Q1) Any model is 'under-fitted' or 'over-fitted'

↳ A model is under fitted when it is too simple to capture the underlying patterns of data. This is indicated by both low training accuracy & low testing accuracy. The model fails to perform well on both training & unseen data, which means it hasn't learned enough from the training data.

↳ A model is over-fitted when it is too complex, capturing noise along with underlying pattern in training data. This is indicated by high training accuracy but low testing accuracy. The model performs well on training data but fails to generalize to unseen data.

Q2) Mean Square Error for the following data,

↳

| Area of house in Sqr Foot | Purchased price in lakhs | Predicted price in lakhs |
|---|---|---|
| 1000 | 35 | 24 |
| 1200 | 46 | 28 |
| 1400 | 24 | 32 |
| 1800 | 35 | 40 |

Q2) Mean Square Value for the following dataset.

↳

| Area of house in square foot | purchased Price in lakhs | Predicted Price in lakhs |
|---|---|---|
| 1000 | 35 | 24 |
| 1200 | 46 | 28 |
| 1400 | 24 | 32 |
| 1800 | 35 | 40 |

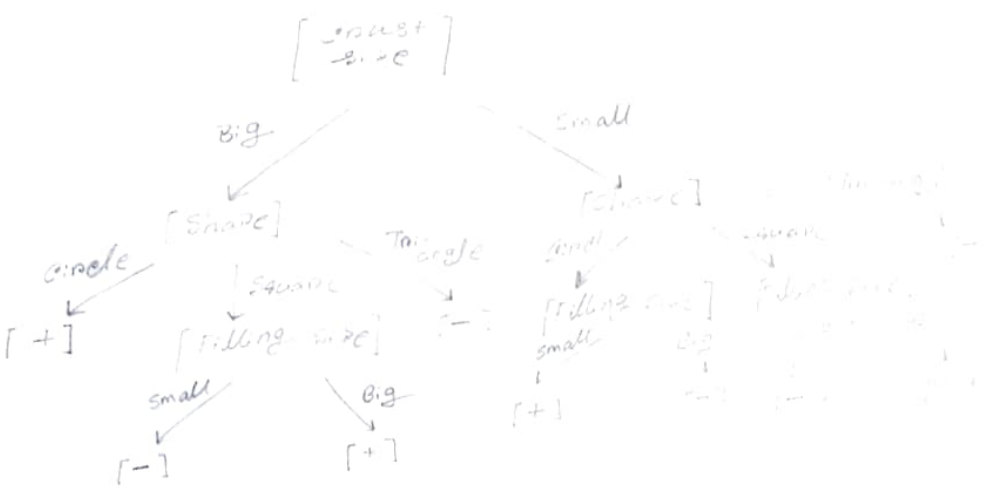
↳
```
import numpy as np
actual_prices = np.array([35, 46, 24, 35])
predicted_prices = np.array([24, 28, 32, 40])

mse = np.mean((actual_prices - predicted_prices)**2)

mse.
```

↳ 133.5

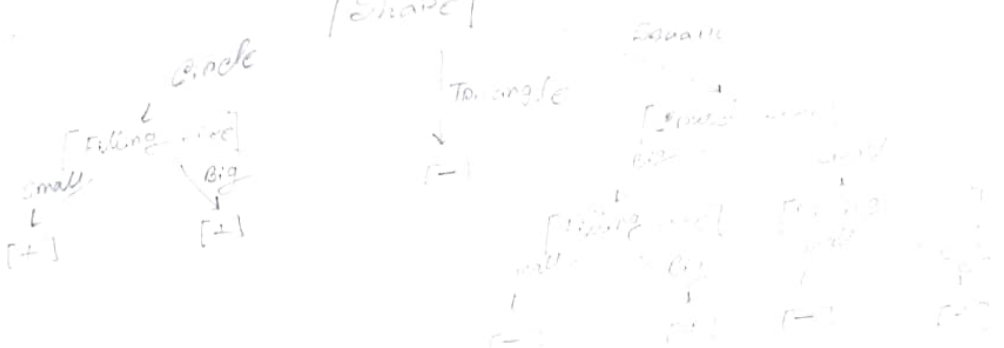
Q3) Decision Trees for the following dataset.

| Example | Coust Size | Shape | Filling Size | class |
|---|---|---|---|---|
| E1 | Big | Circle | Small | Positive |
| E2 | Small | Circle | Small | Positive |
| E3 | Big | Square | Small | Negative |
| E4 | Big | Triangle | Small | Negative |
| E5 | Big | Square | Big | Positive |
| E6 | Small | Square | Small | Negative |
| E7 | Small | Square | Big | Positive |
| E8 | Big | Circle | Big | Positive |
| E9 | Small | Triangle | Small | Negative |
| E10 | Small | Circle | Big | Negative |

a) Decision tree with "Const Size" as Root:




b) "Shape" as Root:




c) "Filling Size" as Root: