Exercise 3

Q1

(a)

	x_1	x_2	x_3	x_4
x_1	0			
x_2	1	0		
x_3	4	3	0	
x_4	5.10	4.12	1.41	0

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

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

(b)

	x_1	x_2	x_3	x_4
x_1	0			
x_2	1	0		
x_3	4	3	0	
x_4	5.10	4.12	1.41	0

	(x_1, x_2)	x_3	x_4
(x_1, x_2)	0		
x_3	3.5	0	
x_4	4.61	1.41	0

$x_1 : (1, 2)$
$x_2 : (2, 2)$
$x_3 : (5, 2)$
$x_4 : (6, 1)$

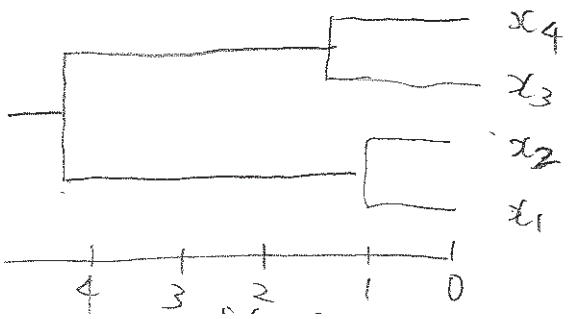
$(x_1, x_2) : (1.5, 2)$
$x_3 : (5, 2)$
$x_4 : (6, 1)$

	(x_1, x_2)	x_3	x_4
(x_1, x_2)	0		
x_3	3.5	0	
x_4	4.61	1.41	0

	(x_1, x_2)	(x_3, x_4)
(x_1, x_2)	0	
(x_3, x_4)	4.03	0

$(x_1, x_2) : (1.5, 2)$
$x_3 : (5, 2)$
$x_4 : (6, 1)$

$(x_1, x_2) : (1.5, 2)$
$(x_3, x_4) : (5.5, 1.5)$



Q2

(a)

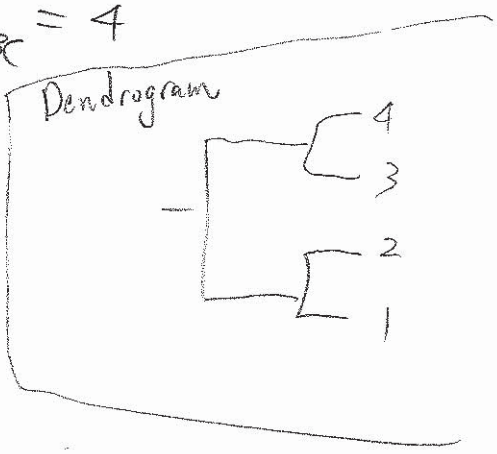
B \ A	1	0
1	2	0
0	1	1

C \ A	1	0
1	1	1
0	2	0

C \ B	1	0
1	0	2
0	2	0

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

$$= \frac{(2\times1 - 1\times0)^2 \times 4}{(2+0)(2+1)(1+1)(1+0)}$$



For attribute A,

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

For attribute B,

$$\chi^2_{AB} + \chi^2_{BC} = 1.33 + 4 = 5.33 \leftarrow \text{choose } B$$

For attribute C,

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

We divide the data into two groups

$\{1,2\}$, $\{3,4\}$