

① Decision Tree

- Decision Tree are used for both :

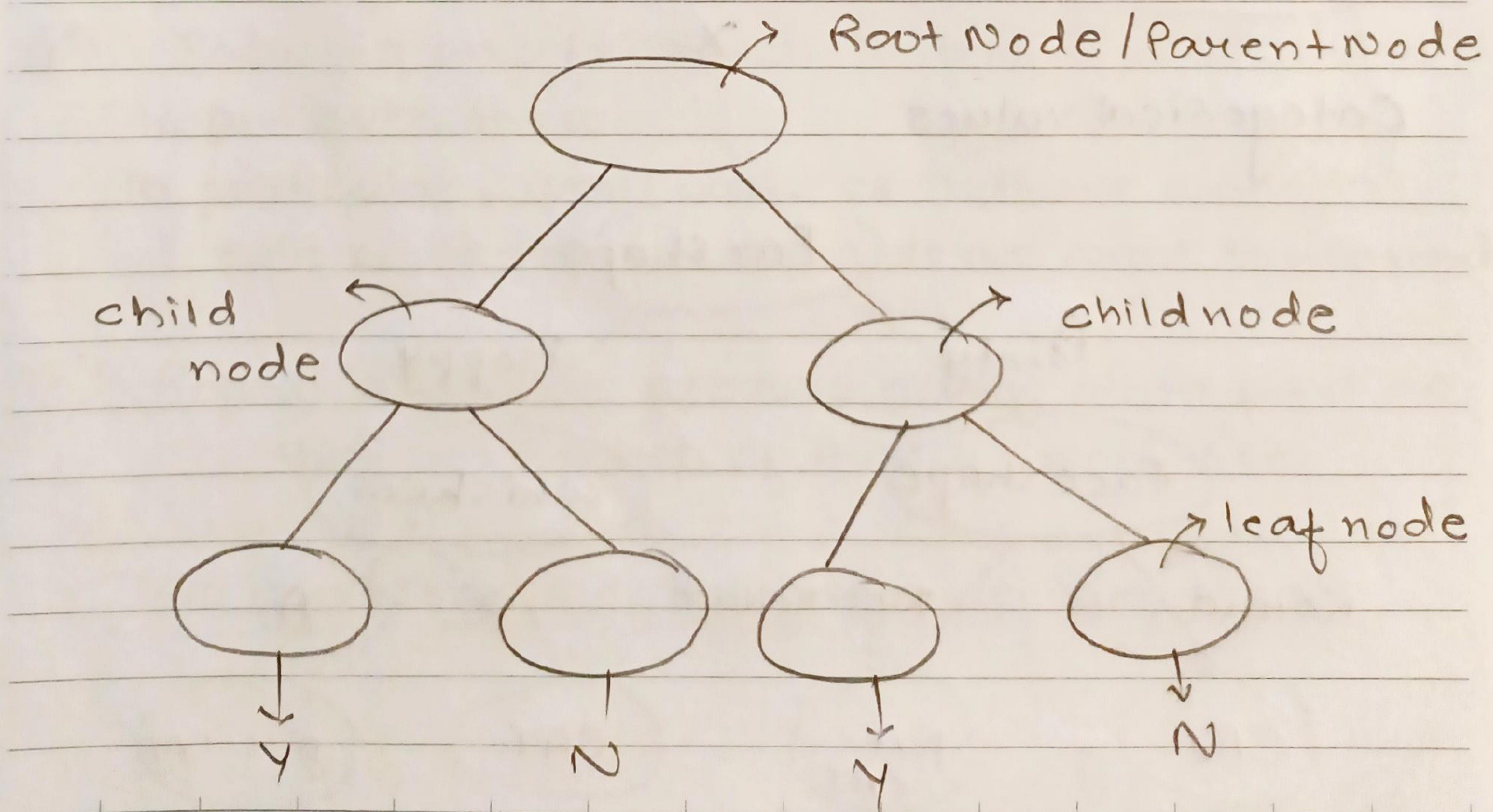
- Regression task
- Classification task

In classification, we have

- Binary data classification - (0,1)
- Multi-class classification

In regression, we get real values of continuous data.

Decision tree starts with a node with conditions and divided into several nodes, this diagram is called a tree.



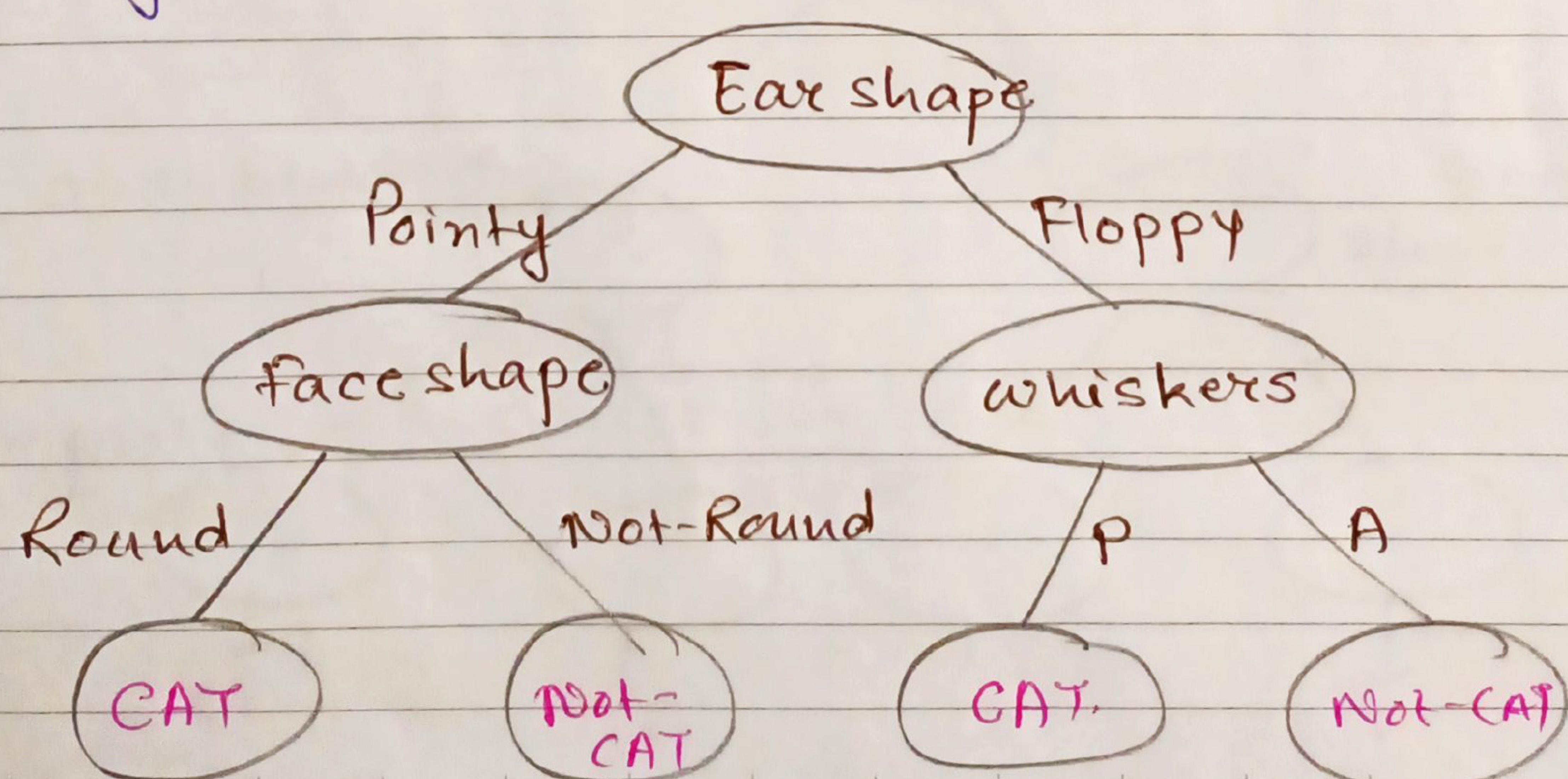
Example:

Cat classification Example

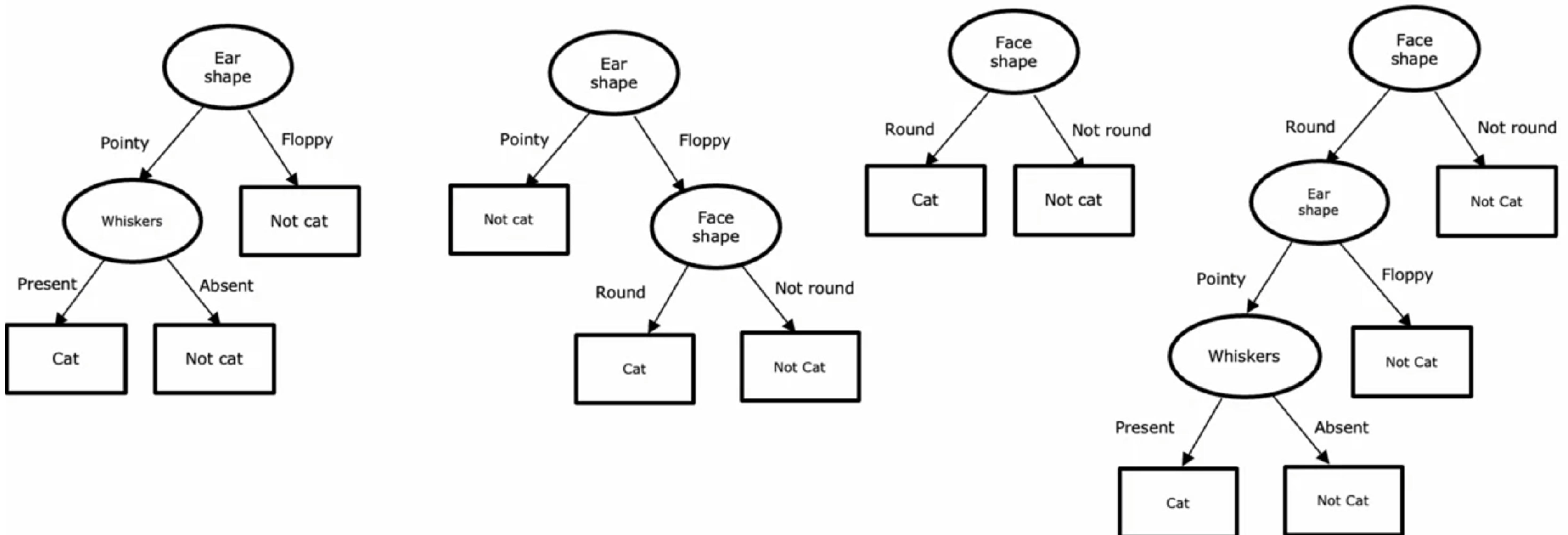
Ear shape (x ₁)	Face Shape (x ₂)	Whiskers (x ₃)	Cat
Pointy	Round	Present	1
Floppy	Not-Round	Present	0
—ii—	Round	Absent	0
Pointy	Not-Round	Present	0
—ii—	Round	Present	1
—ii—	Round	Absent	1
Floppy	Not-Round	Absent	0
Pointy	Round	—ii—	1
Floppy	Round	—ii—	0
—ii—	Round	—ii—	0

X Y

Categorical values



Ear shape	Face shape	Whiskers	Cat
 Pointy	Round	Present	1
 Floppy	Not round	Present	1
 Floppy	Round	Absent	0
 Pointy	Not round	Present	0
 Pointy	Round	Present	1
 Pointy	Round	Absent	1
 Floppy	Not round	Absent	0
 Pointy	Round	Absent	1
 Floppy	Round	Absent	0
 Floppy	Round	Absent	0



Here are a few others. This is a different decision tree for trying to classify cat versus not cat. In this tree, to make a classification decision, you would again start at this topmost root node. Depending on their ear shape of an example, you'd go either left or right. If the ear shape is pointy, then you look at the whiskers feature, and depending on whether whiskers are present or absent, you go left or right to gain and classify cat versus not cat. Just for fun, here's a second example of a decision tree, here's a third one, and here's a fourth one.