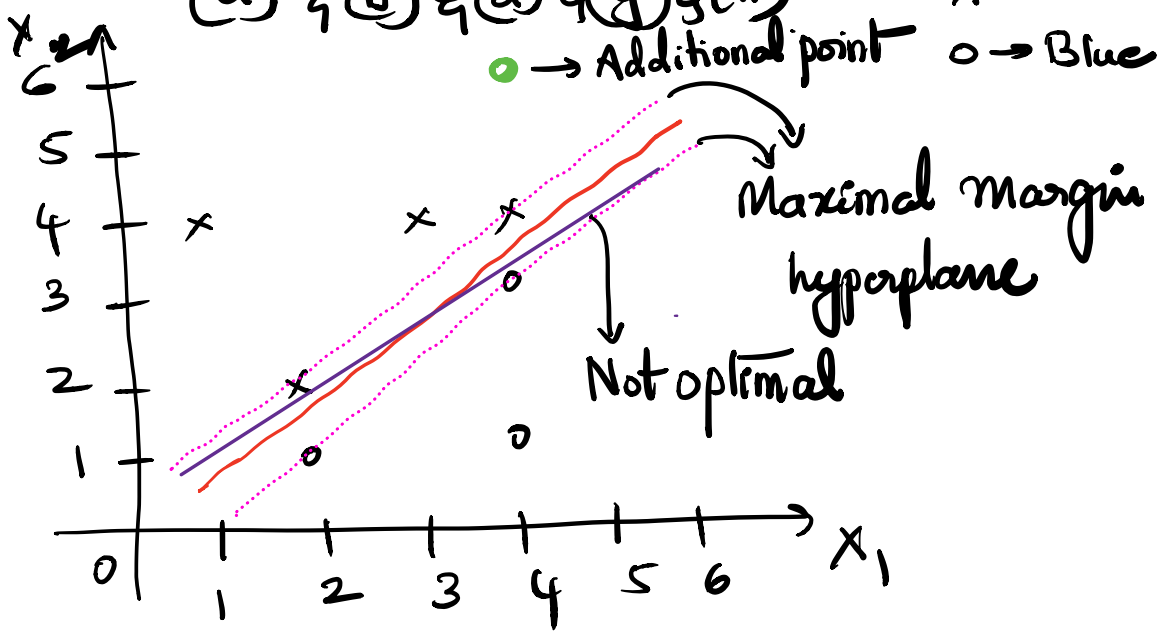
9.7.3

(a) & (b) & (d) & (g) & (h)



(b) (2, 1.5) (4, 3.5)

Eq of line passing through the points is

$$x_2 = x_1 - 0.5$$

(c) $f(x) = 0.5 - x_1 + x_2$

$\beta_0 = 0.5$

$\beta_1 = -1$

$\beta_2 = 1$

Classify to Red if $0.5 - X_1 + X_2 > 0$, Blue otherwise.

(d) As seen above

(e) The support vector is

Red (2,2) & (4,4)

Blue (2,1) & (4,3)

(f) The 7th point does not part of support vector. Any slight movement will not affect the maximal margin hyperplane. (4,1) is away from (4,3)

(g) On the plot above

(2, 1.8) (4, 3.2)

$\boxed{X_2 = 0.1X_1 + 0.4}$ → not optimal but separates the 2 classes.

(h) In the plot, adding (4,6) as Blue no longer separates the 2 classes by a hyperplane.