Problem - 2

(a) Classification Accuracy

→ A = 0.5 , B = 0.27 , Class = C1.

Predicted as :- C1 , ∴ , correct. ✓

→ A = 0.41 , B = 0.54, Class = C2.

Predicted as :- C1 , ∴ , incorrect ✗.

→ A = 0.95, B = 0.3, Class = C2.

Predicted as :- C2, ∴ , correct ✓

→ A = 0.25, B = 0.62, Class = C1.

Predicted as :- C2, ∴ , incorrect ✗

→ A = 0.32, B = 0.81, Class = C2

Predicted as :- C2 , ∴ , correct ✓

∴ , classification accuracy → $\frac{3}{5}$

= Ans.

(b) ① Replacing root :-

The decision tree is :-

C1.

Classification accuracy :-

A = 0.5, B = 0.27, Class = C1 ✓

A = 0.41, B = 0.54, Class = C2 ✗

A = 0.95, B = 0.3, Class = C2 ✗.

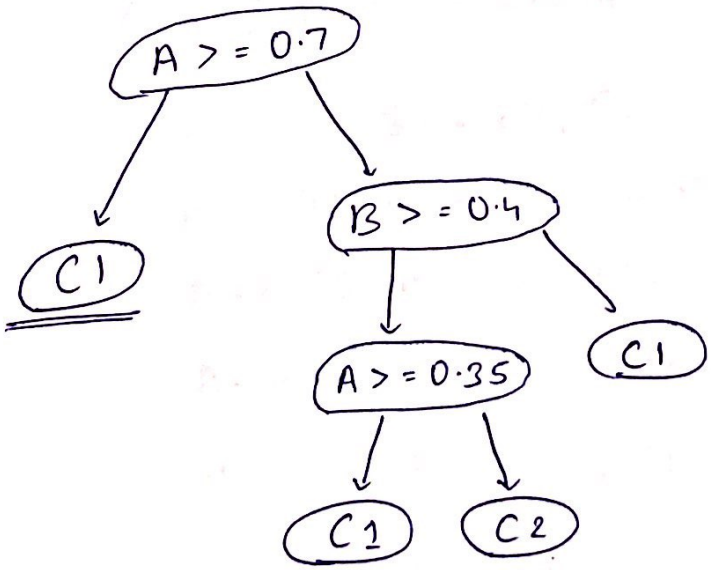
A = 0.25, B = 0.62, Class = C1 ✓

A = 0.32, B = 0.81, Class = C2 ✗.

∴, classification accuracy → $\frac{2}{5}$.

② Replacing 2nd non-leaf node

Decision tree is :-



Classification Accuracy:-

A = 0.5 , B = 0.27, Class = C1 ✓

A = 0.41, B = 0.54, Clan = C2 ✗

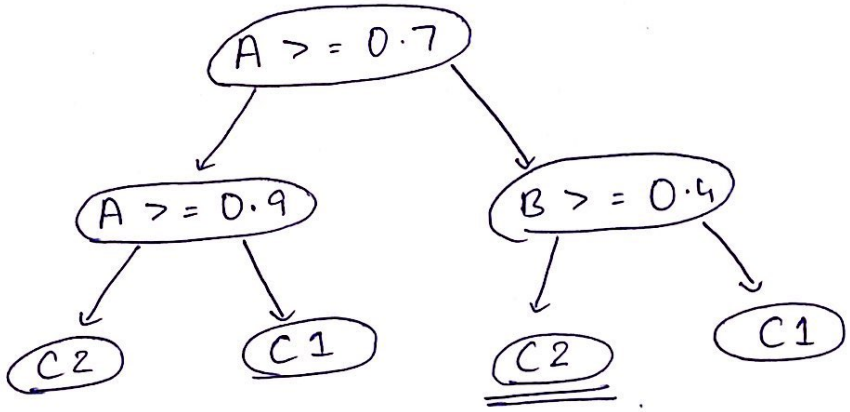
A = 0.95, B = 0.3, Clan = C2 ✗

A = 0.25, B = 0.62, Clan = C1 ✗

A = 0.32, B = 0.81, Clan = C2 ✓

∴, classification accuracy → $\frac{2}{5}$.

③ Replacing 3rd non-Leaf node



Classification Accuracy:-

A = 0.5 , B = 0.27, Clan = C1 ✓

A = 0.41, B = 0.54, Clan = C2 ✓

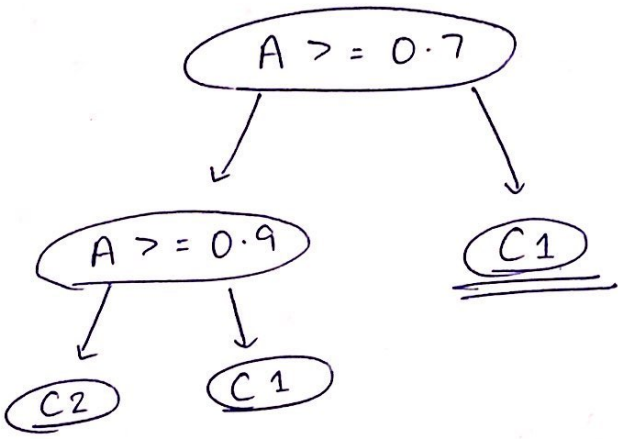
A = 0.95, B = 0.3, Clan = C2 ✓

A = 0.25, B = 0.62, Clan = C1 ✗

A = 0.32, B = 0.81 , Clan = C2 ✓

∴, classification accuracy → $\frac{4}{5}$

④ Replacing 4th non-leaf node



Classification accuracy :-

A = 0.5, B = 0.27, Class = C1 ✓

A = 0.41, B = 0.54, Class = C2 ✗

A = 0.95, B = 0.3, Class = C2 ✓

A = 0.25, B = 0.62, Class = C1 ✓

A = 0.32, B = 0.81, Class = C2 ✗

∴, classification accuracy → $\frac{3}{5}$

(c) Based on the answers above, we prune the non-leaf node → A ≥ 0.35 {3:5}

which is no. ③ in previous answer.

It yields a classification accuracy of $\frac{4}{5}$ = Ans