I, Patrícia Silva, hereby declare on my honor that I attended the lecture held on 24-04-23 and am submitting this assignment as a result of my presence and participation in the class.

→ 1st split $X1 = 2.5$

$S1 = \{15\} \rightarrow \#S1 = 1 \rightarrow \bar{y} = 15$

$S2 = \{10, 15, 15\} \rightarrow \#S2 = 3 \rightarrow \bar{y} = 13.(3)$

$MSE(S1) = 0$

$MSE(S2) = \frac{1}{3}\left[(10-13.(3))^2 + (15-13.(3))^2 + (15-13.(3))^2\right] = 5.(5)$

Overall MSE $= \frac{1}{4} \times 0 + \frac{3}{4} \times 5.(5) = 4.1(6)$

→ 2nd split $X1 = 3.5$

$S1 = \{15, 10\} \rightarrow \#S1 = 2 \rightarrow \bar{y} = 12.5$

$S2 = \{15, 15\} \rightarrow \#S2 = 2 \rightarrow \bar{y} = 15$

$MSE(S1) = \frac{1}{2} \times \left[(15-12.5)^2 + (10-12.5)^2\right] = 6.25$

$MSE(S2) = 0$

Overall MSE $= \frac{1}{2} \times 6.25 + \frac{1}{2} \times 0 = 3.125$

→ 3rd split $X1 = 4.5$

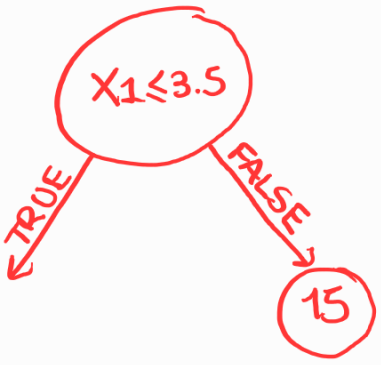
$S1 = \{15, 10, 15\} \rightarrow \#S1 = 3 \rightarrow \bar{y} = 13.(3)$

$S2 = \{15\} \rightarrow \#S2 = 1 \rightarrow \bar{y} = 15$

$MSE(S1) = \frac{1}{3}\left[(15-13.(3))^2 + (10-13.(3))^2 + (15-13.(3))^2\right] = 5.(5)$

$MSE(S2) = 0$

Overall MSE $= \frac{3}{4} \times 5.(5) + \frac{1}{4} \times 0 = 4.1(6)$



with $X1 \leq 3.5$ the dataset is:

X1	X2	y
2	1	15
3	2	10

split $X1 = 2.5$

$S1 = \{15\} \rightarrow \bar{y} = 15 \rightarrow MSE(S1) = 0$

$S2 = \{10\} \rightarrow \bar{y} = 10 \rightarrow MSE(S2) = 0$

Overall MSE = 0