NANYANG TECHNOLOGICAL UNIVERSITY
SINGAPORE

Data Science

Classification Tree

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Second Motivation for Data Science

CLASSIFICATION IN BUSINESS

The Science

Common Problems

Prediction : Categorical

Is it Type A or Type B?

What are the chances that Sourav will default a car purchase loan?

Will DBS allow one?

https://www.youtube.com/watch?v=0XyV91VYrDs

The Science

Common Solutions

Prediction : Numeric

Regression

Prediction : Categorical

Classification

Detection : Anomalies

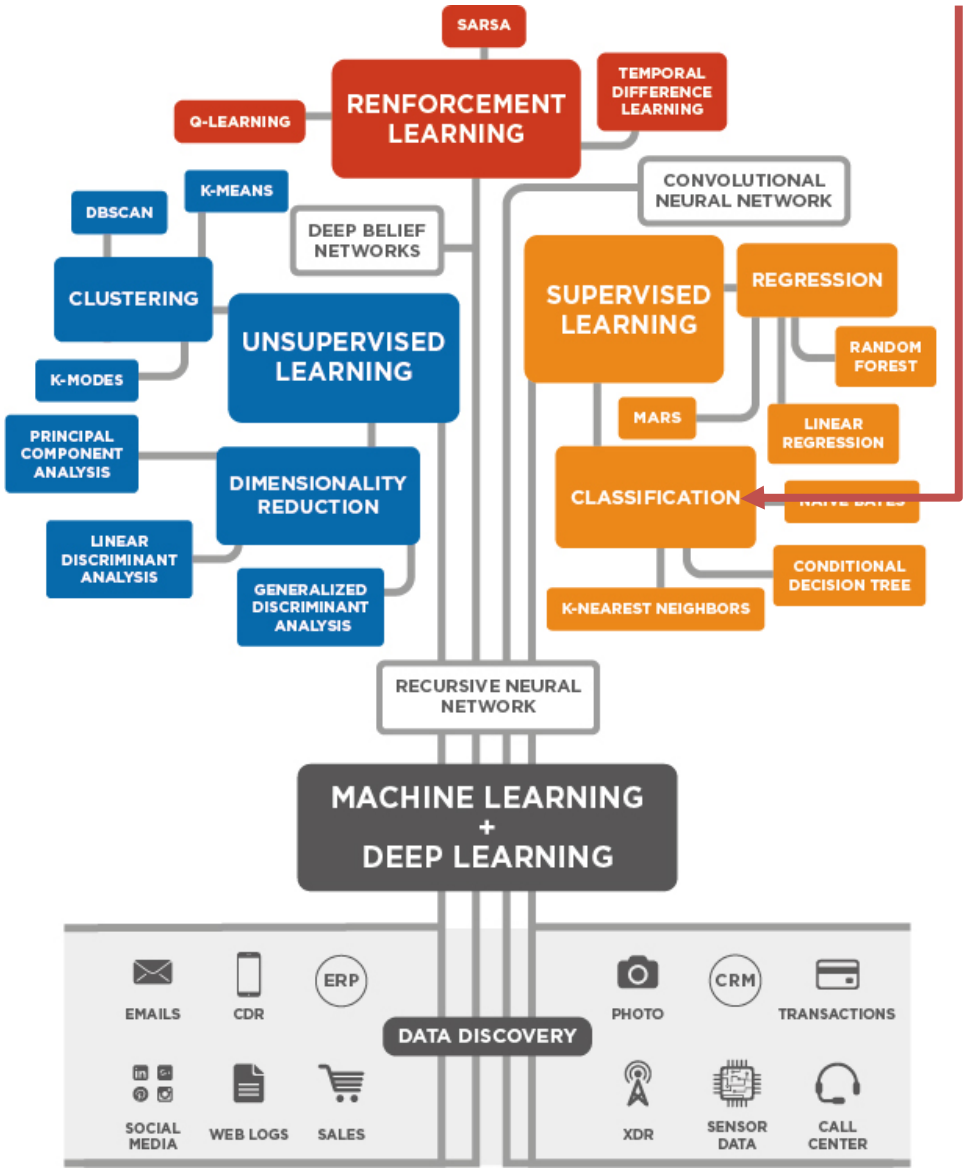
Anomaly Detection

Detection : Structure

Clustering and Dim-Red

Decision for Action

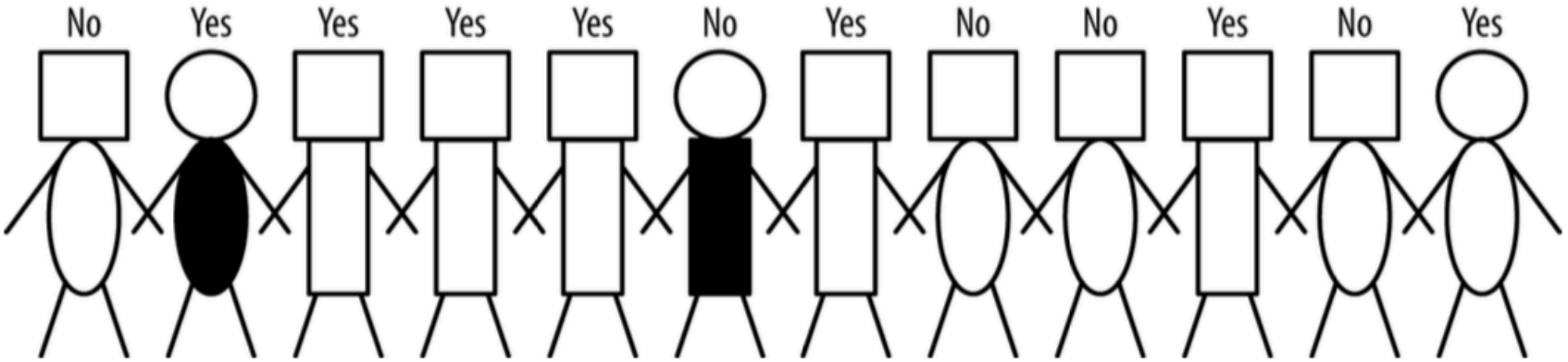
Reinforcement Learning



http://blogs.teradata.com/data-points/tree-machine-learning-algorithms/

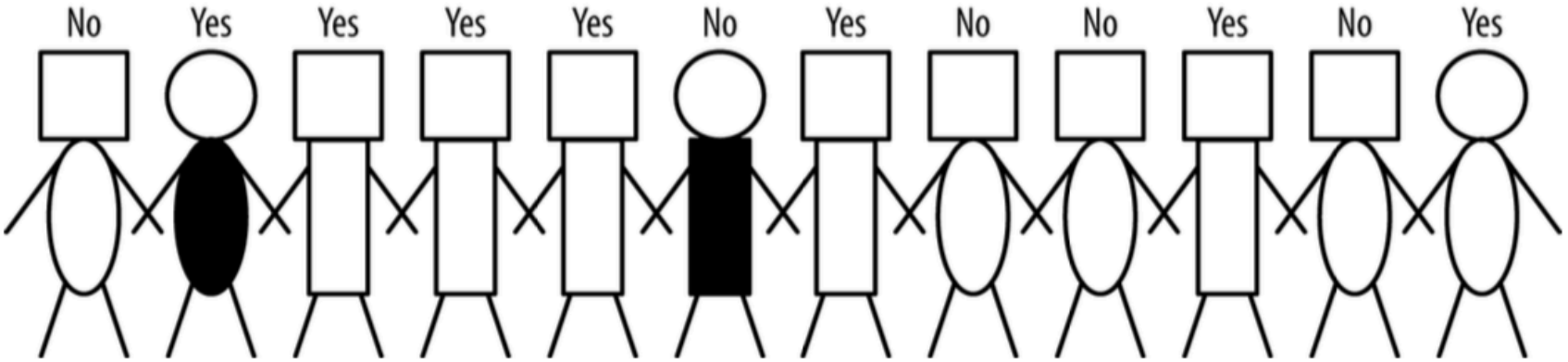
Is the credit rating “Good” or “Bad”?

HOW TO YOU DIFFERENTIATE?



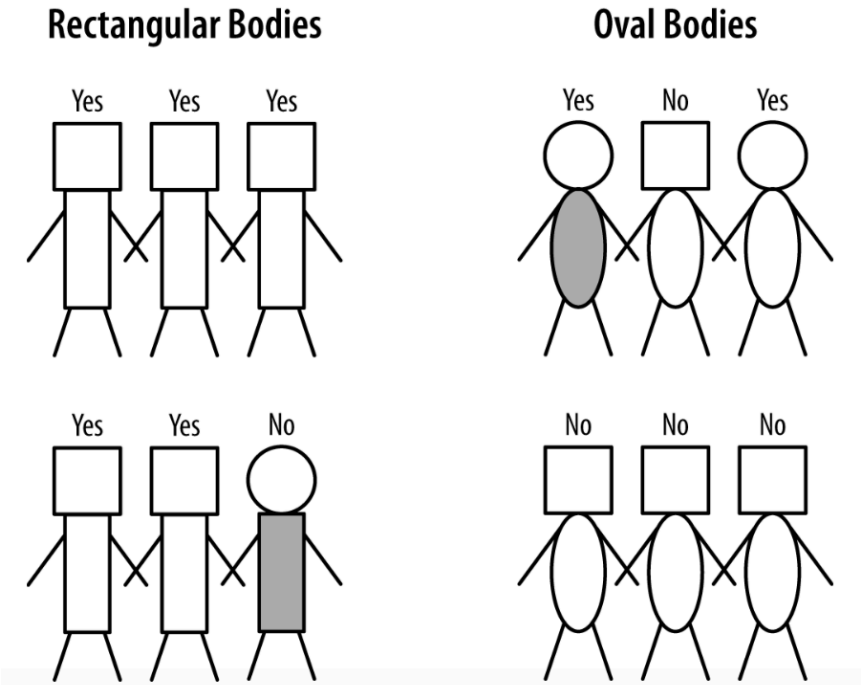
YES : NO

7 : 5



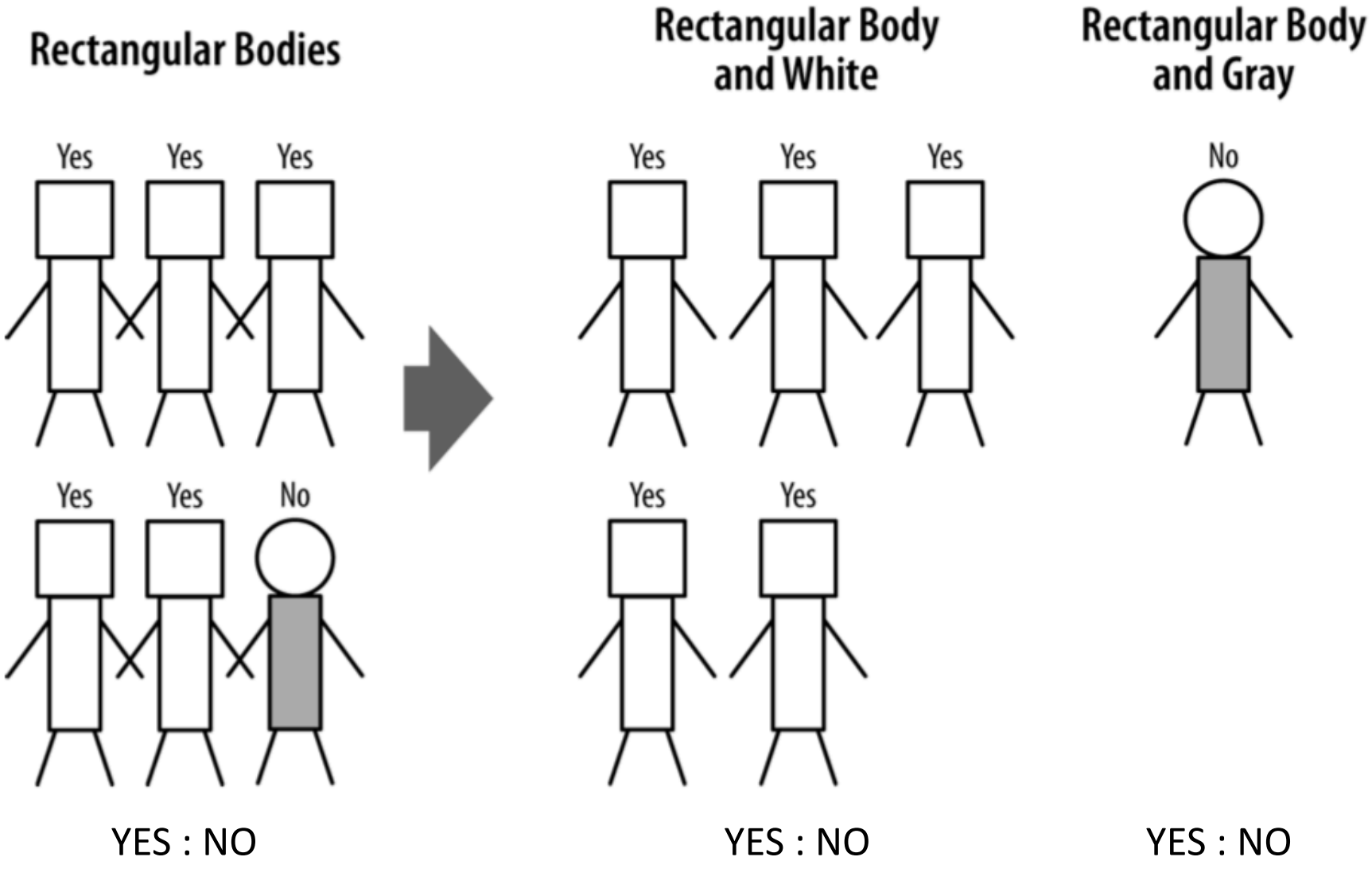
YES : NO

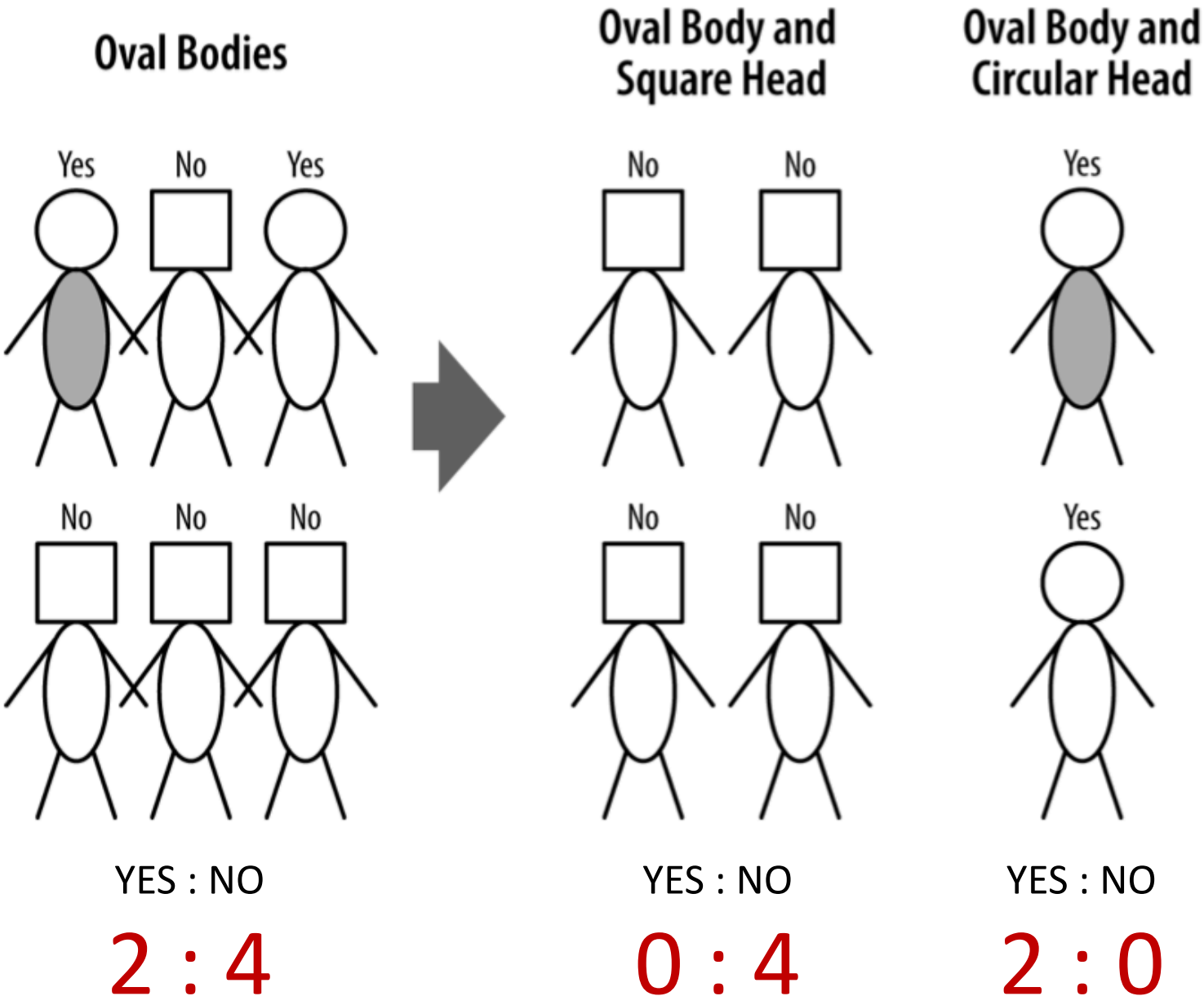
5 : 1

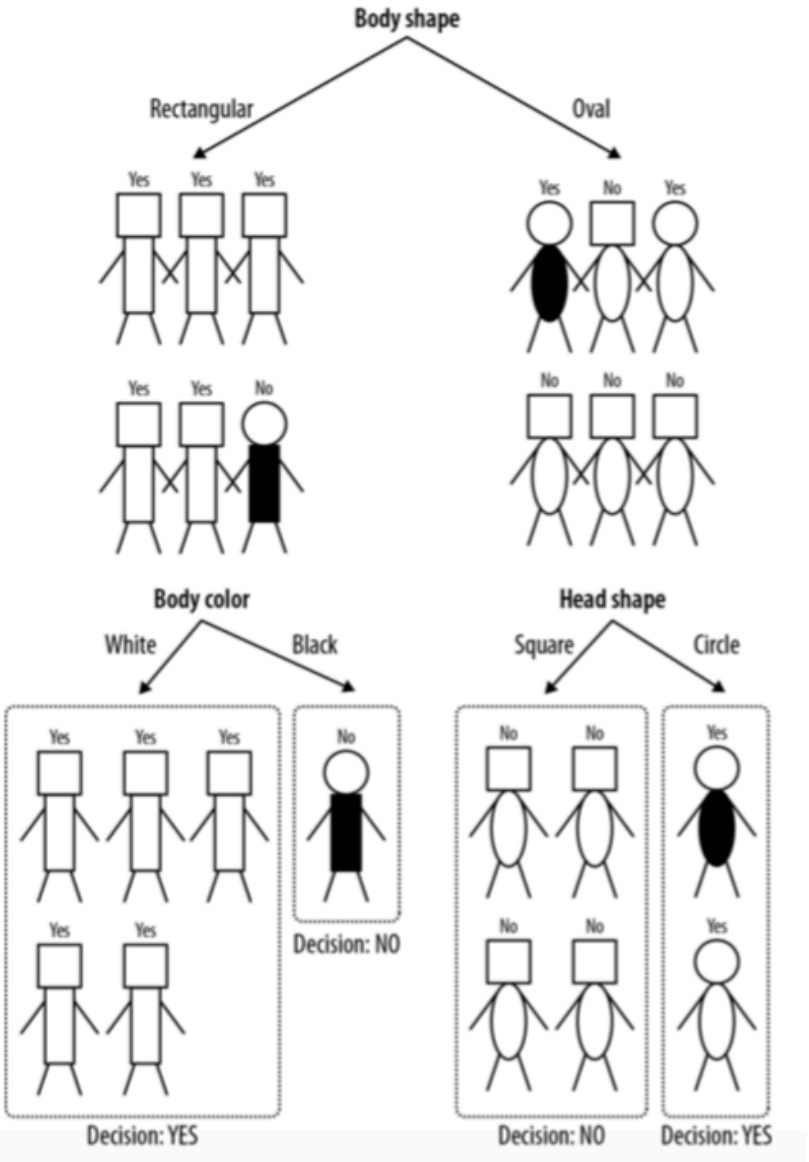


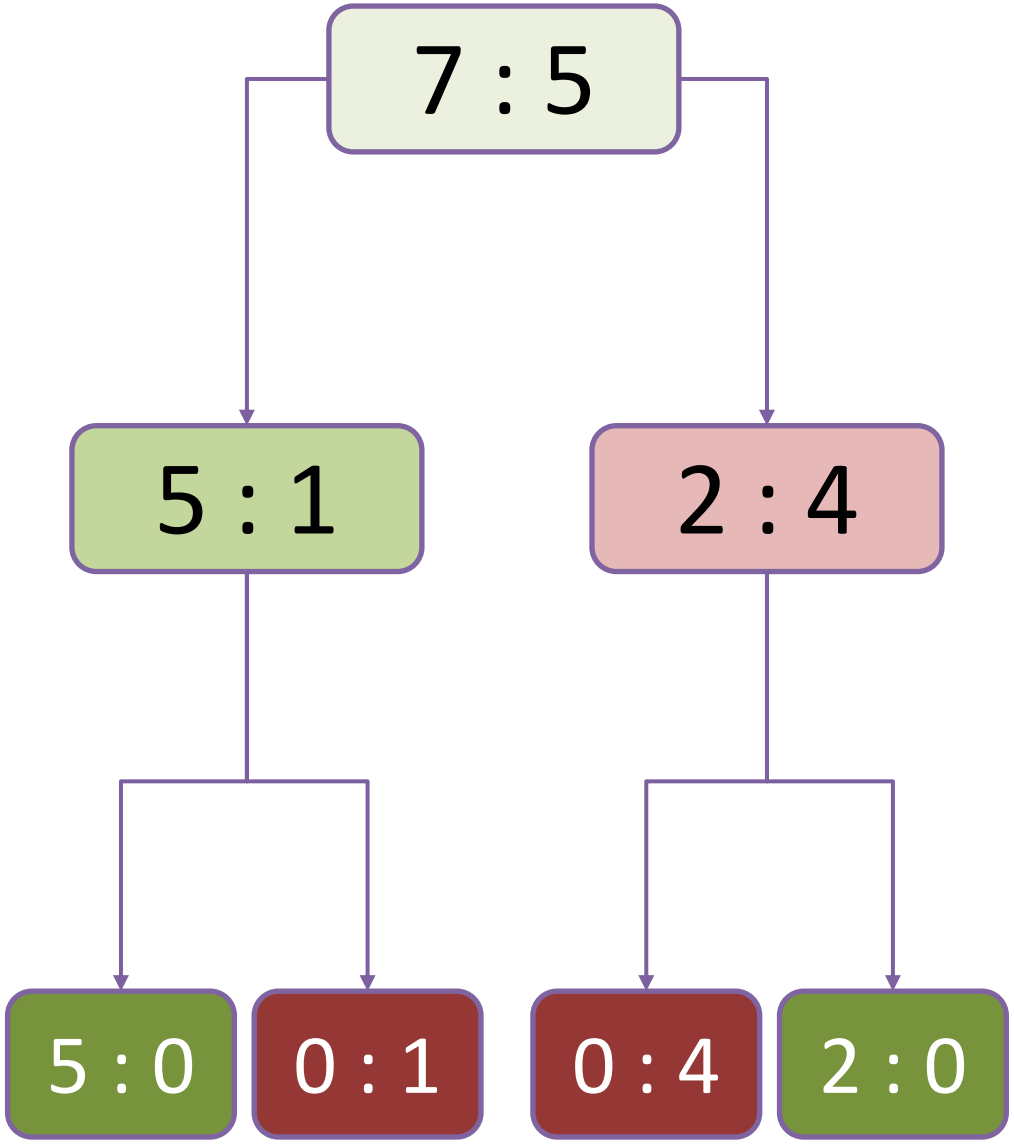
YES : NO

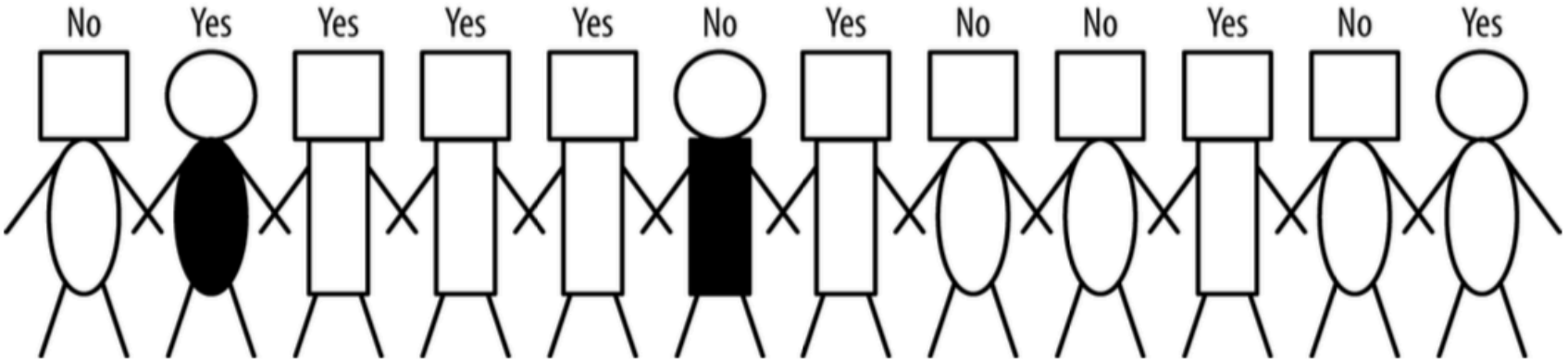
2 : 4


Rectangular Bodies
Yes
Yes
Yes
Yes
Yes
No
Rectangular Body and White
Yes
Yes
Yes
Yes
Yes
Rectangular Body and Gray
No
YES : NO
5 : 1
YES : NO
5 : 0
YES : NO
0 : 1

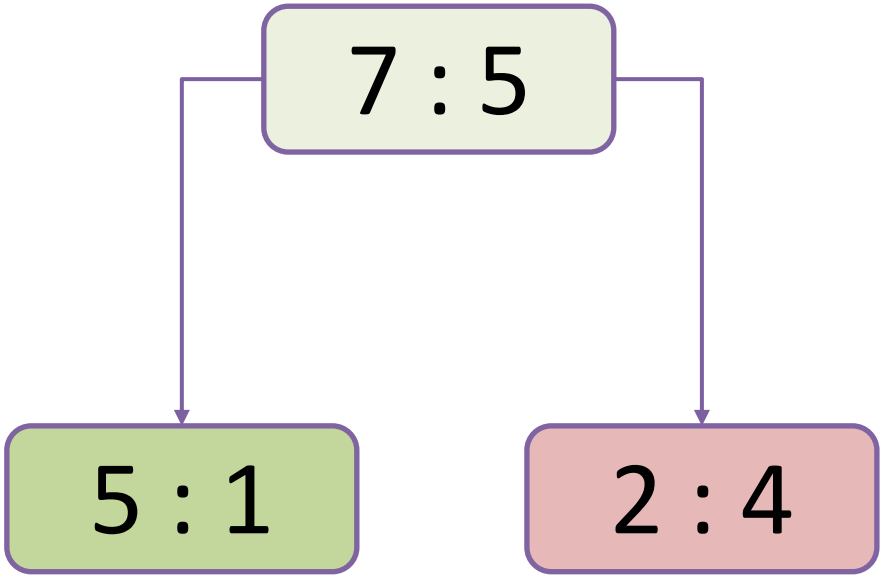

Oval Bodies
Oval Body and Square Head
Oval Body and Circular Head
Yes
No
Yes
No
No
No
No
No
No
No
No
Yes
YES : NO
2 : 4
YES : NO
0 : 4
YES : NO
2 : 0


Body shape
Rectangular
Oval
Yes Yes Yes
Yes No Yes
Yes Yes No
No No No
Body color
White
Black
Yes Yes Yes
Yes Yes
No
Decision: NO
Decision: YES
Head shape
Square
Circle
No No
No No
Yes
Yes
Decision: NO
Decision: YES

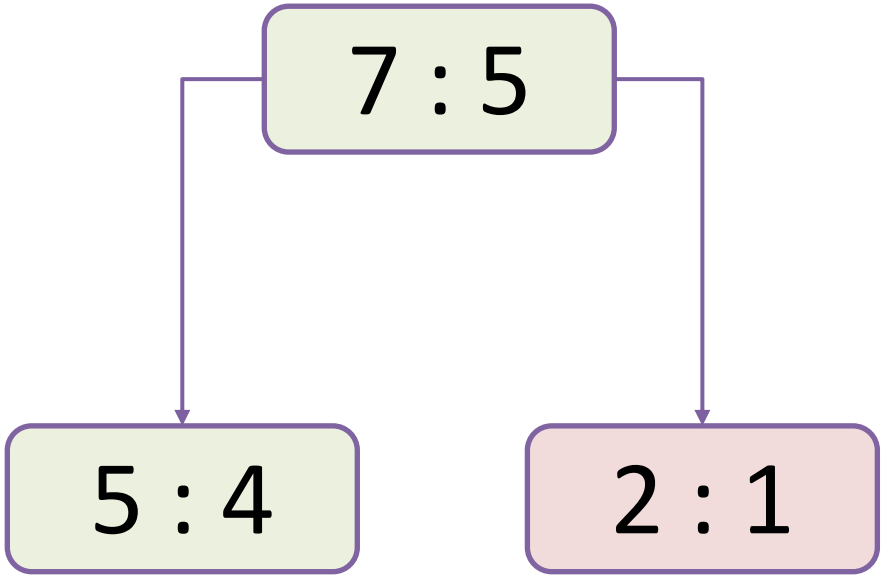

7 : 5
5 : 1
2 : 4
5 : 0
0 : 1
0 : 4
2 : 0



Body : Rectangle or Oval



Head : Square or Circle

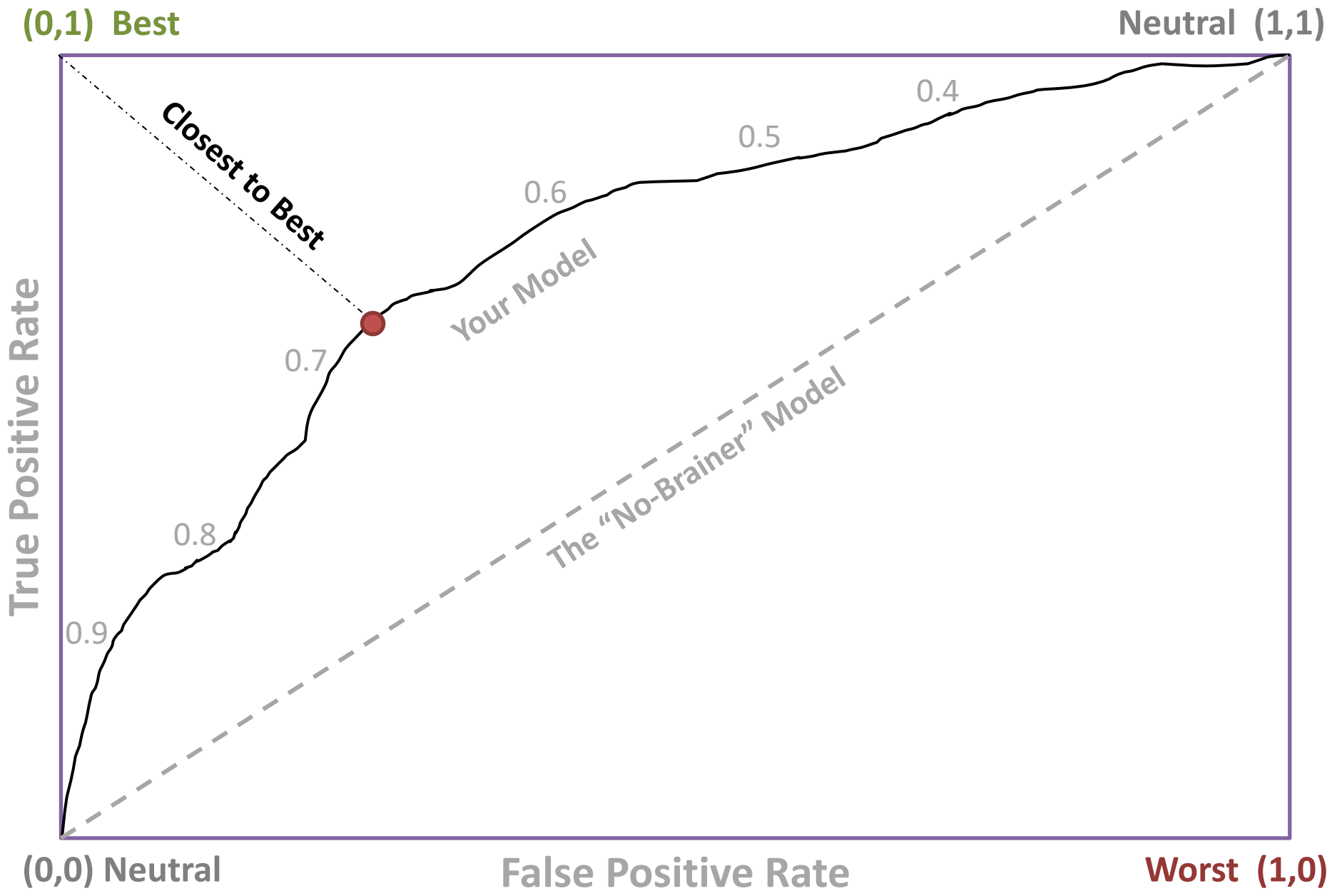


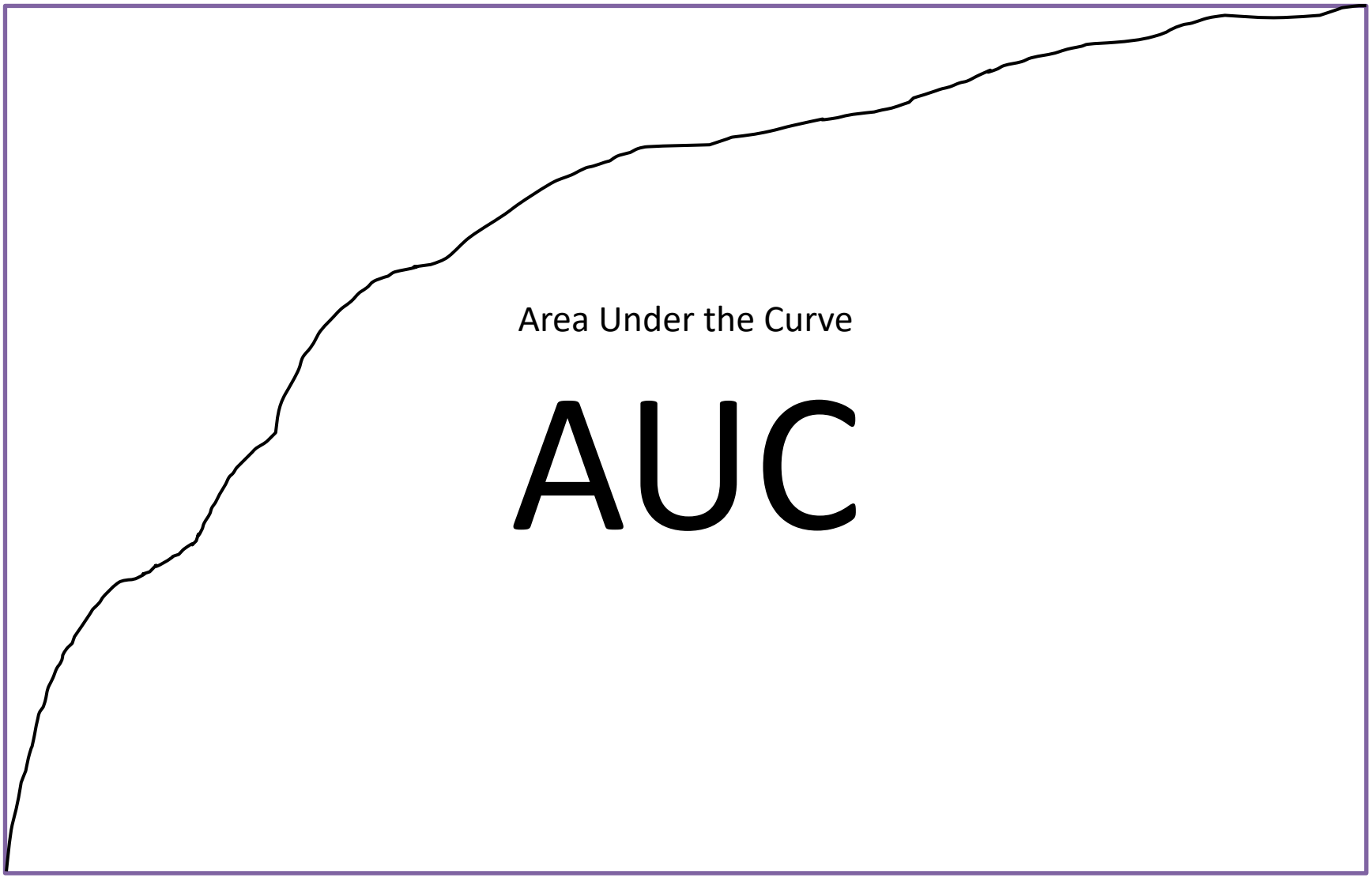
Prediction using a Decision Tree

HOW ACCURATE IS IT?

Confusion Matrix

	Predicted **Bad**	Predicted **Good**
Actually **Bad**	True Negatives	False Positives
Actually **Good**	False Negatives	True Positives


(0,1) Best
Neutral (1,1)
Closest to Best
0.4
0.5
0.6
Your Model
0.7
The "No-Brainer" Model
0.8
0.9
True Positive Rate
(0,0) Neutral
False Positive Rate
Worst (1,0)


Area Under the Curve
AUC