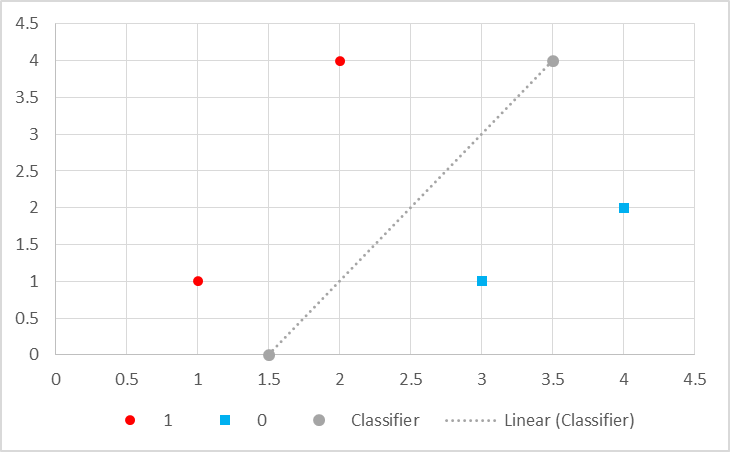
**Question One:**

1)

p1= (1.5, 0)

p2= (4, 5)

m1 =

=

m1 =

b1 =

=

b1 =

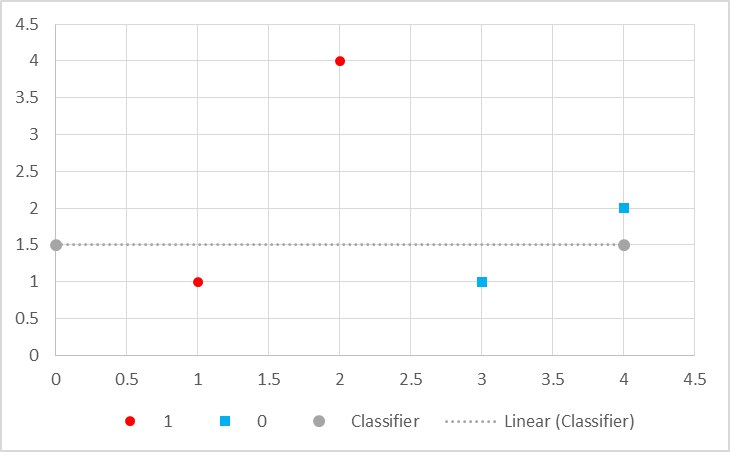
2)

xi1 = x = 2

xi2 = y = 4

yi = class = 1

α = 0.1

3)

4)

Point (1, 1.5 | 1)

**Question Two:**

1)

(2, 4 | 1) 🡪 🡪 0.9525741268224331

(1, 1 | 1) 🡪 🡪 0.8807970779778823

(3, 1 | 0) 🡪 🡪 0.11920292202211757

(4, 2 | 0) 🡪 🡪 0.04742587317756679

2) m = 2 b= -3

3)

(2, 4 | 1) 🡪 🡪 0.9526192830418644

(1, 1 | 1) 🡪 🡪 0.8808600597372731

(3, 1 | 0) 🡪 🡪 0.1193499914227

(4, 2 | 0) 🡪 🡪 0.04750725744145057

4)

(2, 4 | 1) 🡪 🡪 0.9241418199787566

(1, 1 | 1) 🡪 🡪 0.3775406687981454

(3, 1 | 0) 🡪 🡪 0.3775406687981454

(4, 2 | 0) 🡪 🡪 0.6224593312018546

5) m = 0 b= 1.5

6)

(2, 4 | 1) 🡪 🡪 0.9143814609235074

(1, 1 | 1) 🡪 🡪 0.3605121413023435

(3, 1 | 0) 🡪 🡪 0.3339961467390574

(4, 2 | 0) 🡪 🡪 0.5625018633518639

**Question 3**

(2, 4 | 1) 🡪 🡪 -3<0 🡪 1

(1, 1 | 1) 🡪 🡪 -2<0 🡪 1

(3, 1 | 0) 🡪 🡪 2>0 🡪 0

(4, 2 | 0) 🡪 🡪 3>0 🡪 0

**Question 4**

1)

(2, 4 | 1) 🡪 🡪 0.9525741268224331

(1, 1 | 1) 🡪 🡪 0.8807970779778823

(3, 1 | 0) 🡪 🡪 0.11920292202211757

(4, 2 | 0) 🡪 🡪 0.04742587317756679

(1, 3 | 0) 🡪 🡪 0.9820137900379085

2) m = 2 b= -3

3)

(2, 4 | 1) 🡪 🡪 0.9526192830418644

(1, 1 | 1) 🡪 🡪 0.8808600597372731

(3, 1 | 0) 🡪 🡪 0.1193499914227

(4, 2 | 0) 🡪 🡪 0.04750725744145057

(1, 3 | 0) 🡪 🡪 0.9820243845972844

**Question 5**

1)

|  |  |  |  |
| --- | --- | --- | --- |
|  | Class1 | Class2 | Output Classifier |
| Below both lines | 0 | 0 | 1 |
| Below C2, above C1 | 0 | 1 | n/a |
| Above C1, below C2 | 1 | 0 | 0 |
| Above both lines | 1 | 1 | 1 |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| i | w | x | SUM | OUT |  |  |  |  |  |  |
| x | -0.3 | 1 | 0.2 | 0 | |  | | --- | |  | |  |  |  |  |  |
| y | -1 | 1 |  |  |  |  |  |  |  |  |
| b | 1.5 | 1 |  |  |  | i | w | x | SUM | OUT |
|  |  |  |  |  |  | x | 1 | 0 | -0.5 | 1 |
|  |  |  |  |  | |  | | --- | |  | | y | -1 | 0 |  |  |
| i | w | x | SUM | OUT |  | b | -0.5 | 1 |  |  |
| x | -0.3 | 1 | 2.2 | 0 |  |  |  |  |  |  |
| y | -1 | 1 |  |  |  |  |  |  |  |  |
| b | 3.5 | 1 |  |  |  |  |  |  |  |  |

(2, 4 | 1)🡪 🡪 🡪 🡪

(1, 1 | 1)🡪 🡪 🡪 🡪

(3, 1 | 0)🡪 🡪 🡪 🡪

(4, 2 | 0)🡪 🡪 🡪 🡪

(1, 3 | 0)🡪 🡪 🡪 🡪 0