

Gini Impurity of the Root Node

$$= 1 - (P_0)^2 - (P_1)^2$$

$$= 1 - (34/80)^2 - (46/80)^2$$

$$= 0.4888$$

Sample Data = [34, 46] \rightarrow [class 0, class 1]

If we consider Delivery Number < 2 ?

YES \rightarrow [19, 22]

NO \rightarrow [15, 24]

GI of YES Node = 0.4973

GI of NO Node = 0.4734

Sum of Weighted Gini Impurity (WGI)

$$= 0.4973 \times \frac{41}{80} + 0.4734 \times \frac{39}{80}$$

$$= 0.4856$$

Delivery Time < 1 ?

YES \rightarrow [16, 30]

NO \rightarrow [18, 16]

GI of YES = 0.4537

GI of NO = 0.4983

Sum of W.G.I = 0.4727

Blood Pressure < 1 ?

YES \rightarrow [5, 15]

NO \rightarrow [32, 28]

GI of YES = 0.375

GI of NO = 0.4978

Sum of WGI = 0.4671

Heart Problem < 0.5 ?

YES $\rightarrow [28, 22]$

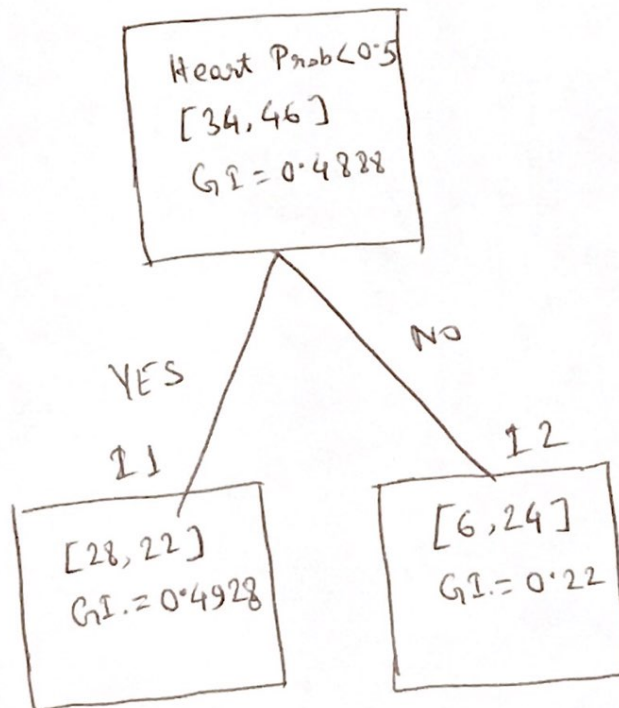
NO $\rightarrow [6, 24]$

GI of YES = 0.4928

GI of NO = 0.32

SUM of WGI = 0.428

SUM of WGI is smallest for Heart Problem question.
So, I will use this as criteria in Root Node.



For Node 11 :-

Delivery Number < 2 ?

YES $\rightarrow [17, 12]$

NO $\rightarrow [11, 10]$

GI of YES = 0.4851

GI of NO = 0.4989

SUM of WGI = 0.4909

Delivery Time < 1 ?

YES $\rightarrow [13, 15]$

NO $\rightarrow [15, 7]$

GI of YES = 0.4974

GI of NO = 0.4339

SUM of WGI = ~~0.4955~~ ~~0.4695~~
0.4695

Blood Pressure < 1 ?

YES $\rightarrow [5, 6]$

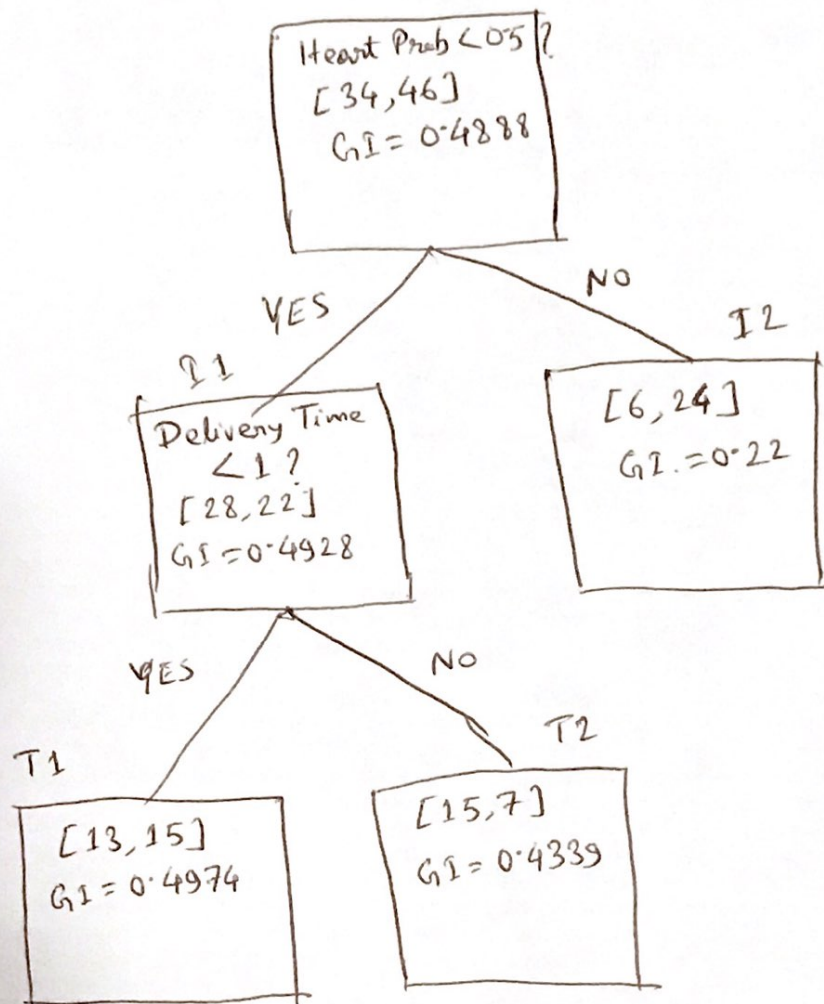
NO $\rightarrow [23, 16]$

GI of YES = 0.4959

GI of NO = 0.4839

SUM of WGI = 0.4865

SGI of Delivery Time is smallest



For Node I2 :-

Delivery Num < 2 ?

YES \rightarrow [2, 10]

NO \rightarrow [4, 14]

G1 of YES = 0.2778

G1 of NO = 0.3457

SUM of WG1 = 0.3185

Blood Pressure < 1 ?

YES \rightarrow [~~5, 6~~] [9, 0]

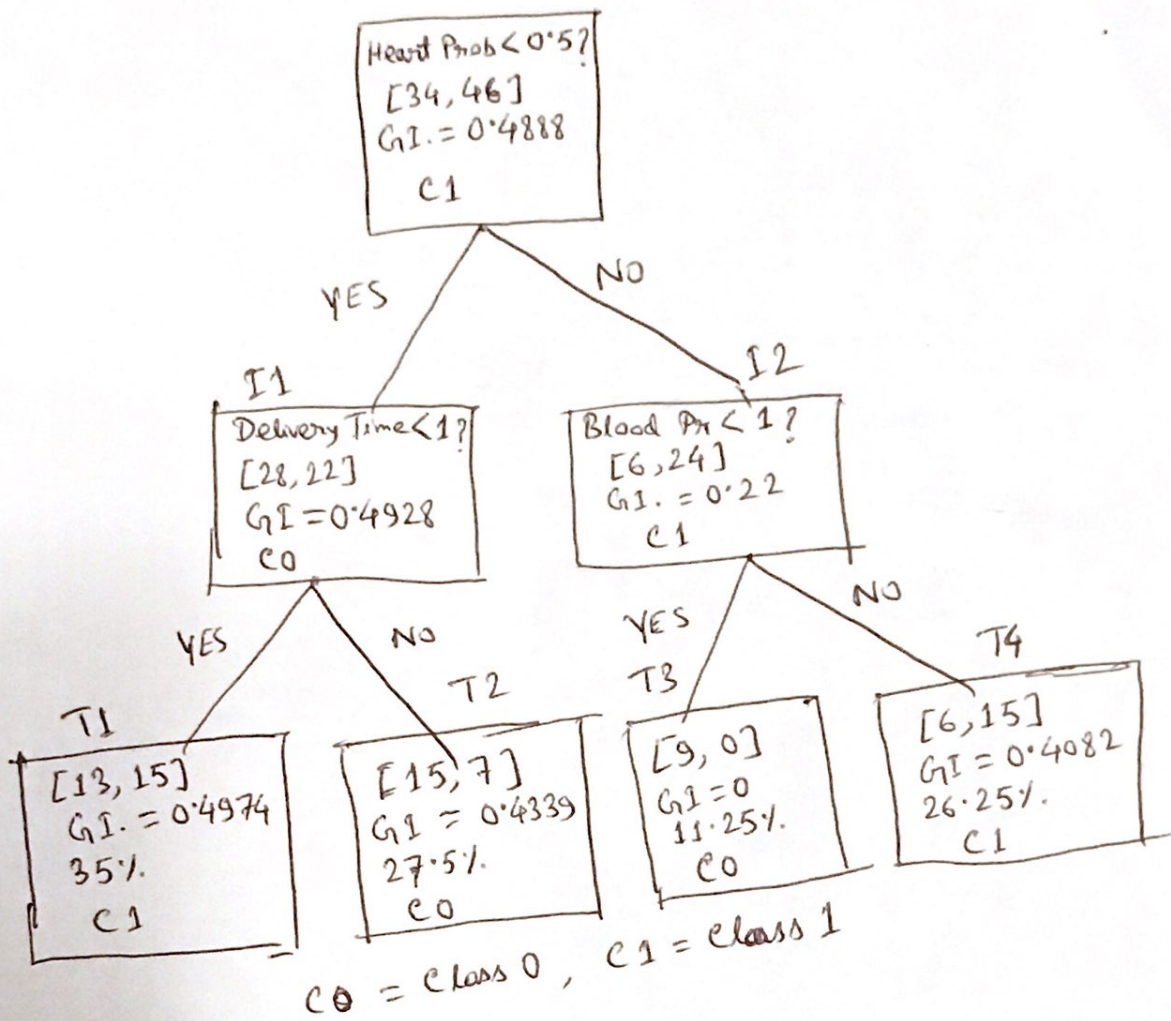
NO \rightarrow [~~23, 16~~] [6, 15]

G1 of YES = ~~0.4959~~ 0

G1 of NO = ~~0.4239~~ 0.4082

SUM of WG1 = 0.2857

So, for I2, I will use Blood Pressure as this has ~~lowest~~ lowest WG1.



Rules:

- If Heart Problem < 0.5 AND Delivery Time < 1 ~~AND~~ then C1
- If Heart Problem < 0.5 ~~and~~ and Delivery Time ≥ 1 then C0
- If Heart Problem ≥ 0.5 AND Blood Pressure < 1, then C0
- If Heart Problem ≥ 0.5 AND Blood Pressure ≥ 1, then C1