

Exercise 3

Q1
(a)

$$\begin{matrix} & x_1 & x_2 & x_3 & x_4 \\ \begin{matrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{matrix} & \begin{pmatrix} 0 \\ 1 \\ 4 \\ 5.10 \end{pmatrix} & \begin{pmatrix} 0 \\ 3 \\ 4.12 \end{pmatrix} & \begin{pmatrix} 0 \\ 0 \\ 1.41 \end{pmatrix} & \begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix} \end{matrix}$$

$$\sqrt{(1.5-5)^2 + (2-2)^2}$$

$$\sqrt{(1-2)^2 + (2-2)^2}$$

(b)

$$\begin{matrix} & x_1 & x_2 & x_3 & x_4 \\ \begin{matrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{matrix} & \begin{pmatrix} 0 \\ 1 \\ 4 \\ 5.10 \end{pmatrix} & \begin{pmatrix} 0 \\ 3 \\ 4.12 \end{pmatrix} & \begin{pmatrix} 0 \\ 0 \\ 1.41 \end{pmatrix} & \begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix} \end{matrix}$$

$$\begin{matrix} & (x_1, x_2) & x_3 & x_4 \\ \begin{matrix} (x_1, x_2) \\ x_3 \\ x_4 \end{matrix} & \begin{pmatrix} 0 \\ 3.5 \\ 4.61 \end{pmatrix} & \begin{pmatrix} 0 \\ 0 \\ 1.41 \end{pmatrix} & \begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix} \end{matrix}$$

$$\begin{aligned} x_1 &: (1, 2) \\ x_2 &: (2, 2) \\ x_3 &: (5, 2) \\ x_4 &: (6, 1) \end{aligned}$$

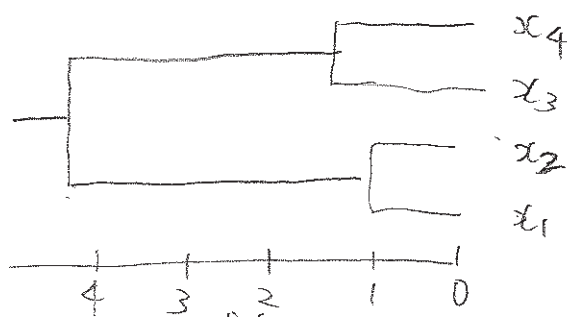
$$\begin{aligned} (x_1, x_2) &: (1.5, 2) \\ x_3 &: (5, 2) \\ x_4 &: (6, 1) \end{aligned}$$

$$\begin{matrix} & (x_1, x_2) & x_3 & x_4 \\ \begin{matrix} (x_1, x_2) \\ x_3 \\ x_4 \end{matrix} & \begin{pmatrix} 0 \\ 3.5 \\ 4.61 \end{pmatrix} & \begin{pmatrix} 0 \\ 0 \\ 1.41 \end{pmatrix} & \begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix} \end{matrix}$$

$$\begin{matrix} & (x_1, x_2) & (x_3, x_4) \\ \begin{matrix} (x_1, x_2) \\ (x_3, x_4) \end{matrix} & \begin{pmatrix} 0 \\ 4.03 \end{pmatrix} & \begin{pmatrix} 0 \\ 0 \end{pmatrix} \end{matrix}$$

$$\begin{aligned} (x_1, x_2) &: (1.5, 2) \\ x_3 &: (5, 2) \\ x_4 &: (6, 1) \end{aligned}$$

$$\begin{aligned} (x_1, x_2) &: (1.5, 2) \\ (x_3, x_4) &: (5.5, 1.5) \end{aligned}$$



Q2

(a)

A \ B	1	0
1	2	0
0	1	1

A \ C	1	0
1	1	1
0	2	0

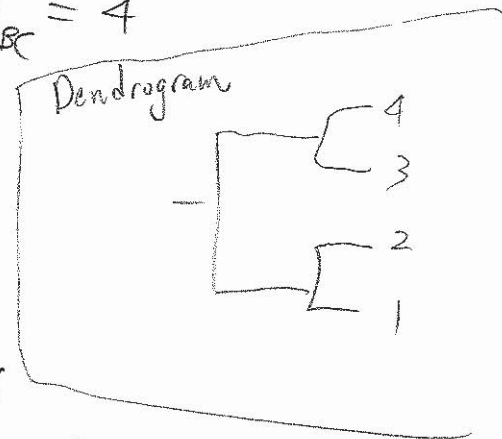
B \ C	1	0
1	0	2
0	2	0

$$\chi^2_{AB} = 1.33$$

$$\chi^2_{AC} = 1.33$$

$$\chi^2_{BC} = 4$$

$$= \frac{(2 \times 1 - 1 \times 0)^2 \times 4}{(2+0)(2+1)(1+1)(1+0)}$$



For attribute A,

$$\chi^2_{AB} + \chi^2_{AC} = 1.33 + 1.33 = 2.66$$

For attribute B,

$$\chi^2_{AB} + \chi^2_{BC} = 1.33 + 4 = 5.33$$

For attribute C,

$$\chi^2_{AC} + \chi^2_{BC} = 1.33 + 4 = 5.33$$

← choose B

We divide the data into two groups
 $\{1, 2\}, \{3, 4\}$