Animal Questions.

 # legs?

0   1   2   4   6   8

Primate?

- Yes
- no → **Carnivore**
  - Yes → **domestic?**
    - Yes
    - no → [milk]
      - Yes → [weight]
        - Small
        - medium
        - large → [Color]
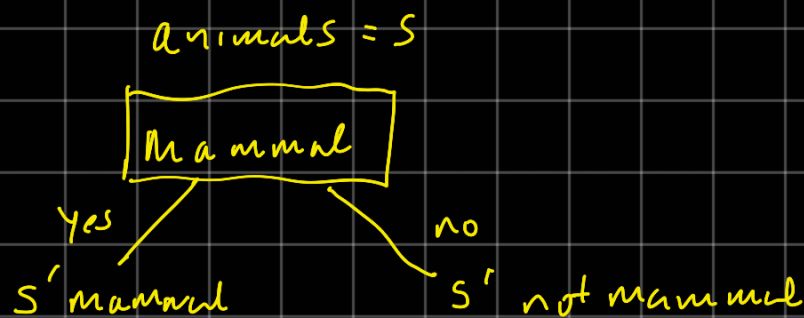   - green → Crocadile
      - no
  - no

Need to know what questions to ask.
   Use questions that are informative
   Have one branch that would have a lot of information

Decision tree → random forest

                    animals = S

                  ┌─────────────┐
                  │   Mammal   │
                  └─────────────┘
            yes /   \ no
                /   \
         S' mammal   S' not mammal

Complete tree may give us overfitting

$P(apple | red)$ $\frac{3}{4}$

              reduce to red items , then apples in those red

Construct a decision tree

                                    training vs classification

     DT ← construction
     Input: S
     Output: t ← root node of tree

DT_construct (s)
   t = new Node ()
   label (t) = representative Class (s)
   if impure (s) then   ← termination
        criterion = split Criterion (s)

```
Else return (t)
{S1,... Sn} = decompose (S, criterim)
Foreach S' in {S1,...,Sn} do
    add Successor (t, DT_construct (S'))
return (t)


DT_ classify (x, t)

    If is Leaf (t) then
        return (label (t))
```