

	Refund	Marital Status	Taxable Income	Cheat
1	Yes	Single	High	No
2	No	Married	High	No
3	No	Single	Medium	No
4	Yes	Married	High	No
5	No	Divorced	High	Yes
6	No	Married	Low	No
7	Yes	Divorced	High	No
8	No	Single	High	Yes
9	No	Married	Medium	No
10	No	Single	High	Yes

Grini: Order for Refund (Yes). $1 - \left(\left(\frac{3}{3} \right)^2 + \left(\frac{0}{3} \right)^2 \right) = 0.$

(No) $1 - \left(\left(\frac{3}{7} \right)^2 + \left(\frac{4}{7} \right)^2 \right) = 0.48$

Grini (Split - Refund) = $\frac{3}{10} \times 0 + \frac{7}{10} \times 0.48 = 0.336.$

Gini Index for Marital Status

$$(Single) = 1 - \left(\left(\frac{1}{4} \right)^2 + \left(\frac{2}{4} \right)^2 \right) = 0.5$$

$$(Married) = 1 - \left(\left(\frac{0}{4} \right)^2 + \left(\frac{4}{4} \right)^2 \right) = 0$$

$$(Divorced) = 1 - \left(\left(\frac{1}{2} \right)^2 + \left(\frac{1}{2} \right)^2 \right) = 0.5$$

$$Gini (Split - Marital Status) = \frac{4}{10} \times 0.5 + \frac{4}{10} \times 0 + \frac{2}{10} \times 0.5 = 0.3$$

Gini Index for Taxable Income

$$(Low) = 1 - \left(\left(\frac{0}{1} \right)^2 + \left(\frac{1}{1} \right)^2 \right) = 0$$

$$(Medium) = 1 - \left(\left(\frac{0}{2} \right)^2 + \left(\frac{2}{2} \right)^2 \right) = 0$$

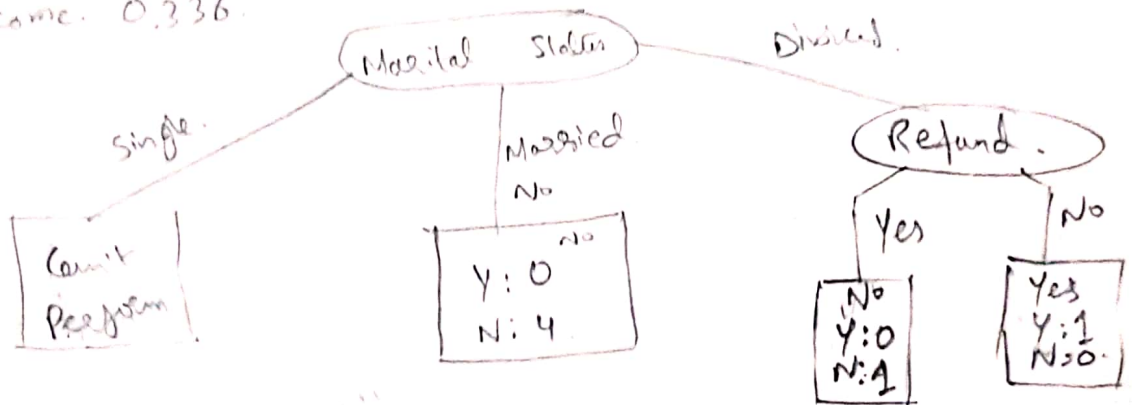
$$(High) = 1 - \left(\left(\frac{3}{7} \right)^2 + \left(\frac{4}{7} \right)^2 \right) = 0.48$$

$$Gini (Split - Taxable Income) = \frac{1}{10} \times 0 + \frac{2}{10} \times 0 + \frac{7}{10} \times 0.48 = 0.336$$

Refund 0.336

Marital Status 0.3 → Minimum

Taxable Income 0.336



Gini Index for Taxable (Marital Status: Single)

$$Gini Taxable (High) = 1 - \left(\left(\frac{2}{3} \right)^2 + \left(\frac{1}{3} \right)^2 \right) = 0.4$$

$$Gini Taxable (Low) = 1 - \left(\left(\frac{0}{0} \right)^2 + \left(\frac{0}{0} \right)^2 \right) = 0$$

$$Gini Taxable (Medium) = 1 - \left(\left(\frac{0}{1} \right)^2 + \left(\frac{1}{1} \right)^2 \right) = 0$$

Gini Split

$$\frac{3}{4} \times 0.4 + \frac{0}{4} \times 0 + \frac{0}{4} \times 0 = 0.33$$

Because we have same values in Gini split index for Marital Status single so we cannot perform

Gini Index for Taxable Material Status derived.

$$(High) = 1 - \left(\left(\frac{1}{2} \right)^2 + \left(\frac{1}{2} \right)^2 \right) = 0.5$$

$$(Low) = 0$$

$$(Medium) = 0$$

$$split = \frac{1}{2} \times 0.5 + \frac{0}{2} \times 0 + \frac{0}{2} \times 0 = 0.25$$

Gini Index for Refund 'Married Status Single'.

$$(Yes) = 1 - \left(\left(\frac{1}{1} \right)^2 + \left(\frac{0}{1} \right)^2 \right) = 0.$$

$$(No) = 1 - \left(\left(\frac{1}{3} \right)^2 + \left(\frac{2}{3} \right)^2 \right) = 0.4.$$

Gini Index for Refund 'Married Status Divorced'.

$$(Yes) = 1 - \left(\left(\frac{0}{1} \right)^2 + \left(\frac{1}{1} \right)^2 \right) = 0.$$

$$(No) = 1 - \left(\left(\frac{1}{1} \right)^2 + \left(\frac{0}{1} \right)^2 \right) = 0.$$