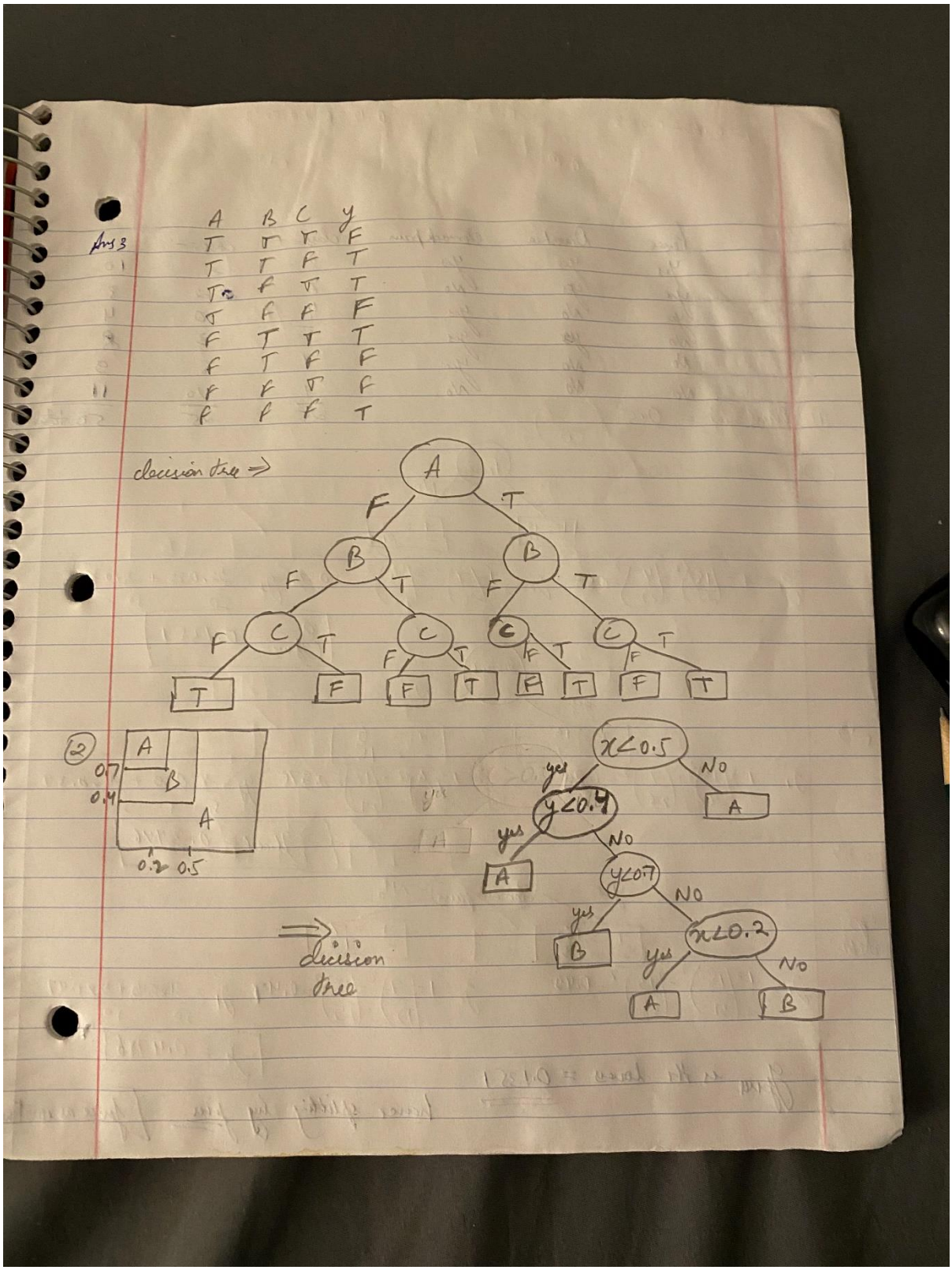
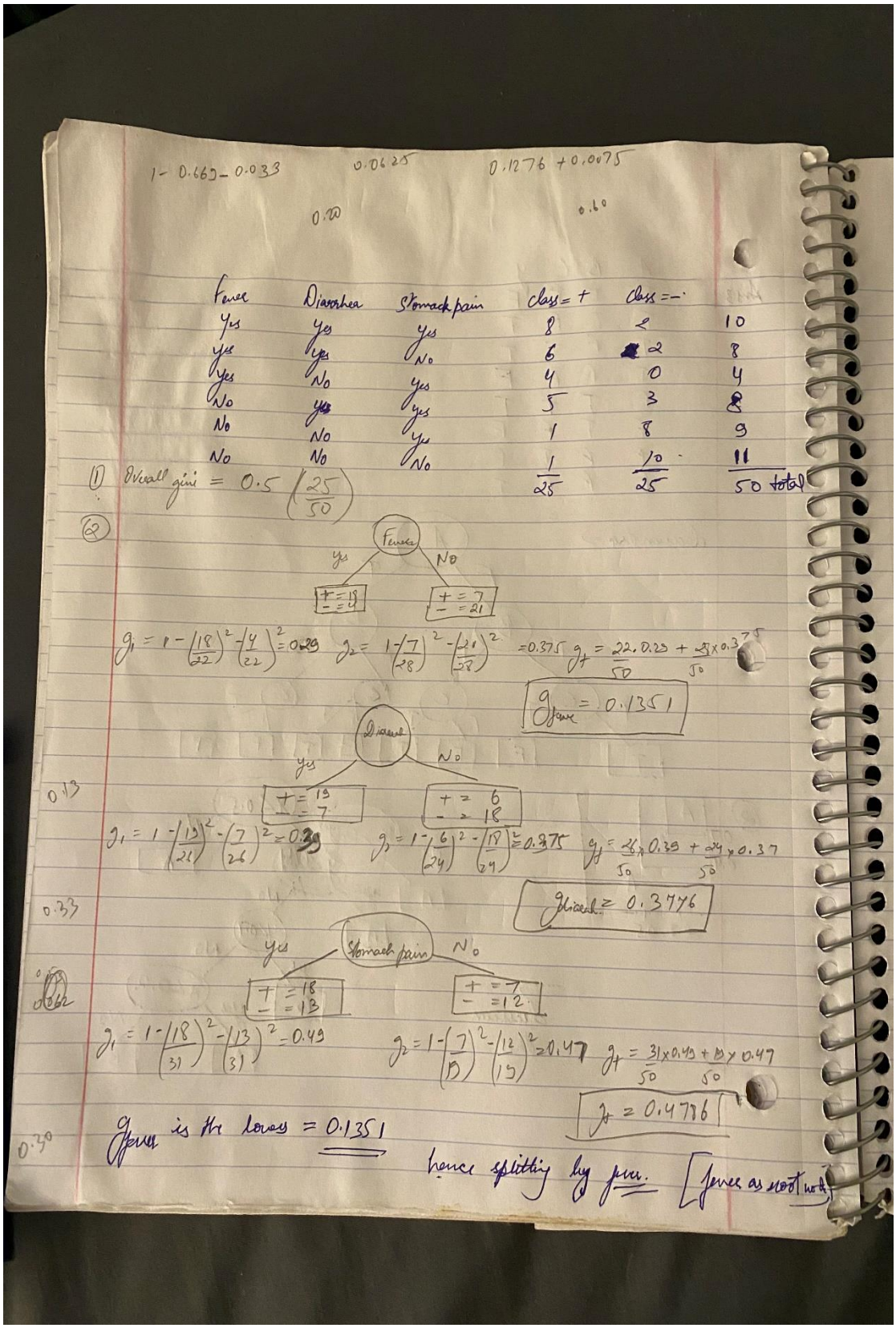
Aditya Jain

Answer images for question 3 and 4

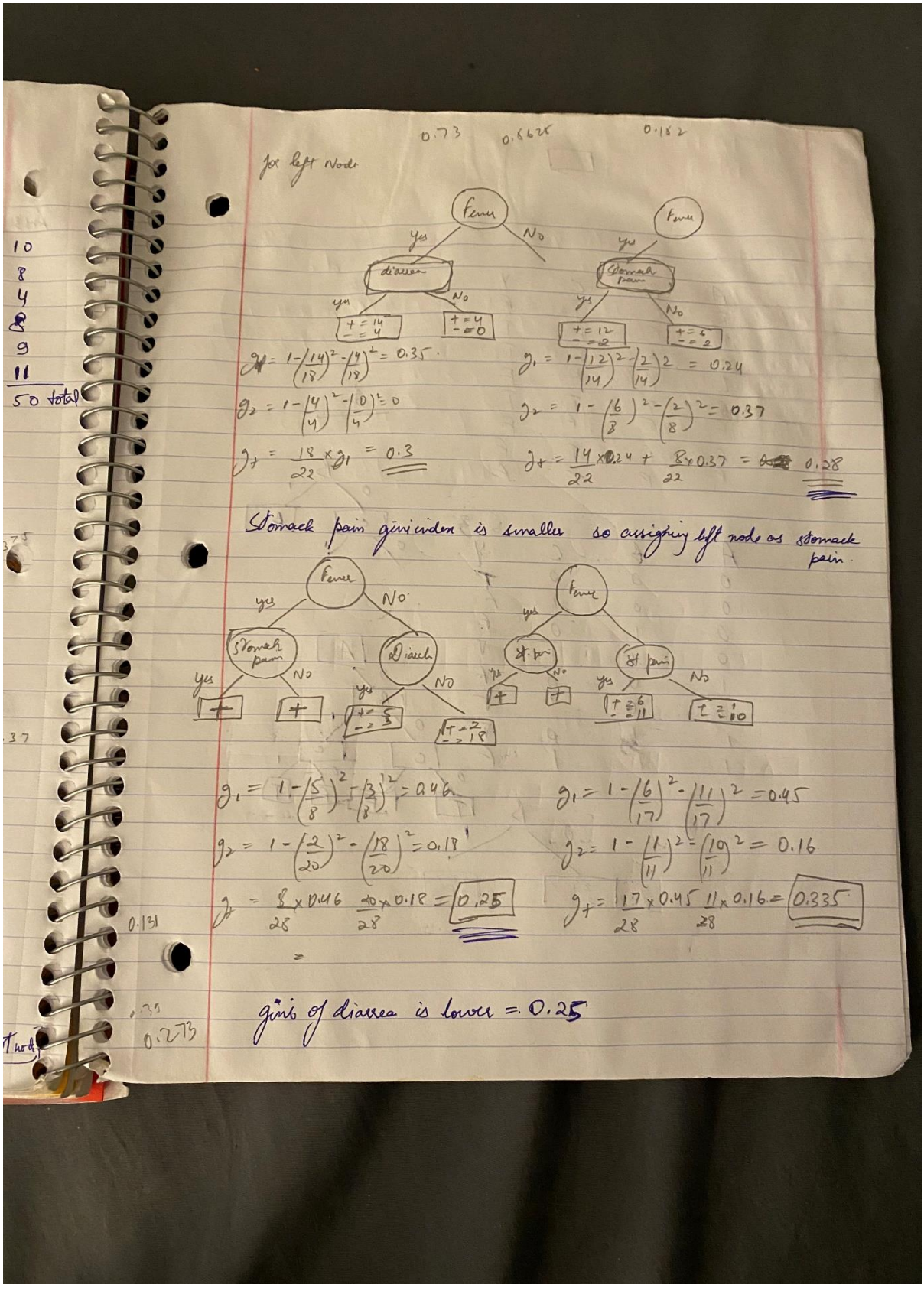
Answer 3

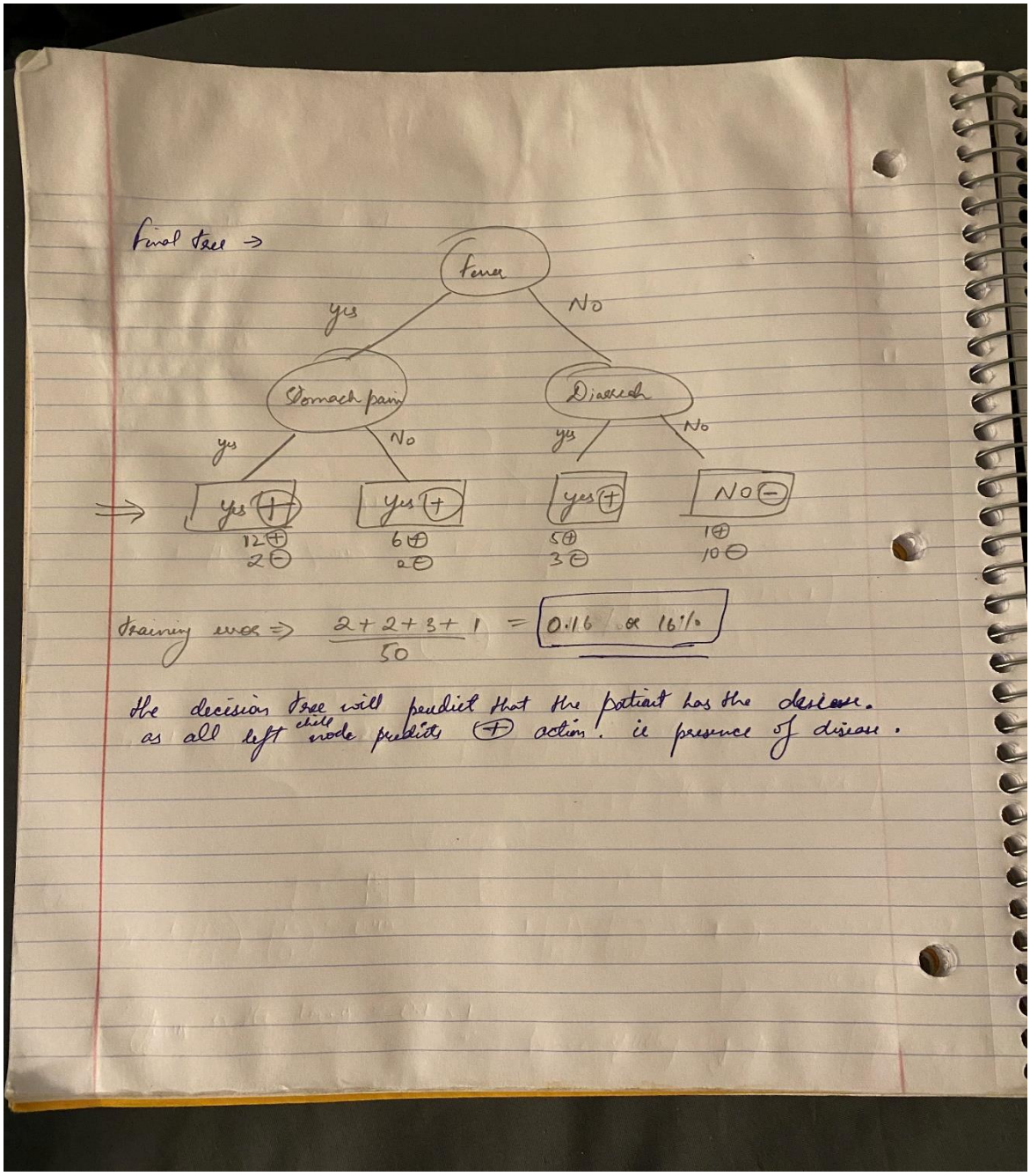


Answer 4 – Page 1



Page -2


0.73
0.5625
0.152
for left Node
Fever
yes
No
diarrea
Stomach pain
+ = 14
- = 4
+ = 4
- = 0
+ = 12
- = 2
+ = 4
- = 2
$g_1 = 1 - \left(\frac{14}{18}\right)^2 - \left(\frac{4}{18}\right)^2 = 0.35$
$g_2 = 1 - \left(\frac{4}{4}\right)^2 - \left(\frac{0}{4}\right)^2 = 0$
$g_t = \frac{18}{22} \times g_1 = 0.3$
$g_1 = 1 - \left(\frac{12}{14}\right)^2 - \left(\frac{2}{14}\right)^2 = 0.24$
$g_2 = 1 - \left(\frac{6}{8}\right)^2 - \left(\frac{2}{8}\right)^2 = 0.37$
$g_t = \frac{14}{22} \times 0.24 + \frac{8}{22} \times 0.37 = 0.28$
Stomach pain giniciden is smaller so assigning left node as stomach pain
Fever
yes
No
Stomach pain
diarrea
+
+
+ = 5
- = 3
+ = 2
- = 18
+ = 6
- = 11
+ = 1
- = 10
$g_1 = 1 - \left(\frac{5}{8}\right)^2 - \left(\frac{3}{8}\right)^2 = 0.46$
$g_2 = 1 - \left(\frac{2}{20}\right)^2 - \left(\frac{18}{20}\right)^2 = 0.18$
$g_t = \frac{8}{28} \times 0.46 \quad \frac{20}{28} \times 0.18 = 0.25$
$g_1 = 1 - \left(\frac{6}{17}\right)^2 - \left(\frac{11}{17}\right)^2 = 0.45$
$g_2 = 1 - \left(\frac{1}{11}\right)^2 - \left(\frac{10}{11}\right)^2 = 0.16$
$g_t = \frac{17}{28} \times 0.45 \quad \frac{11}{28} \times 0.16 = 0.335$
gini of diarrea is lower = 0.25



Training error ⇒ $\frac{2+2+3+1}{50} = 0.16$ or 16%

The decision tree will predict that the patient has the disease. as all left child node predicts ⊕ action. ie presence of disease.