Damion Huppert

Assignment 1

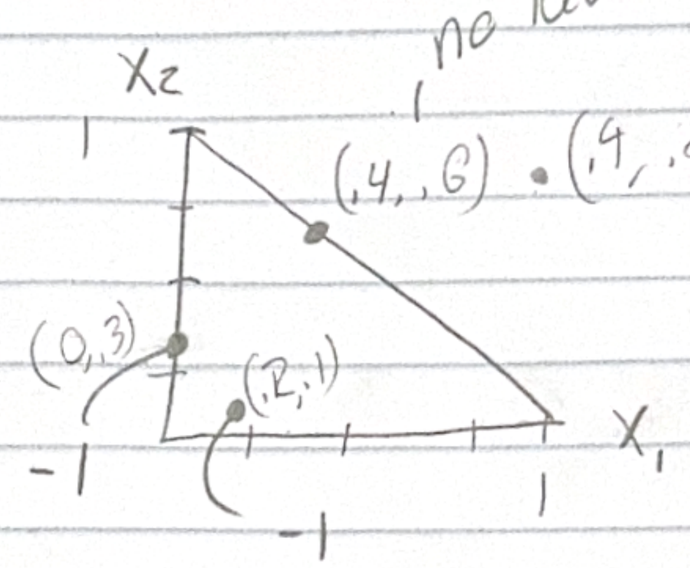
1) Label 1 : $x_1 a_1 + x_2 a_2 > b$
Label -1 : $x_1 a_1 + x_2 a_2 < b$

A) $x = \begin{bmatrix} x_1 \\ x_2 \\ 1 \end{bmatrix}$ $w = \begin{bmatrix} a_1 \\ a_2 \\ -b \end{bmatrix}$ $x^T w = x_1 a_1 + x_2 a_2 - b$

b) $x_1 a_1 + x_2 a_2 - b = 0$ "$x_2 = y$"
$x_2 a_2 = b - x_1 a_1$
$x_2 = \frac{b - x_1 a_1}{a_2}$ this takes the form $y = mx + b$ so therefore is a line
$\text{intercept} = \frac{b}{a_2}$

c) $X^T = \begin{bmatrix} 0 & .3 & 1 \\ .2 & .1 & 1 \\ .4 & .6 & 1 \\ .9 & .8 & 1 \end{bmatrix}$

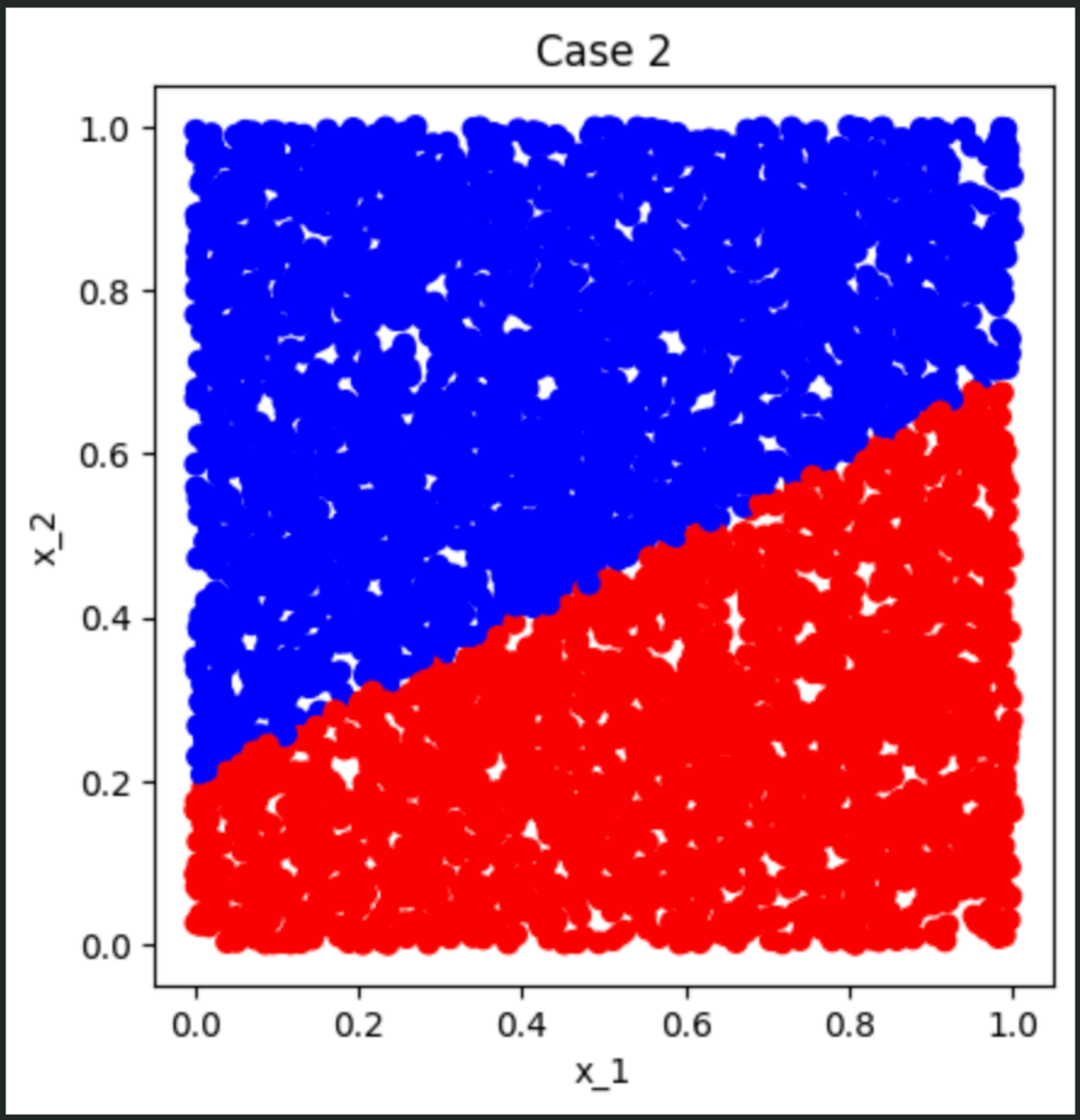
d)

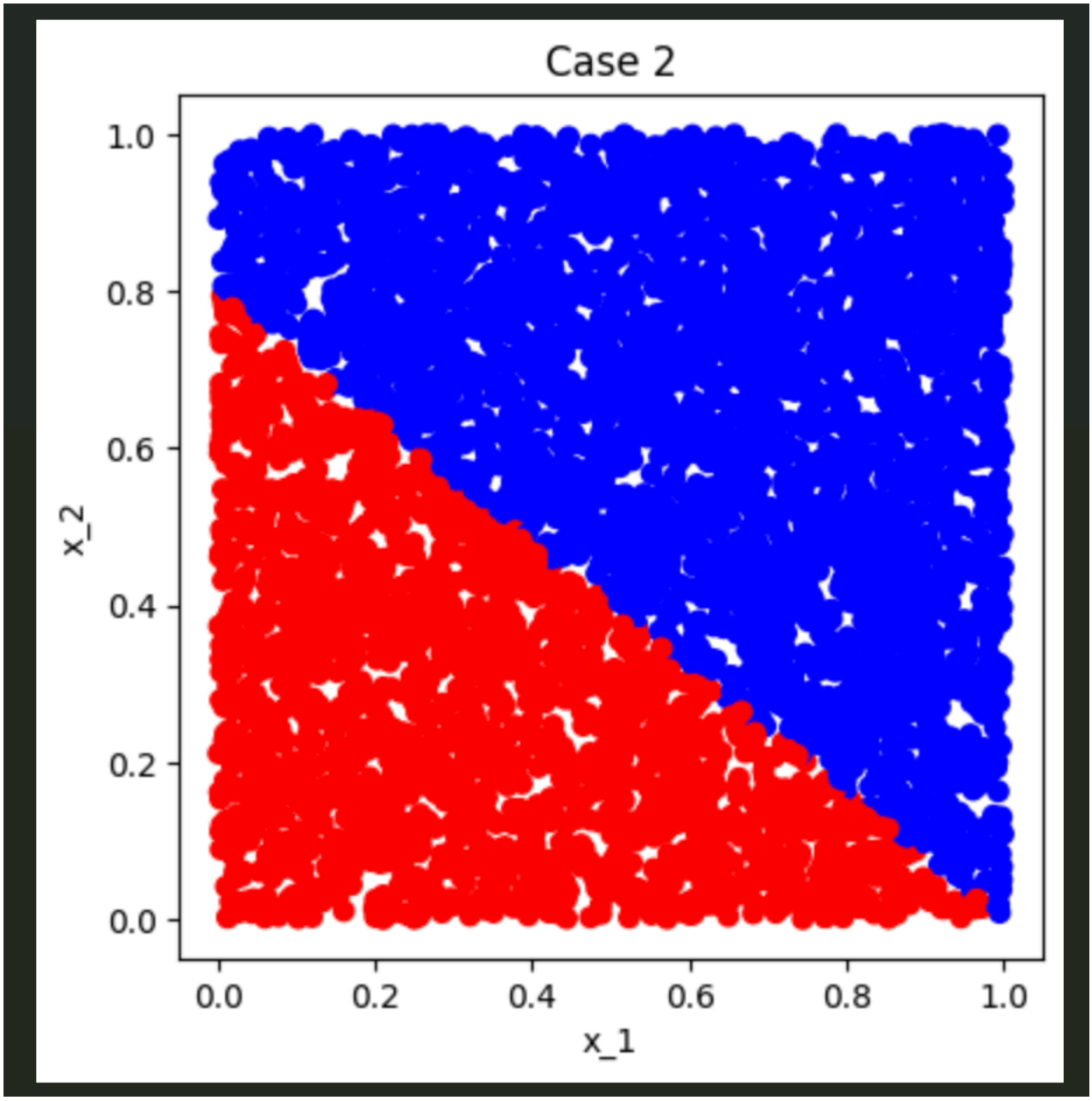


e) The decision boundary is a line with slope .4 and intercept .2.

f) The slope is now negative and the y intercept increased

✓ 1.3s




Case 2
1.0
0.8
0.6
0.4
0.2
0.0
x_2
0.0
0.2
0.4
0.6
0.8
1.0
x_1