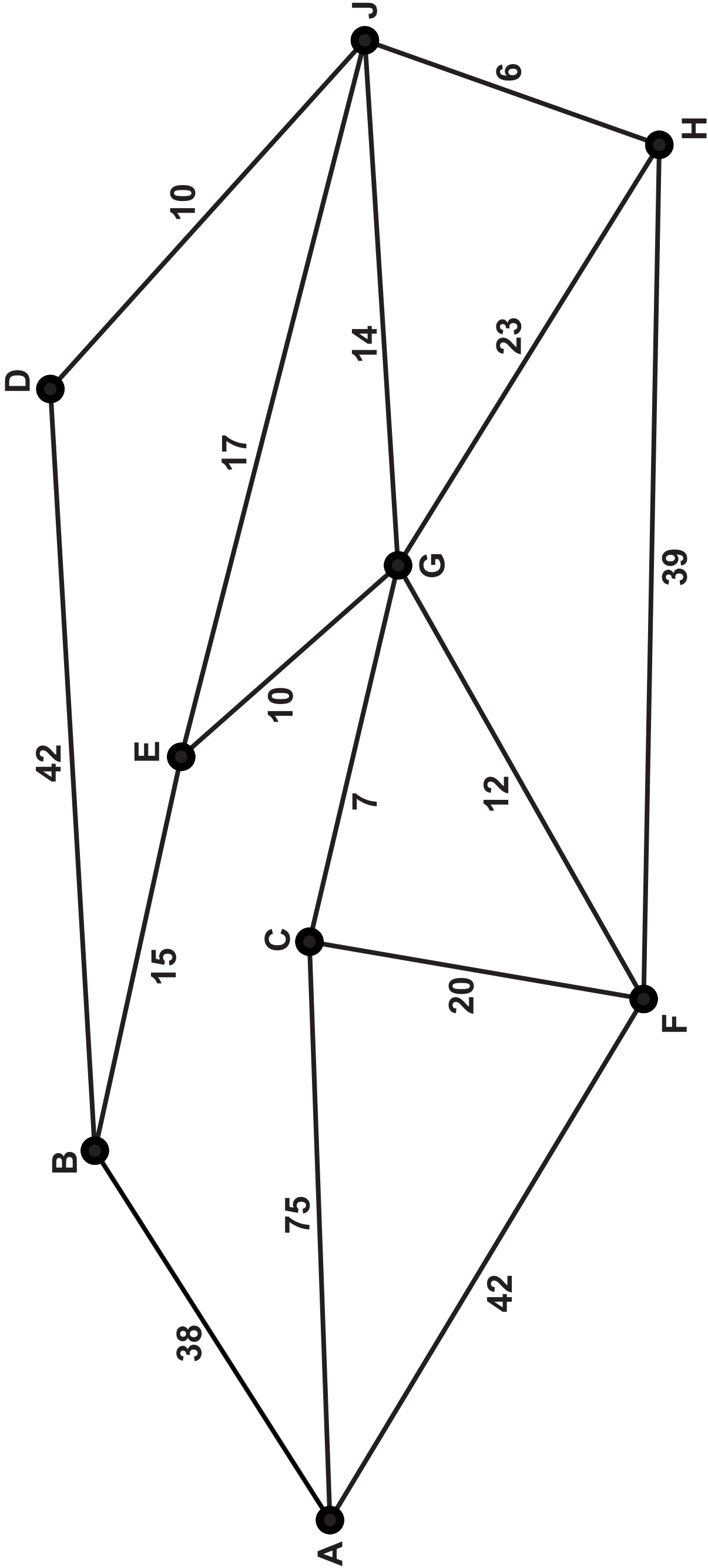


Diagram 2

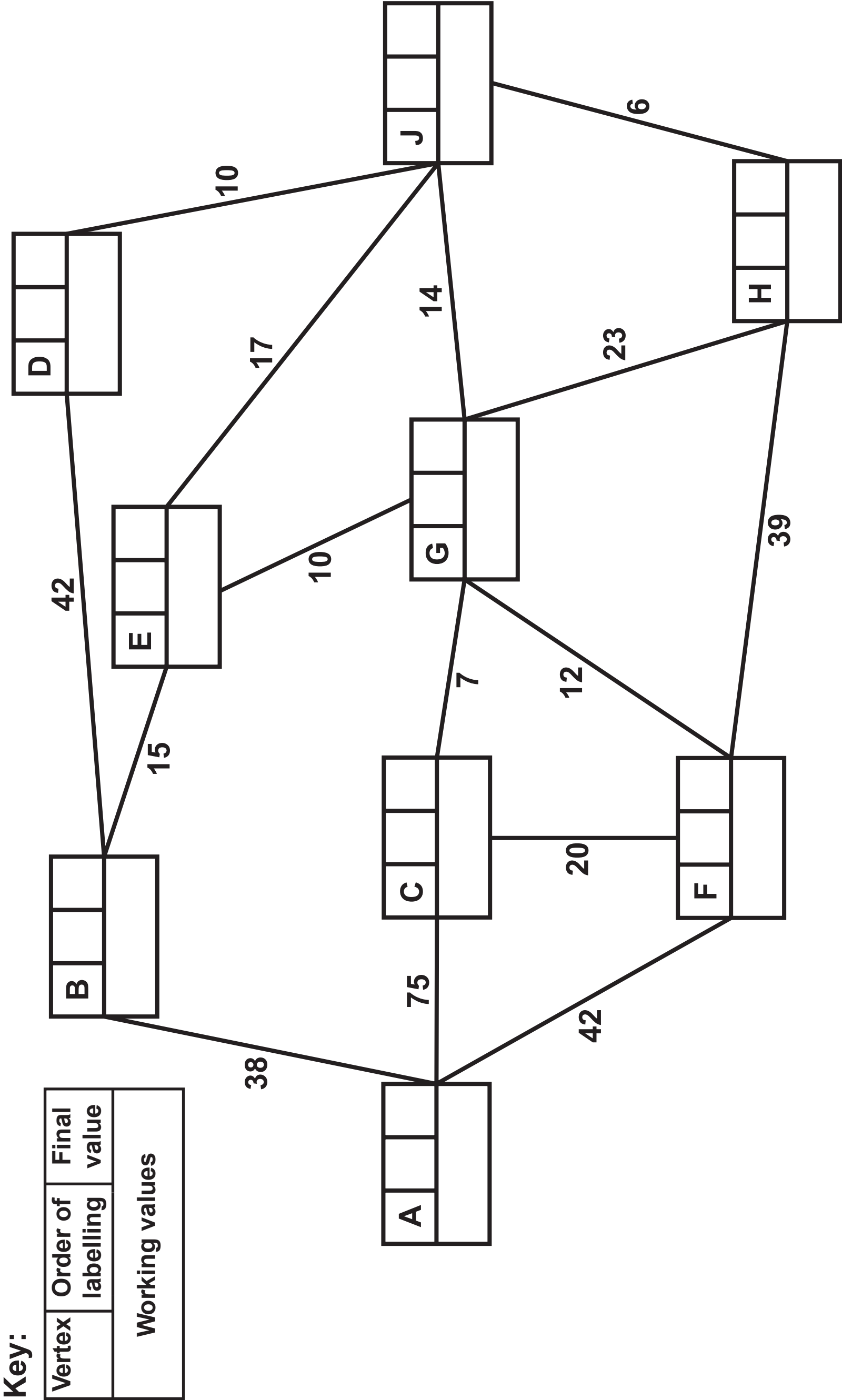


Diagram 2

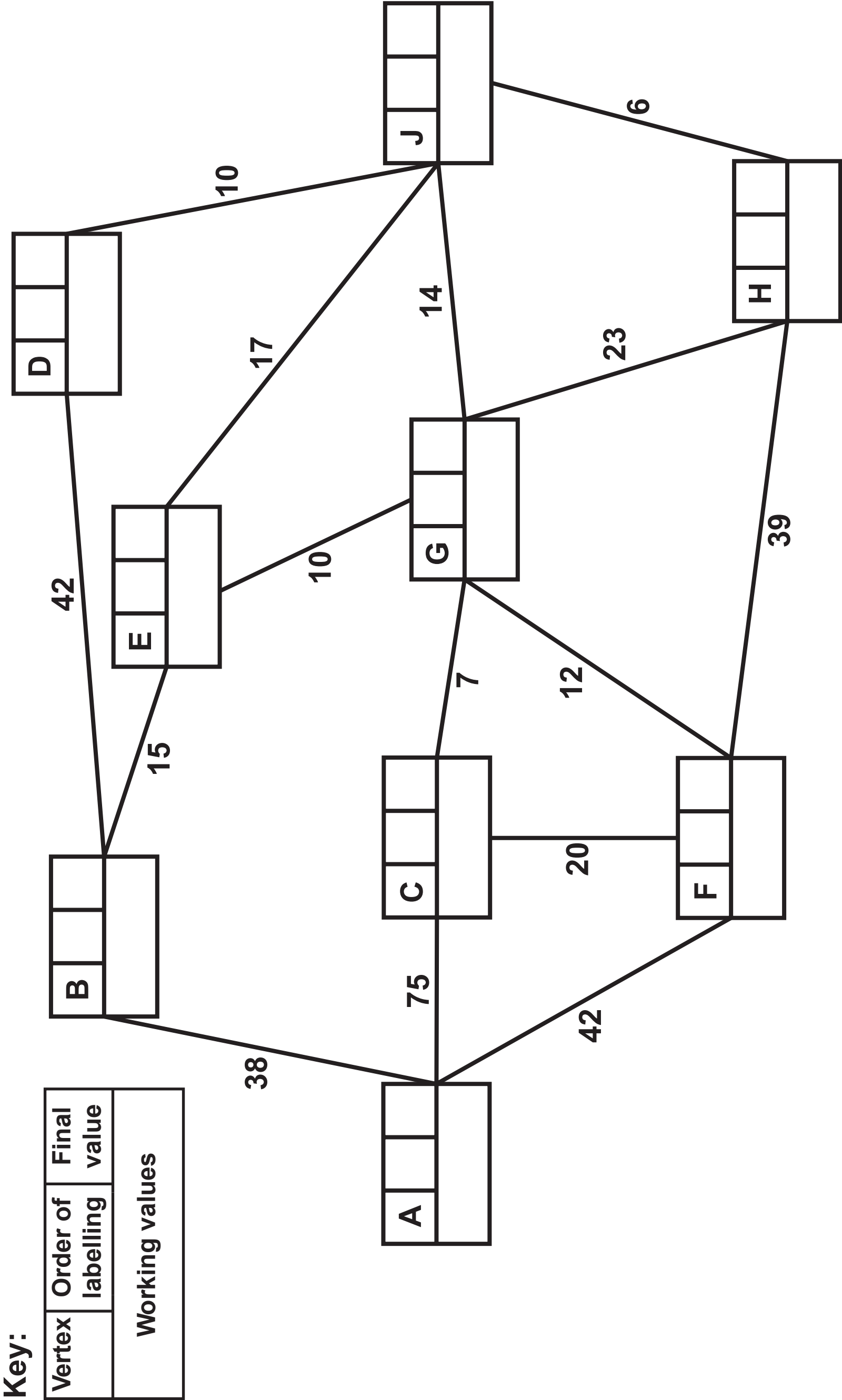


Diagram 3

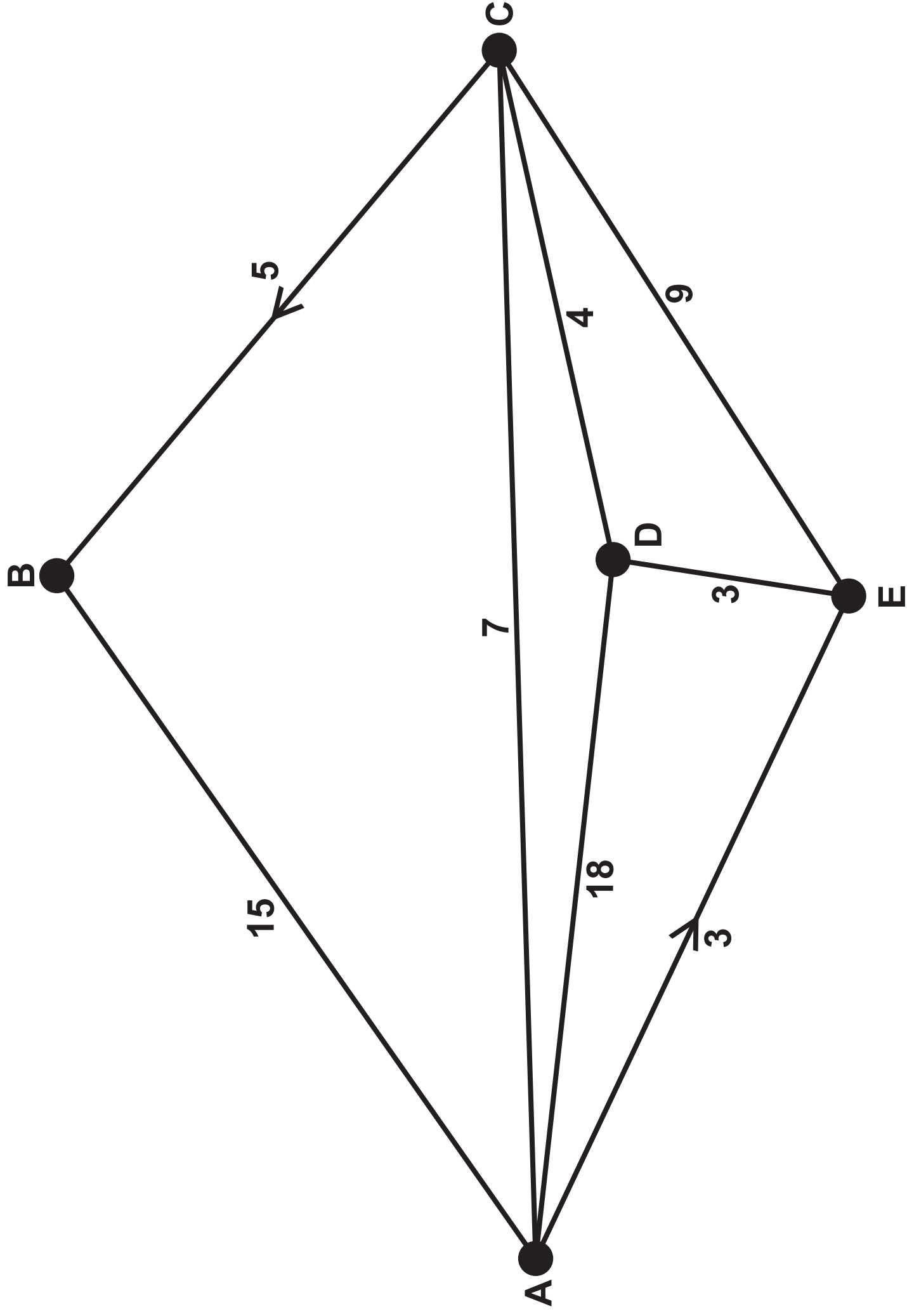


Diagram 3

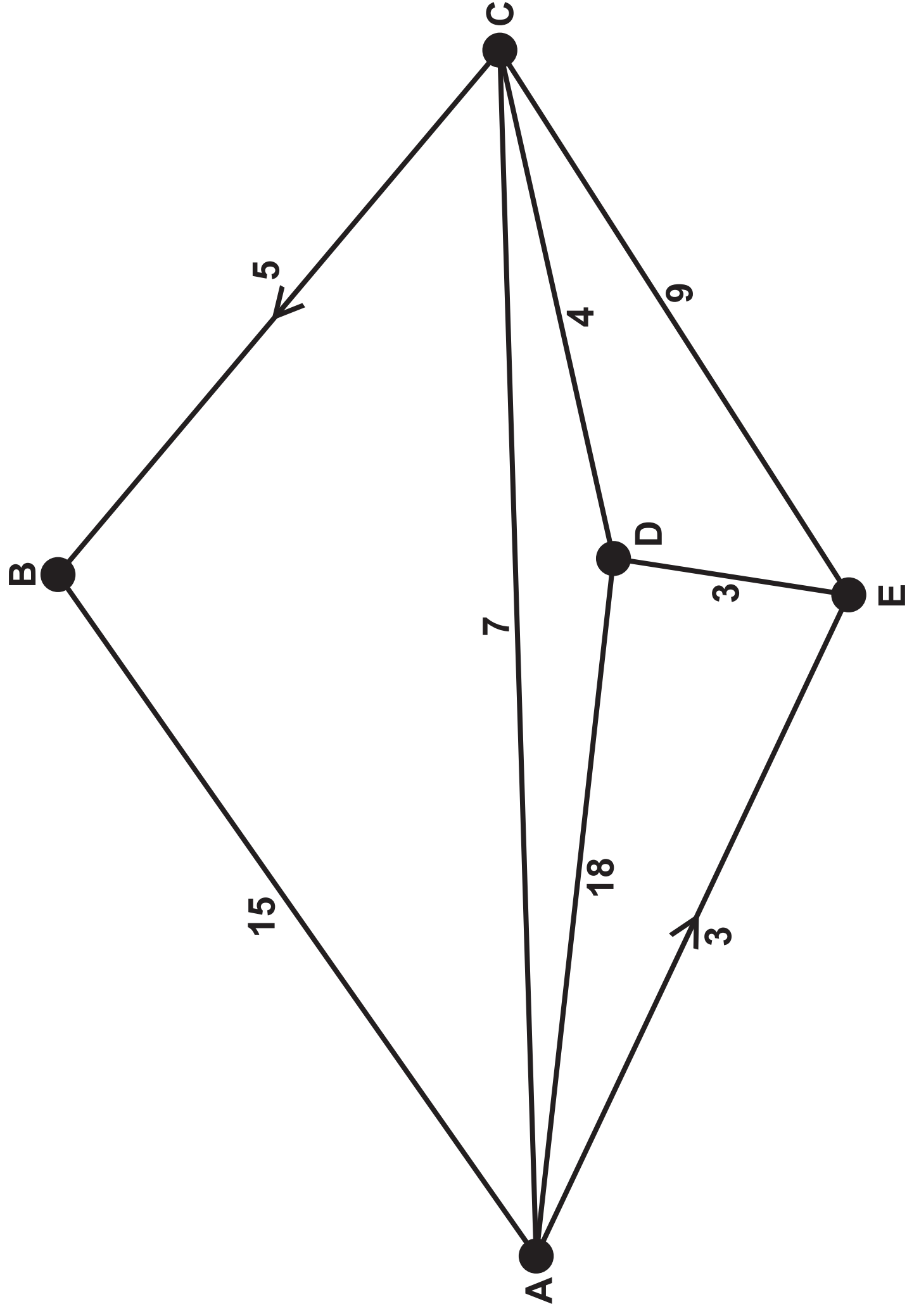


Diagram 4

Initial distance table

	A	B	C	D	E
A					
B					
C					
D					
E					

Initial route table

	A	B	C	D	E
A					
B					
C					
D					
E					

Diagram 4

Initial distance table

	A	B	C	D	E
A					
B					
C					
D					
E					

Initial route table

	A	B	C	D	E
A					
B					
C					
D					
E					

Diagram 5

1st iteration

Distance table

	A	B	C	D	E
A					
B					
C					
D					
E					

Route table

	A	B	C	D	E
A					
B					
C					
D					
E					

2nd iteration

Distance table

	A	B	C	D	E
A					
B					
C					
D					
E					

Route table

	A	B	C	D	E
A					
B					
C					
D					
E					

3rd iteration

Distance table

	A	B	C	D	E
A					
B					
C					
D					
E					

Route table

	A	B	C	D	E
A					
B					
C					
D					
E					

Diagram 5

1st iteration

Distance table

	A	B	C	D	E
A					
B					
C					
D					
E					

Route table

	A	B	C	D	E
A					
B					
C					
D					
E					

2nd iteration

Distance table

	A	B	C	D	E
A					
B					
C					
D					
E					

Route table

	A	B	C	D	E
A					
B					
C					
D					
E					

3rd iteration

Distance table

	A	B	C	D	E
A					
B					
C					
D					
E					

Route table

	A	B	C	D	E
A					
B					
C					
D					
E					

Diagram 6

Distance table

	A	B	C	D	E
A	—	12	7	6	3
B	15	—	22	21	18
C	7	5	—	4	7
D	11	9	4	—	3
E	14	12	7	3	—

Route table

	A	B	C	D	E
A	A	—	—	—	—
B	A	B	—	—	—
C	A	B	C	—	—
D	C	C	C	D	—
E	D	D	D	D	E

Diagram 6

Distance table

	A	B	C	D	E
A	–	12	7	6	3
B	15	–	22	21	18
C	7	5	–	4	7
D	11	9	4	–	3
E	14	12	7	3	–

Route table

	A	B	C	D	E
A	A	–	–	–	–
B	A	B	–	–	–
C	A	B	C	–	–
D	C	C	C	D	–
E	D	D	D	D	E

Diagram 7

Key:

Early event time	Late event time
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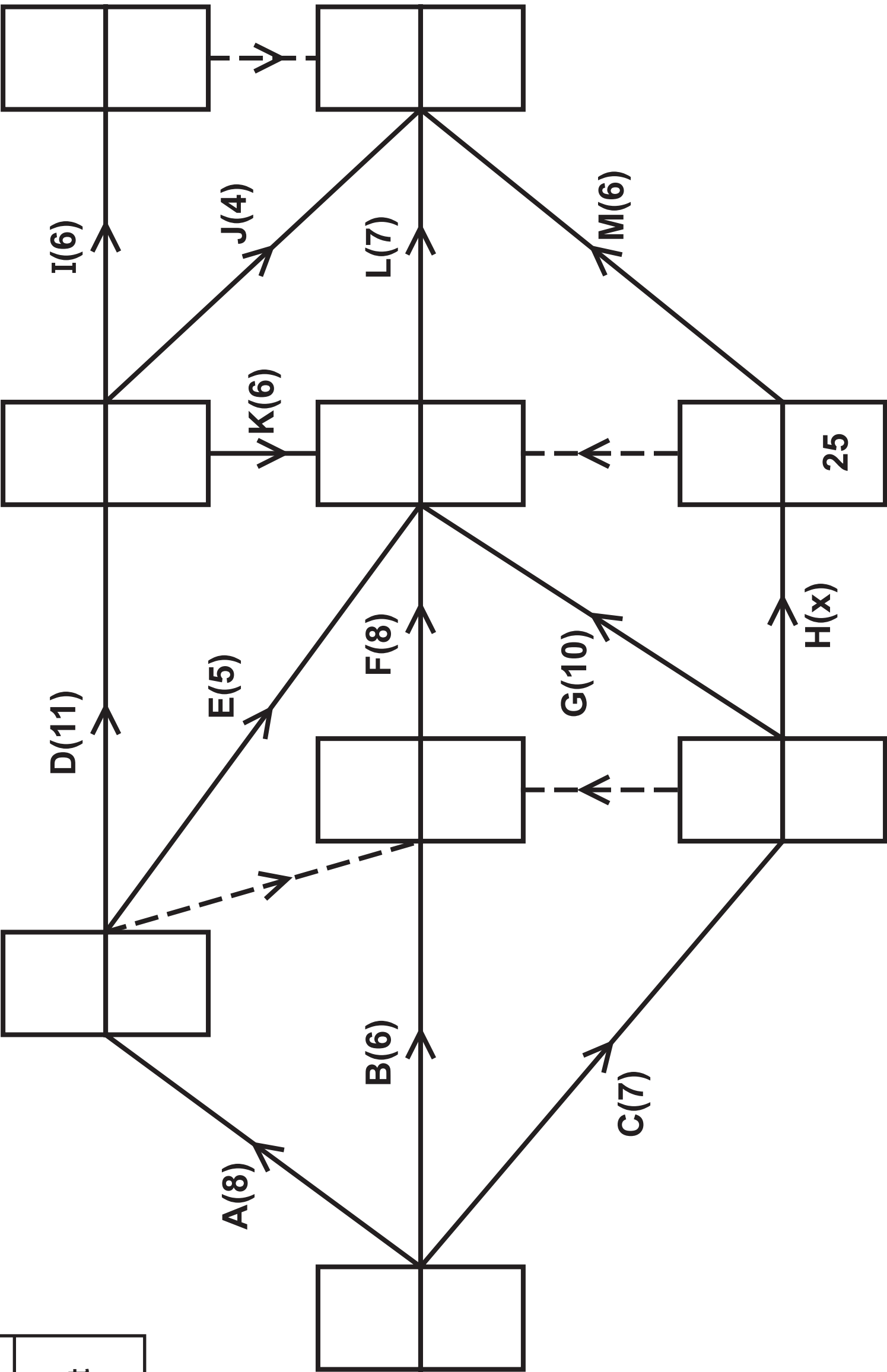


Diagram 7

Key:

Early event time	Late event time
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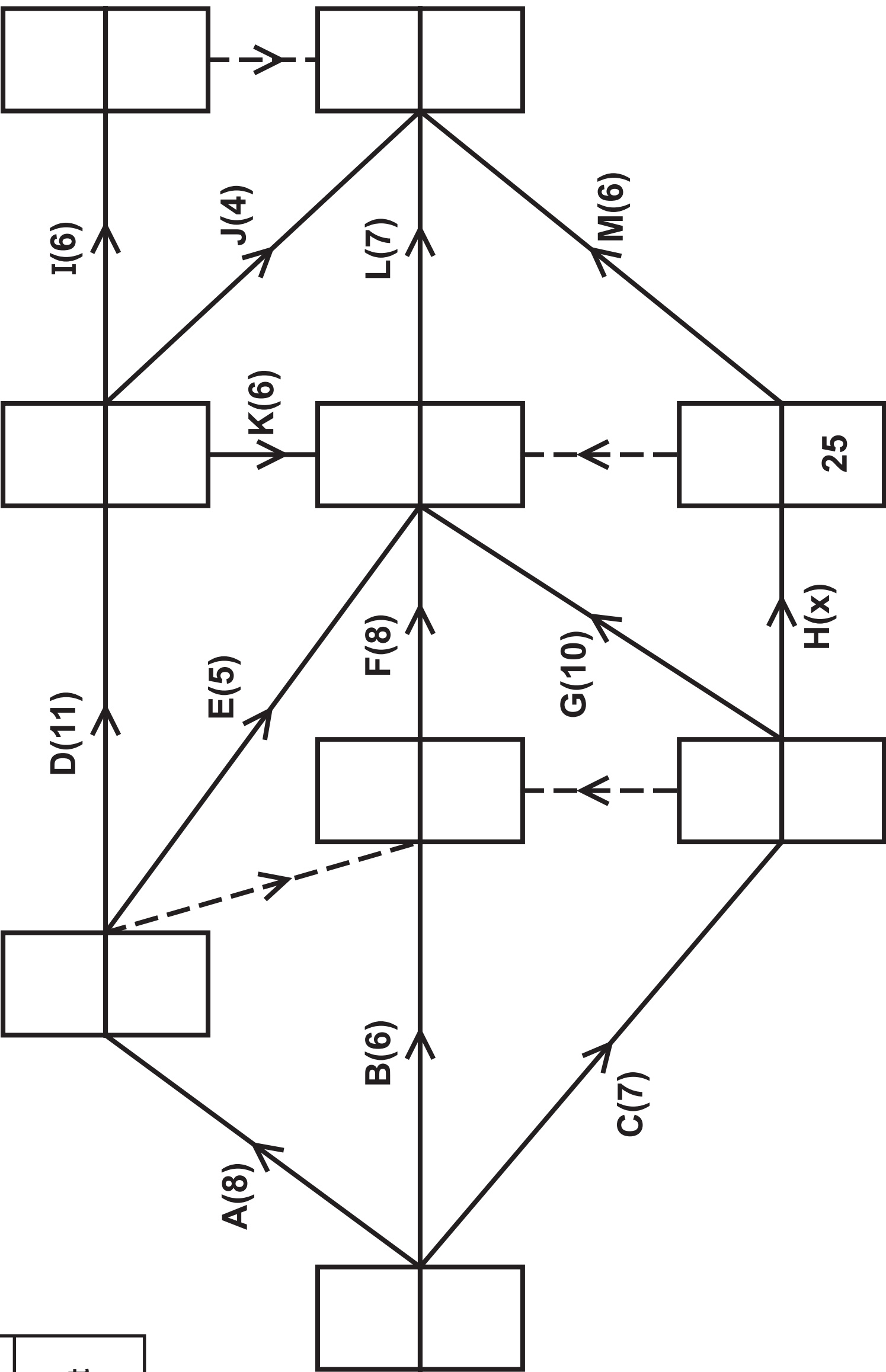


Diagram 8

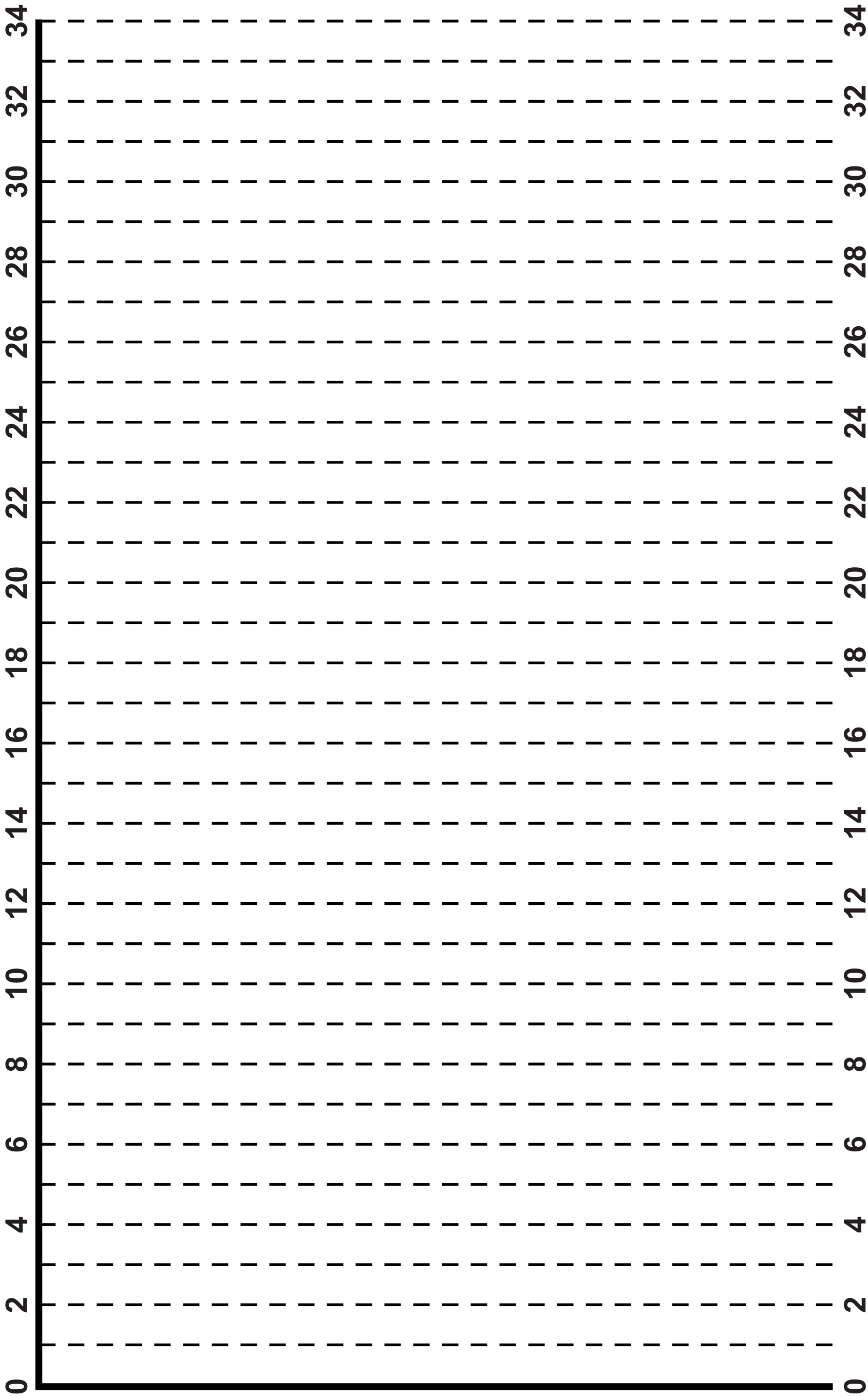


Diagram 8

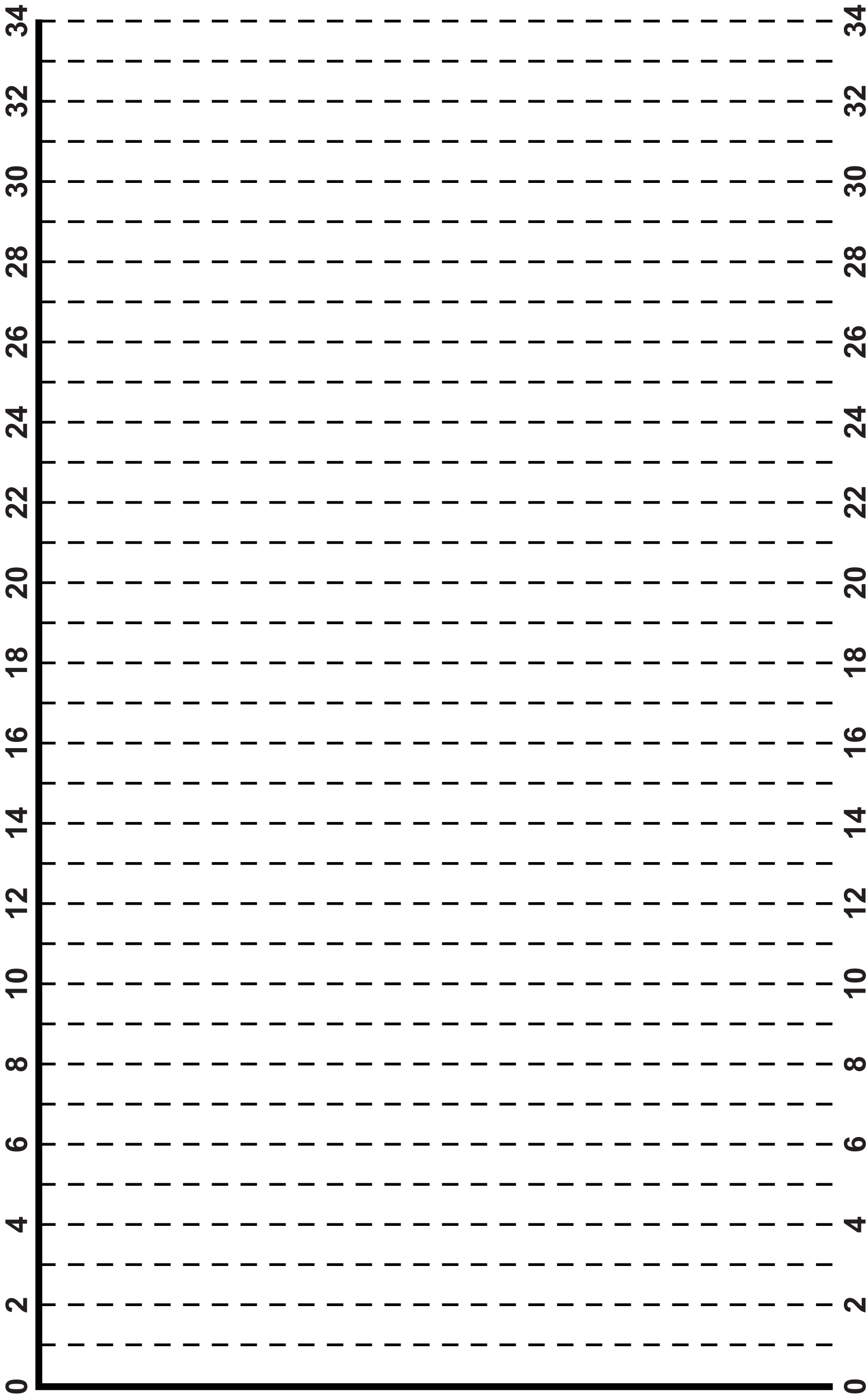


Diagram 9

Activity	Immediately preceding activities
A	—
B	—
C	—
D	A
E	C
F	B, C, D
G	A
H	B, C, D
I	B, C, D, G
J	B, C, D, G
K	E, H

Diagram 9

Activity	Immediately preceding activities
A	—
B	—
C	—
D	A
E	C
F	B, C, D
G	A
H	B, C, D
I	B, C, D, G
J	B, C, D, G
K	E, H

Diagram 11

b.v.	x	y	z	s ₁	s ₂	s ₃	a ₁	a ₂	Value
s ₁	3	0	1.5	1	0	0.25	0	-0.25	26.25
a ₁	1	0	1.5	0	-1	-0.25	1	0.25	11.75
y	0	1	0.5	0	0	-0.25	0	0.25	3.75
P	-(2 + M)	0	2 - 1.5M	0	M	-0.5 + 0.25M	0	0.5 + 0.75M	7.5 - 11.75M

Diagram 11

b.v.	x	y	z	s ₁	s ₂	s ₃	a ₁	a ₂	Value
s ₁	3	0	1.5	1	0	0.25	0	-0.25	26.25
a ₁	1	0	1.5	0	-1	-0.25	1	0.25	11.75
y	0	1	0.5	0	0	-0.25	0	0.25	3.75
P	-(2 + M)	0	2 - 1.5M	0	M	-0.5 + 0.25M	0	0.5 + 0.75M	7.5 - 11.75M

Diagram 12

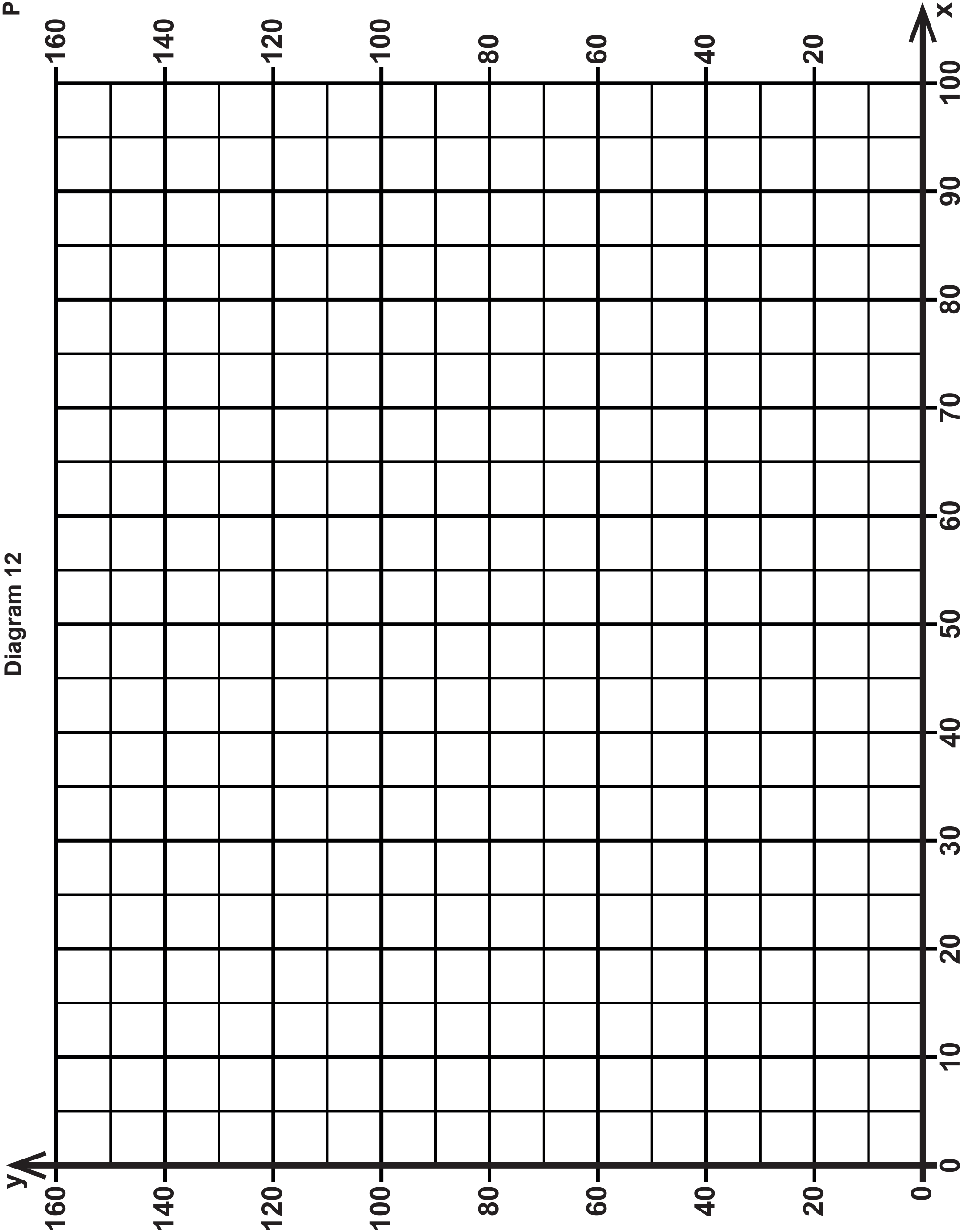


Diagram 12

