DTC

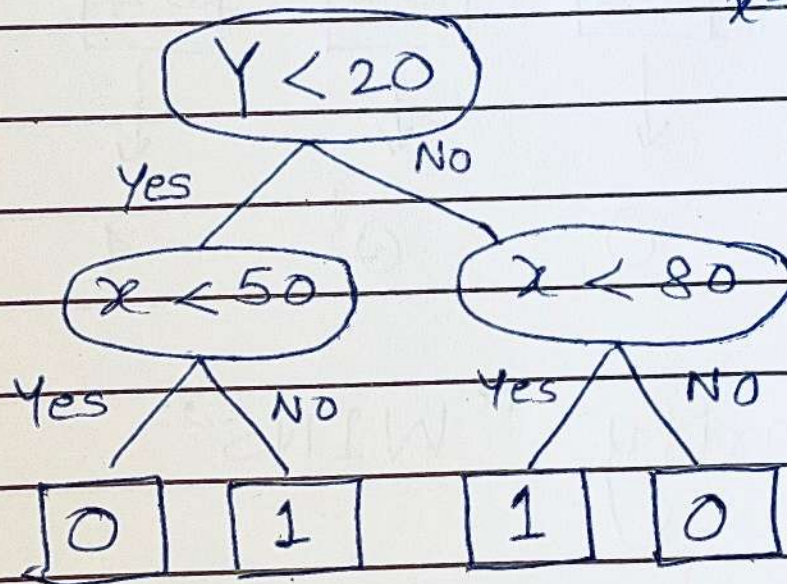x = 80

x = 50

Y < 20

Yes   No

x < 50   x < 80

Yes   NO   Yes   NO

| 0 | 1 | | 1 | 0 |

Test : (52, 22)

RFC

Training Data

K_3 K_1

K_5 K_4 K_2

K_n

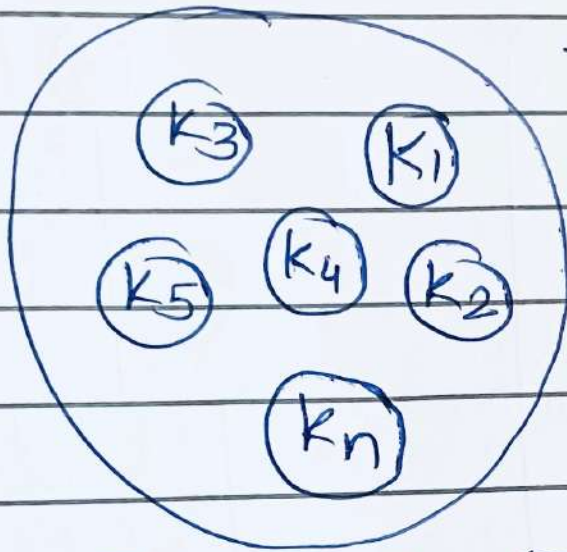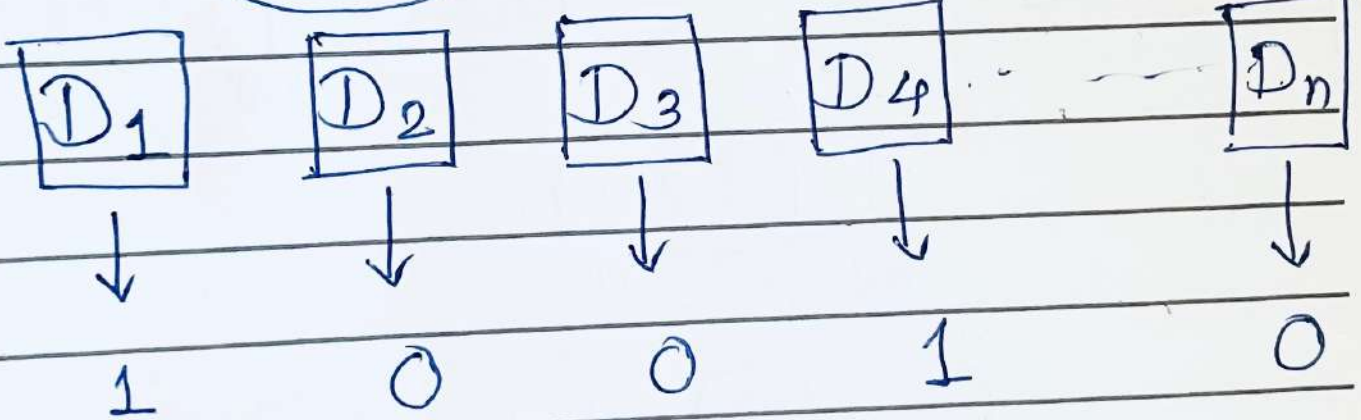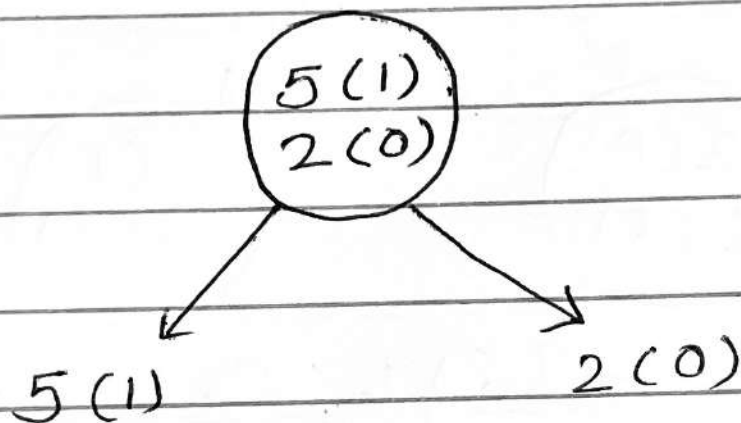| D_1	D_2	D_3	D_4	- - -	D_n
↓	↓	↓	↓		↓
1	0	0	1		0

Majority " WINS "

Entropy

$$E = -P_{(+)} \log_2 P_{(+)} - P_{(-)} \log_2 P_{(-)}$$
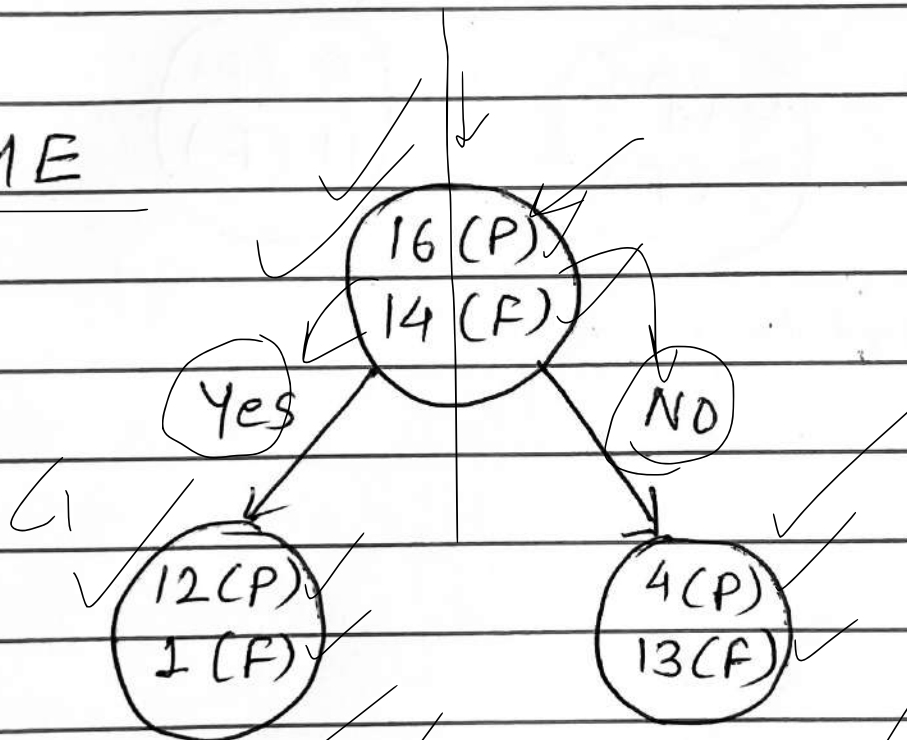
probability of +ve class

probability of -ve class

$$\boxed{\begin{array}{c} 5\,(1) \\ 2\,(0) \end{array}}$$

$$5\,(1) \qquad\qquad 2\,(0)$$

$$\rightarrow \quad -\left(\frac{5}{7}\right)\log_2\left(\frac{5}{7}\right) - \left(\frac{2}{7}\right)\log_2\left(\frac{2}{7}\right)$$

$$= \quad 0.85$$

2 features.

(5ME)   (Guide)
↙   ↘   ↙   ↘
Yes   No   Yes   No

1) 5ME

16 (P)
14 (F)

Yes   No

12 (P)   4 (P)
1 (F)   13 (F)

$$E(Parent) = -\left(\frac{16}{30}\right) \log_2 \left(\frac{16}{30}\right) - \left(\frac{14}{30}\right) \log_2 \left(\frac{14}{30}\right)$$
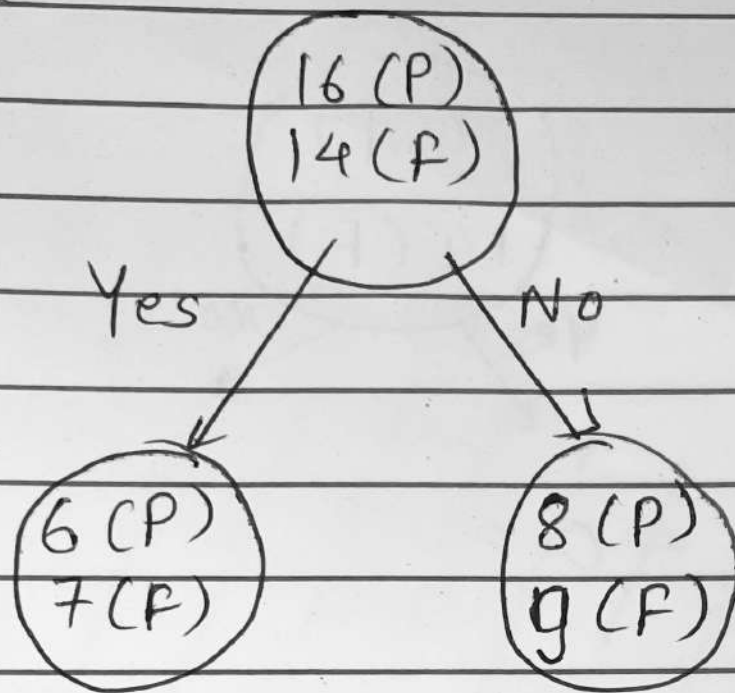
$$= 0.99$$

$$E(Parent | 5ME = Yes) = 0.39$$
$$E(Parent | 5ME = NO) = 0.79$$

→ $\frac{13}{30} \times 0.39 + \frac{17}{30} \times 0.79 = 0.62$

→ $0.99 - 0.62 = \boxed{0.37}$ IG

2) Guide

16 (P)
14 (f)

Yes →

No →

6 (P)
7 (F)

8 (P)
9 (F)

$E(Parent) = 0.99$

$E(Parent/Guide = Yes) = 0.994$

$E(Parent/Guide = NO) = \cancel{0.817}\ 0.996$

→ $\dfrac{13}{30} \times 0.994 + \dfrac{17}{30} \times 0.996$

$= 0.43 + 0.56$

$= 0.99$

→ $0.99 - 0.99 = 0.00$ IG

∴ $\boxed{0.37 > 0.00}$