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1a).

Calculate distance using Euclidean formula.

$$d_{A,B} = \sqrt{(3-6)^2+(9-5)^2} = 5$$

$$d_{A,C} = \sqrt{(3-9)^2+(9-3)^2} = 8.48$$

$$d_{A,D} = \sqrt{(3-7)^2+(9-3)^2} = 7.21$$

$$d_{A,E} = \sqrt{(3-6)^2+(9-7)^2} = 3.60$$

$$d_{A,F} = \sqrt{(3-6)^2+(9-4)^2} = 5.83$$

$$d_{A,G} = \sqrt{(3-2)^2+(9-1)^2} = 8.06$$

$$d_{A,H} = \sqrt{(3-3)^2+(9-10)^2} = 1$$

$$d_{B,C} = \sqrt{(6-9)^2+(5-3)^2} = 3.6055$$

$$d_{B,D} = \sqrt{(6-7)^2+(5-3)^2} = 2.236$$

$$d_{B,E} = \sqrt{(6-6)^2+(5-7)^2} = 2$$

$$d_{B,F} = \sqrt{(6-6)^2+(5-4)^2} = 1$$

$$d_{B,G} = \sqrt{(6-2)^2+(5-1)^2} = 5.65$$

$$d_{B,H} = \sqrt{(6-3)^2+(5-10)^2} = 5.83$$

$$d_{C,D} = \sqrt{(9-7)^2+(3-3)^2} = 2$$

$$d_{C,E} = \sqrt{(9-6)^2+(3-7)^2} = 5$$

$$d_{C,F} = \sqrt{(9-6)^2+(3-4)^2} = 3.16$$

$$d_{C,G} = \sqrt{(9-2)^2+(3-1)^2} = 7.28$$

$$d_{C,H} = \sqrt{(9-3)^2+(3-10)^2} = 9.21$$

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$d_{D,E} = \sqrt{(7-6)^2+(3-7)^2} = 4.12$

$d_{D,F} = \sqrt{(7-6)^2+(3-4)^2} = 1.4141$

$d_{D,G} = \sqrt{(7-2)^2+(3-1)^2} = 5.385$

$d_{D,H} = \sqrt{(7-3)^2+(3-10)^2} = 8.06$

$d_{E,F} = \sqrt{(6-6)^2+(7-4)^2} = 3$

$d_{E,G} = \sqrt{(6-2)^2+(7-1)^2} = 7.211$

$d_{E,H} = \sqrt{(6-3)^2+(7-10)^2} = 4.24$

$d_{F,G} = \sqrt{(6-2)^2+(4-1)^2} = 5$

$d_{F,H} = \sqrt{(6-3)^2+(4-10)^2} = 6.708$

$d_{G,H} = \sqrt{(2-3)^2+(1-10)^2} = 9.055$

For points find neighbors $\varepsilon : 2$ Minpts $= 3$

A: H (noise)
B: E, F (Core)
C: D (border)
D: C, F (Core)
E: B (border)
F: B, D (Core)
G: (Noise)
H: A (Noise)

→ B, D, F = core (mipts condition)
→ C and E are border as they are associated with D and B core points.
→ Rest are neither border nor core so are considered as noise

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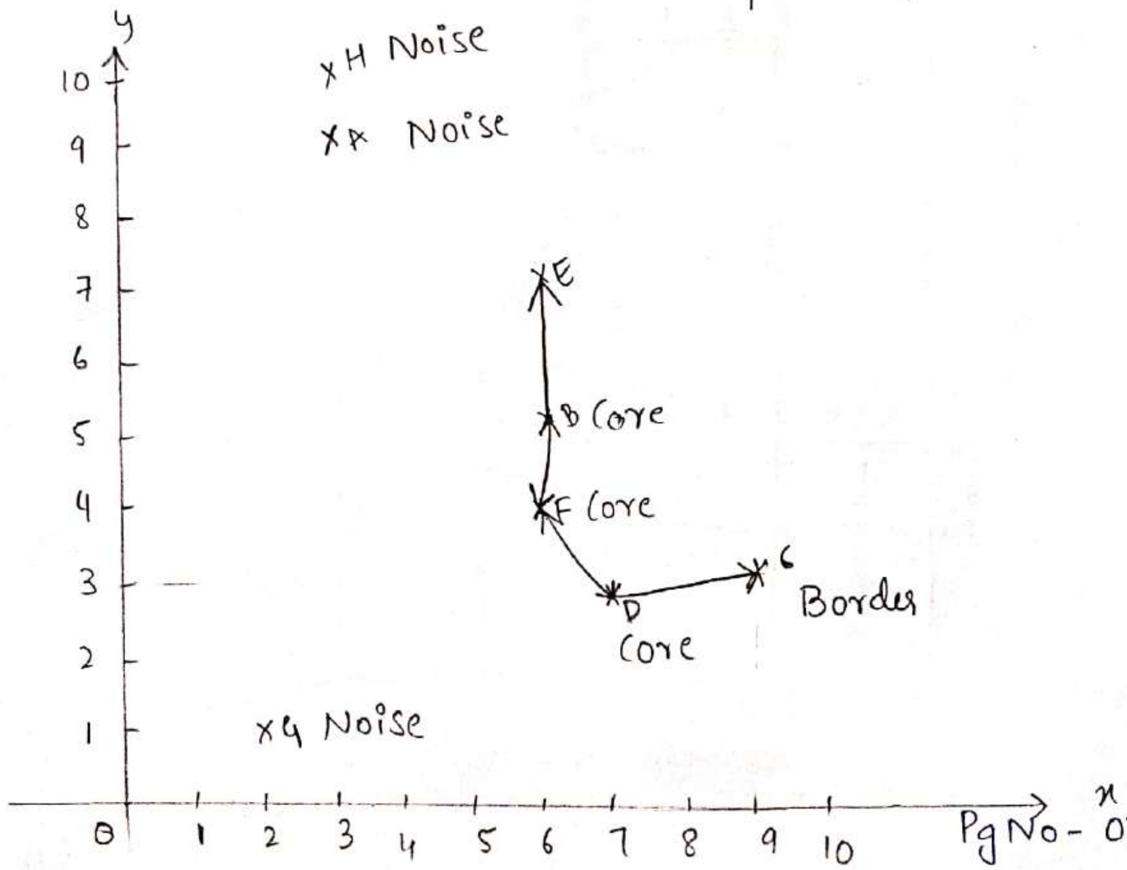
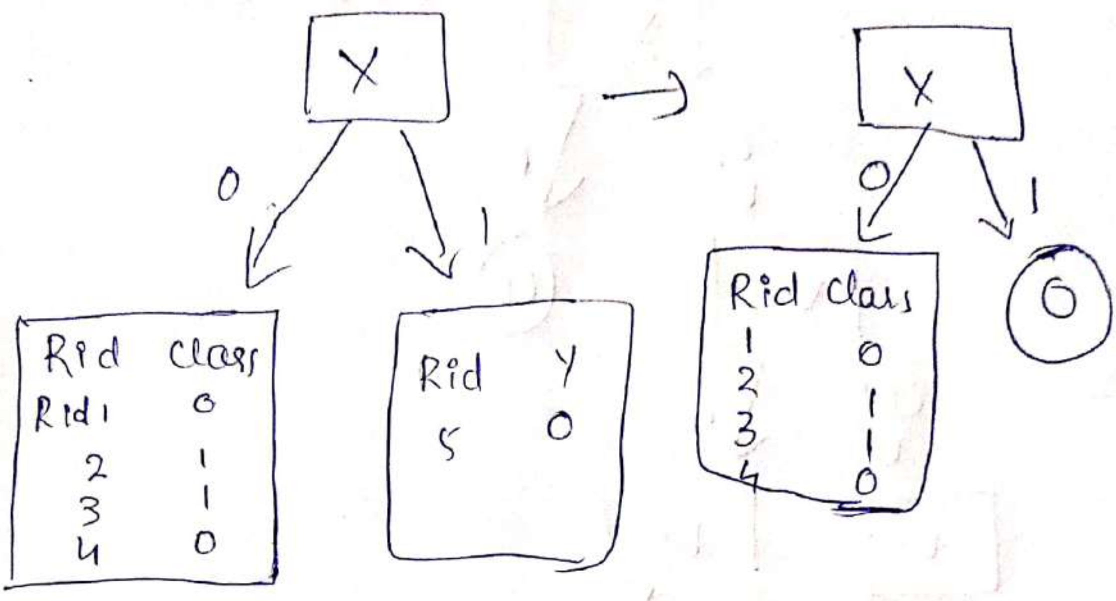
Update the distance matrix.

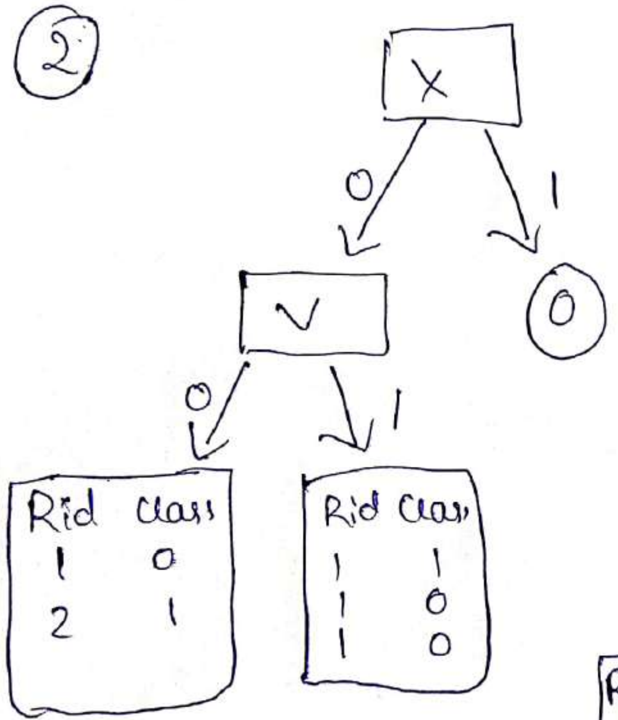
	A	B	C	D	E	F	G	H
A	0							
B	5	0						
C	8.48	3.60	0					
D	7.21	2.23	2	0				
E	3.60	2	5	4.12	0			
F	5.83	1	3.16	1.414	3	0		
G	8.06	5.65	7.28	5.385	7.211	5	0	
H	1	5.83	9.21	8.06	4.24	6.708	9.055	0



1


X
0
1
Rid Class
Rid1 0
2 1
3 1
4 0
Rid Y
5 0
X
0
1
Rid Class
1 0
2 1
3 1
4 0
0

2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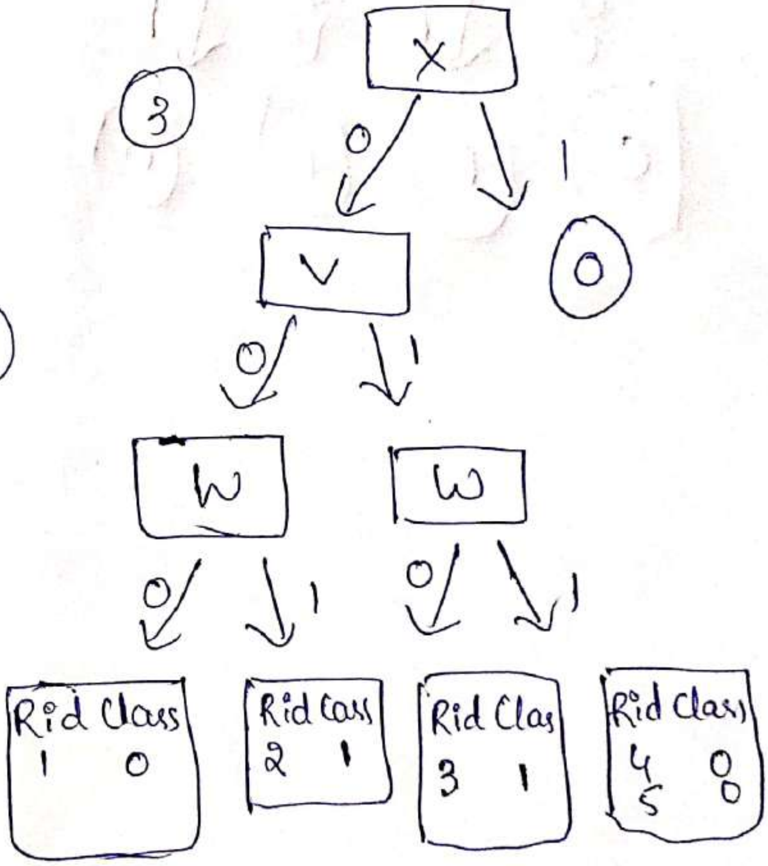
0
1
V
0
0
1
Rid Class
1 0
2 1
Rid Class
1 1
1 0
1 0

3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1
V
0
0
1
W
W
0
1
0
1
Rid Class
1 0
Rid Class
2 1
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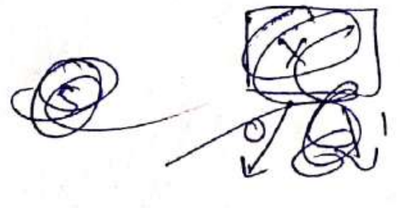
3 1
Rid Class
4 0
5 0



Final tree