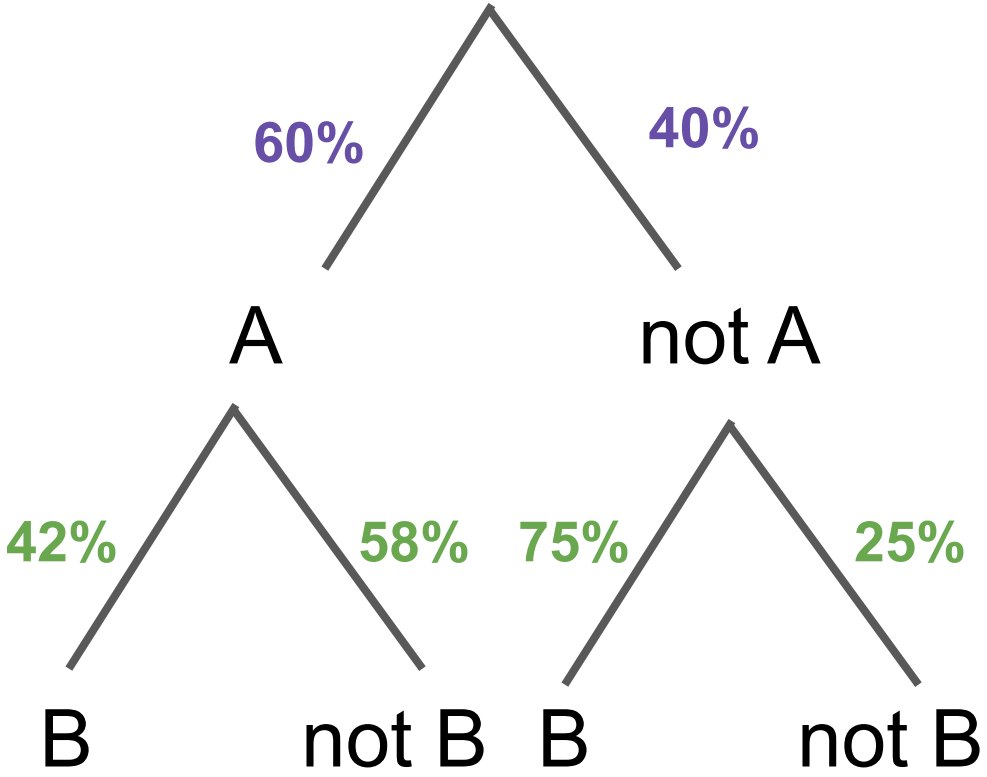
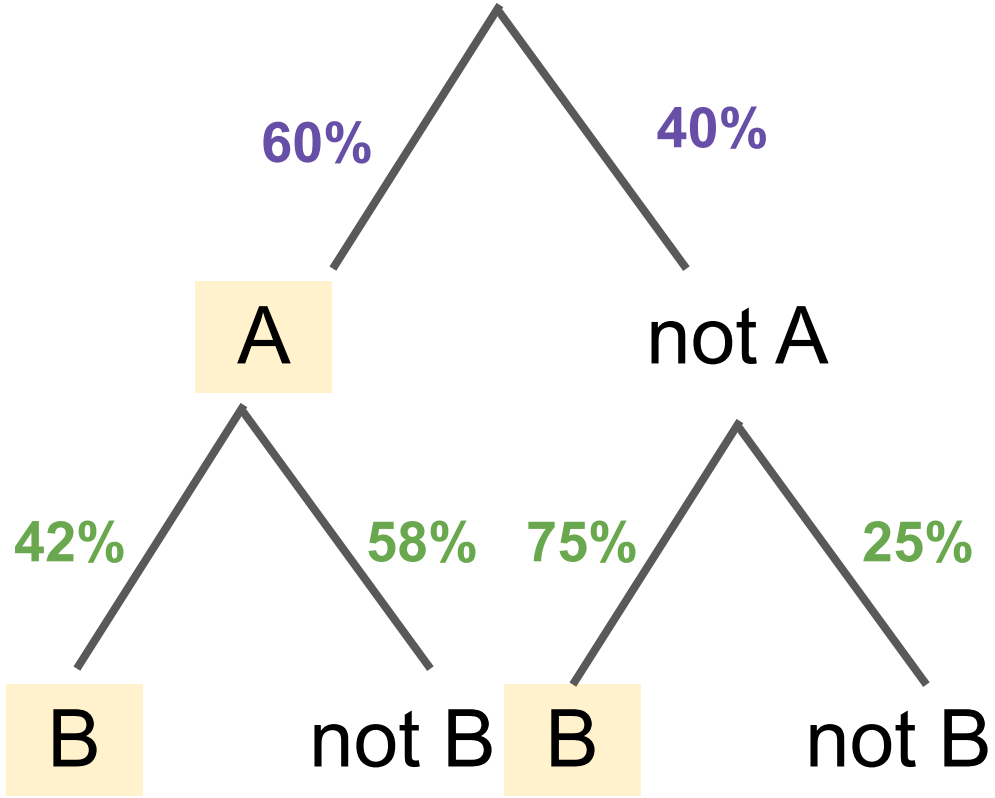
Recap...

$$P(A|B) = \frac{P(A)P(B|A)}{P(B)}$$



Recap...

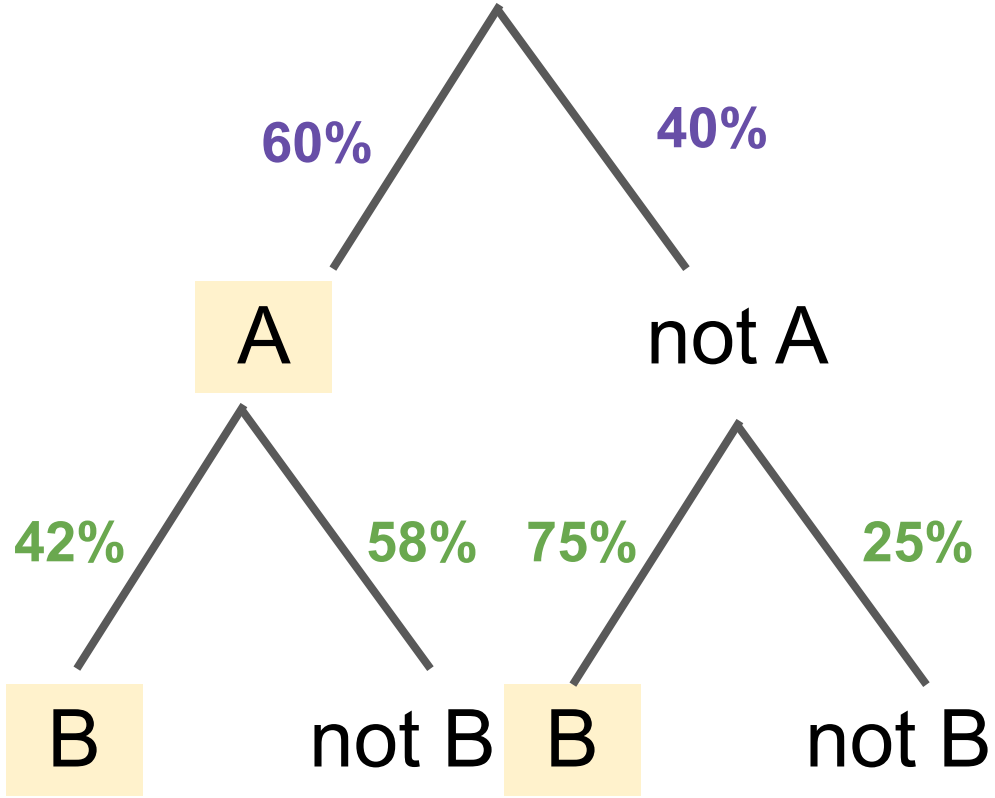
$$P(A|B) = \frac{P(A)P(B|A)}{P(B)}$$



Recap...

$$P(A|B) = \frac{P(A)P(B|A)}{P(B)}$$

$$\frac{0.6 \times 0.42}{0.6 \times 4.2 + 0.4 \times 0.75}$$

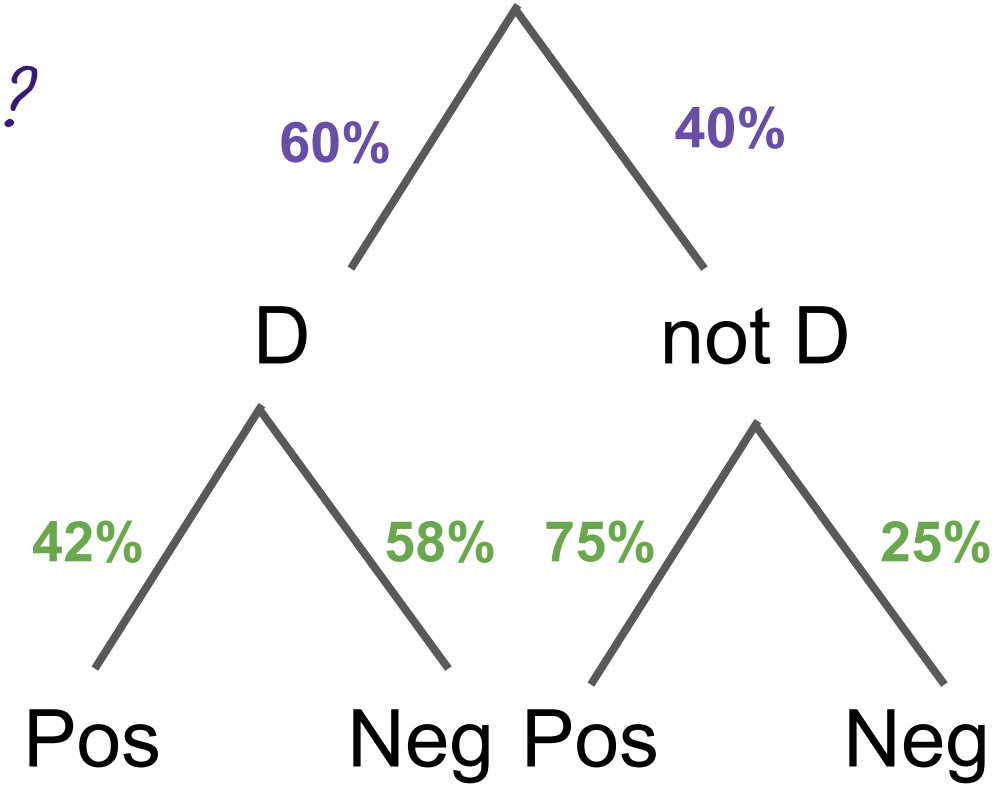


What about false positives?

Test	Positive	Negative
Disease	25 TP	35 FN
No Disease	30 FP	10 TN

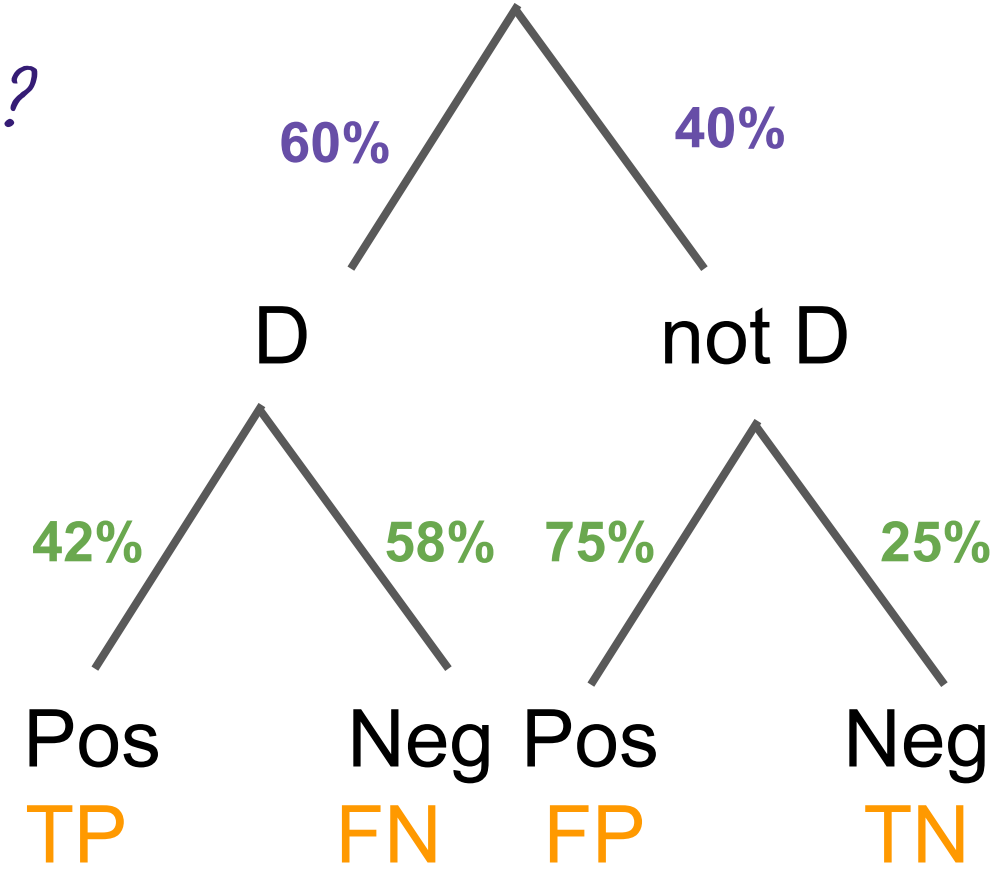
What about false positives?

Test	Positive	Negative
Disease	25 TP	35 FN
No Disease	30 FP	10 TN



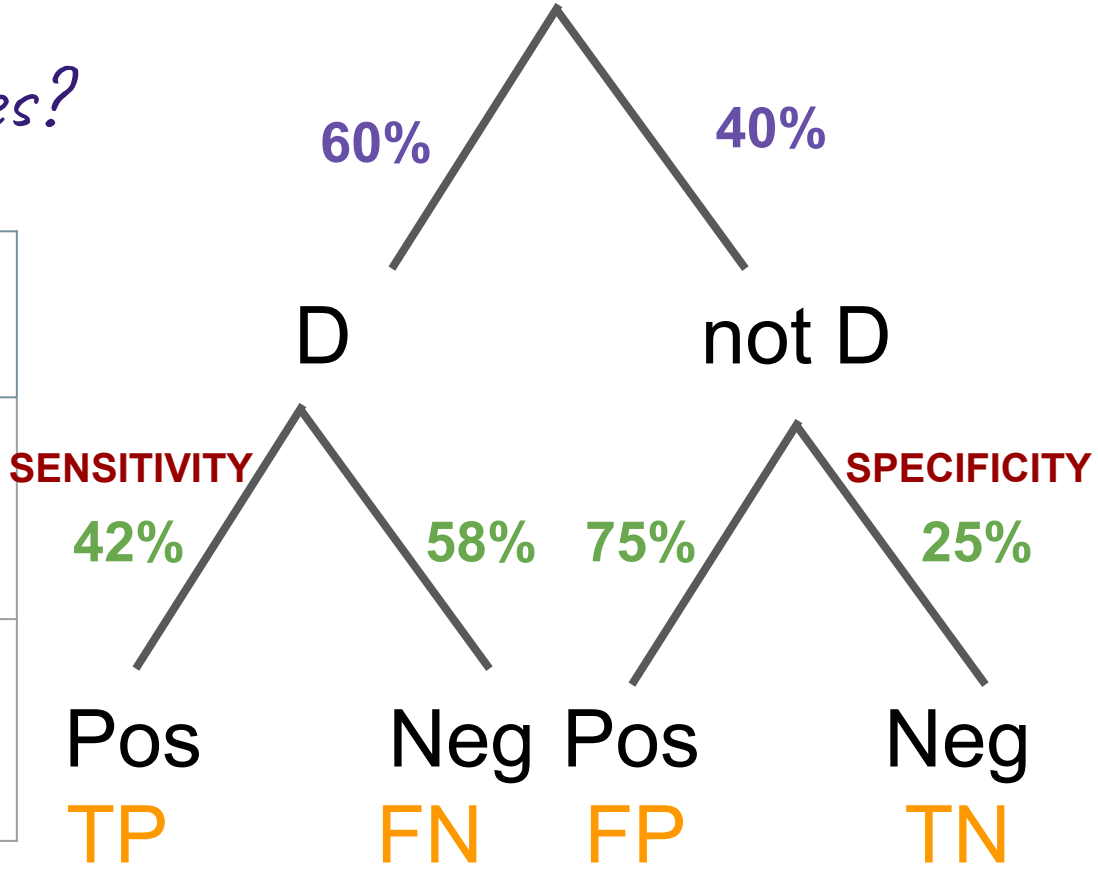
What about false positives?

Test	Positive	Negative
Disease	25 TP	35 FN
No Disease	30 FP	10 TN



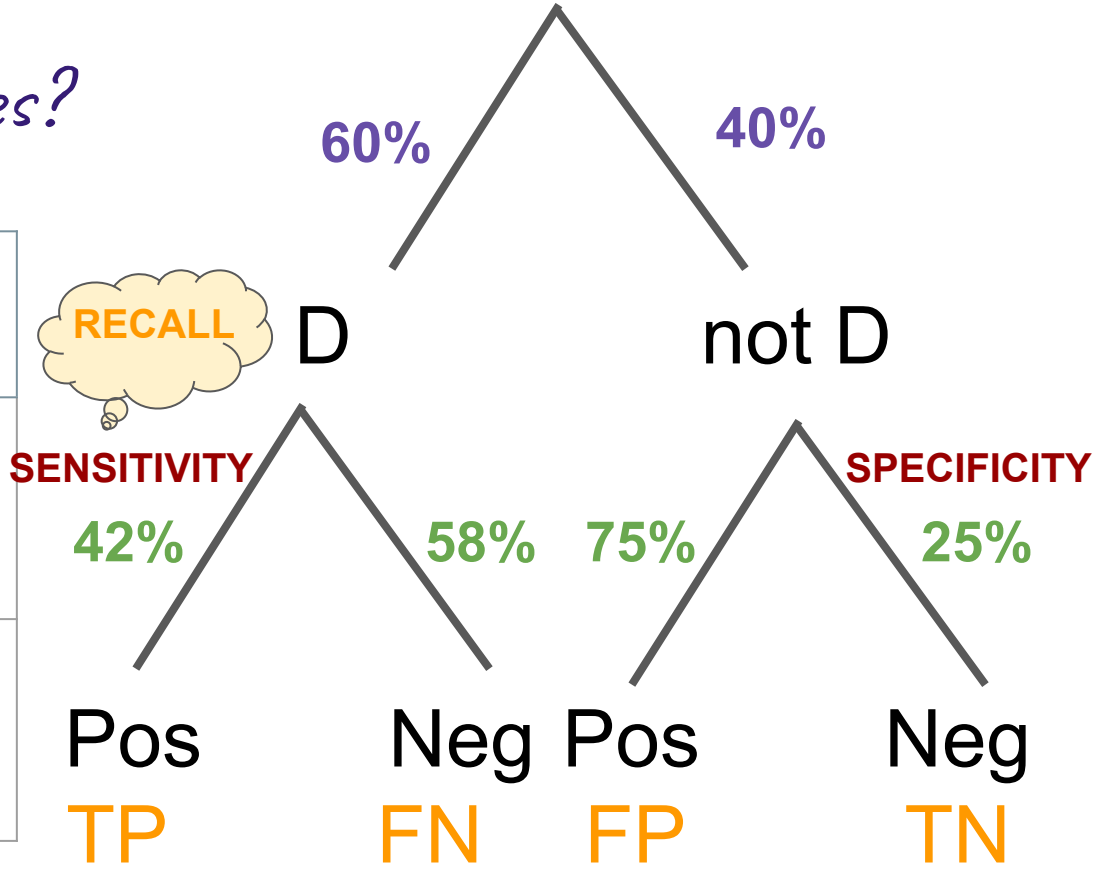
What about false positives?

Test	Positive	Negative
Disease	25 TP	35 FN
No Disease	30 FP	10 TN



What about false positives?

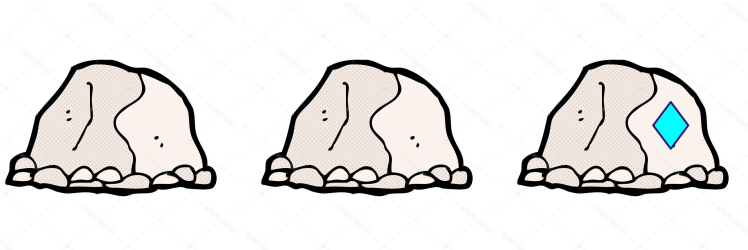
Test	Positive	Negative
Disease	25 TP	35 FN
No Disease	30 FP	10 TN



When does this become paradoxical?

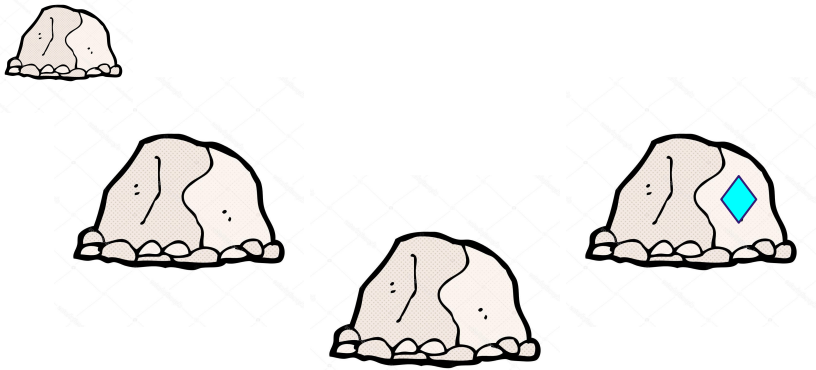
When does this become paradoxical?

Consider **rocks** with or without a rare mineral



When does this become paradoxical?

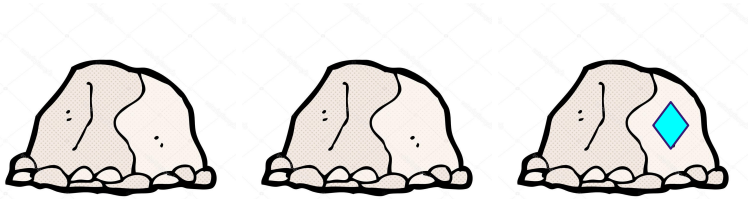
Consider **rocks** with or without a rare mineral



Only **1%** of the rocks have the mineral

When does this become paradoxical?

Consider **rocks** with or without a rare mineral inside



Only **1%** of the rocks have the mineral

Someone builds a mineral **detector**

The **detector**

Has 100% sensitivity:

- **100% of** rocks containing the mineral are **correctly determined** (No false negatives)

The **detector**

Has 100% sensitivity (recall):

- **100% of** rocks containing the mineral are **correctly determined** (No false negatives)

has 90% specificity

- **10%** False positives (Rocks without mineral but labeled by the detector as if they had it)

The **owner** of the detector wants to sell you a rock. He examines the rock in front of you with the detector:

The **owner** of the detector wants to sell you a rock. He examines the rock in front of you with the detector:

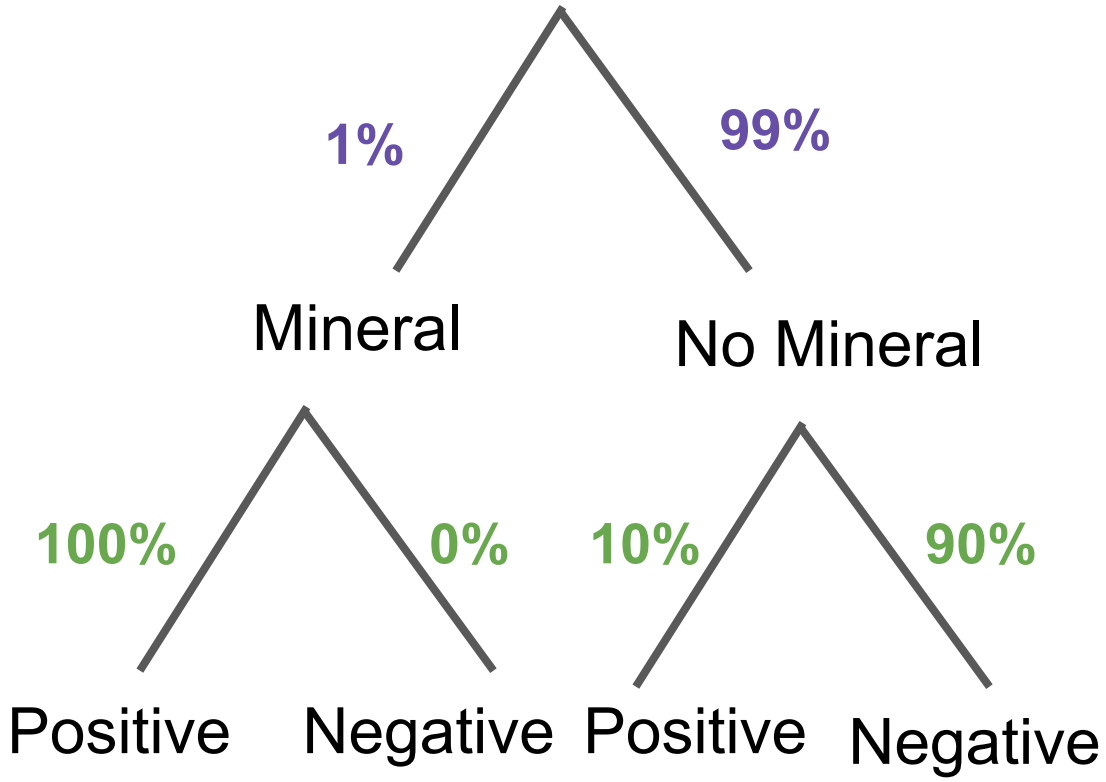
The **owner** of the detector wants to sell you a rock. He examines the rock in front of you with the detector:

Would you buy the rock?

(For a big price, but quite cheaper that the mineral standard price)

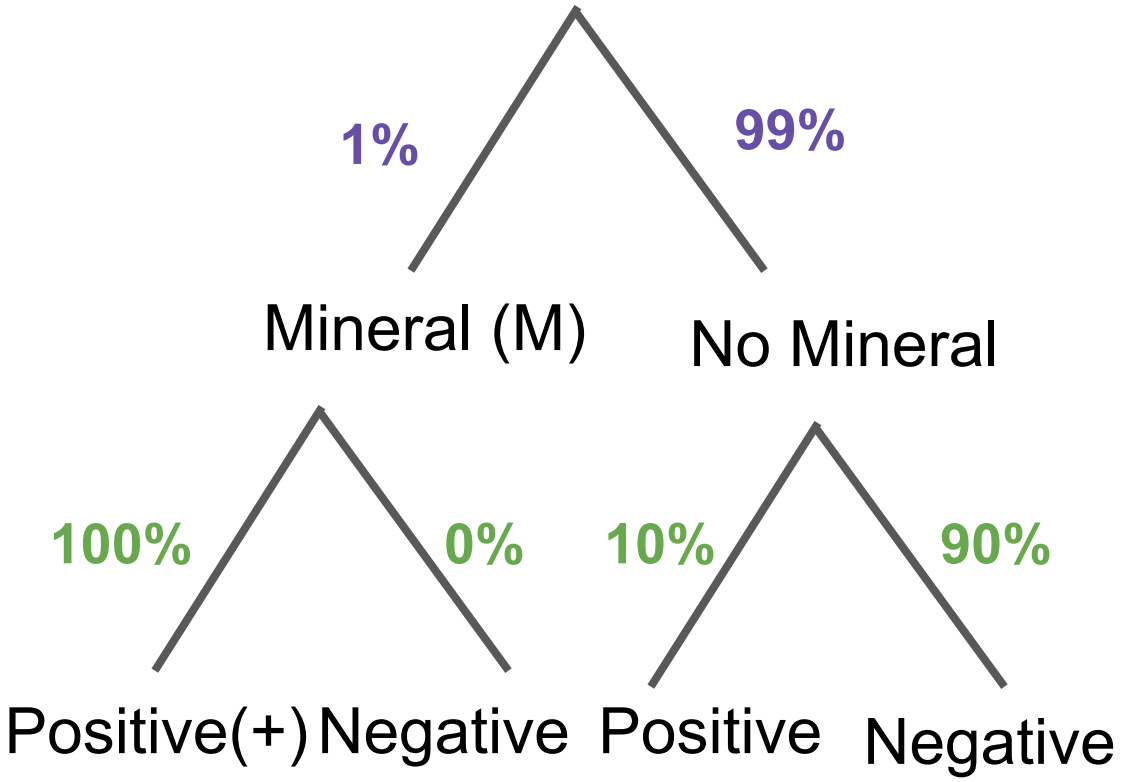
Again the tree.....

Probability tree.....



Probability tree.....

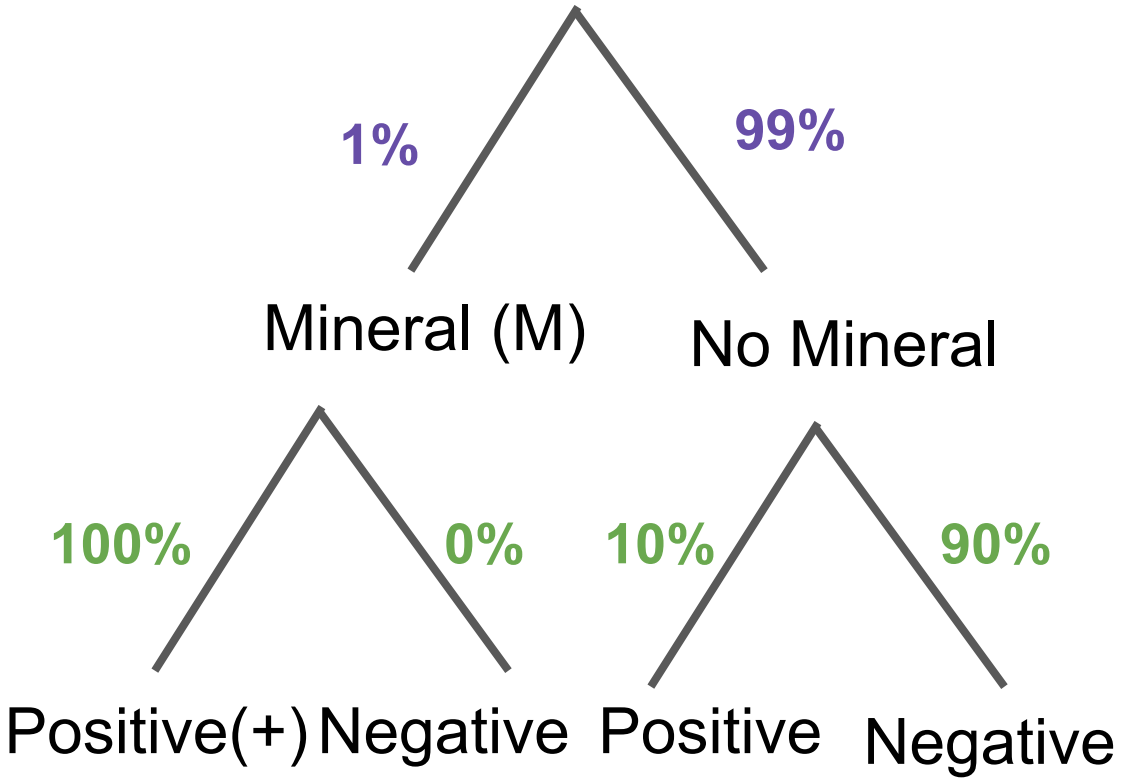
$$P(M|+)= \frac{P(M)P(+|M)}{P(+)}$$



Probability tree.....

$$P(M|+) = \frac{P(M)P(+|M)}{P(+)}$$

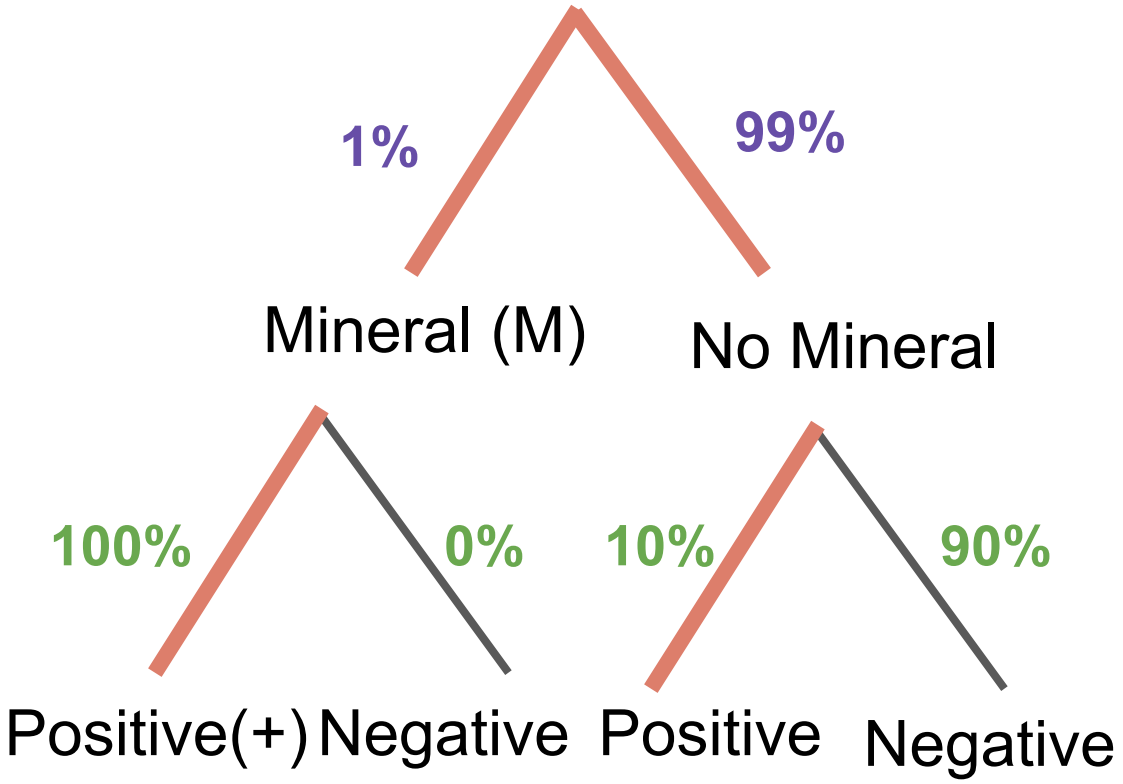
$$= \frac{0.01 \times 1}{P(+)}$$



Probability tree.....

$$P(M|+) = \frac{P(M)P(+|M)}{P(+)}$$

$$= \frac{0.01 \times 1}{P(+)}$$

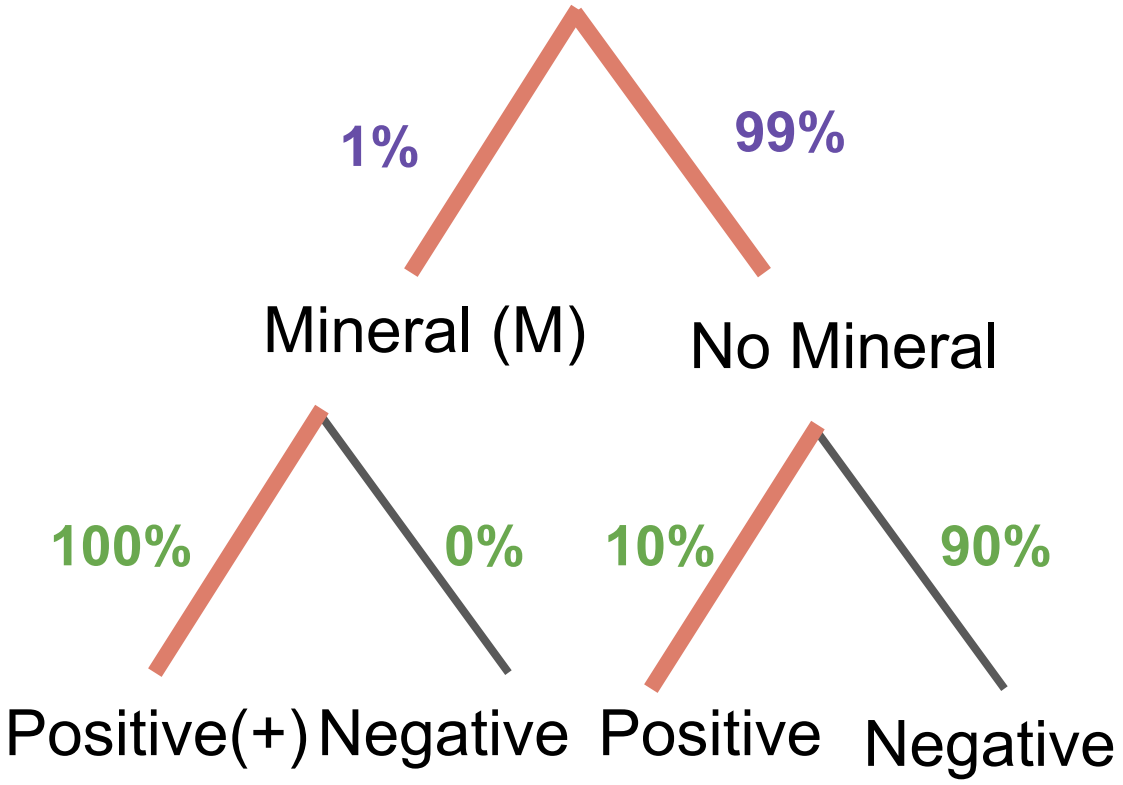


Probability tree.....

$$P(M|+) = \frac{P(M)P(+|M)}{P(+)}$$

$$= \frac{0.01 \times 1}{P(+)}$$

$$= \frac{0.01 \times 1}{0.01x1+0.99x0.1}$$



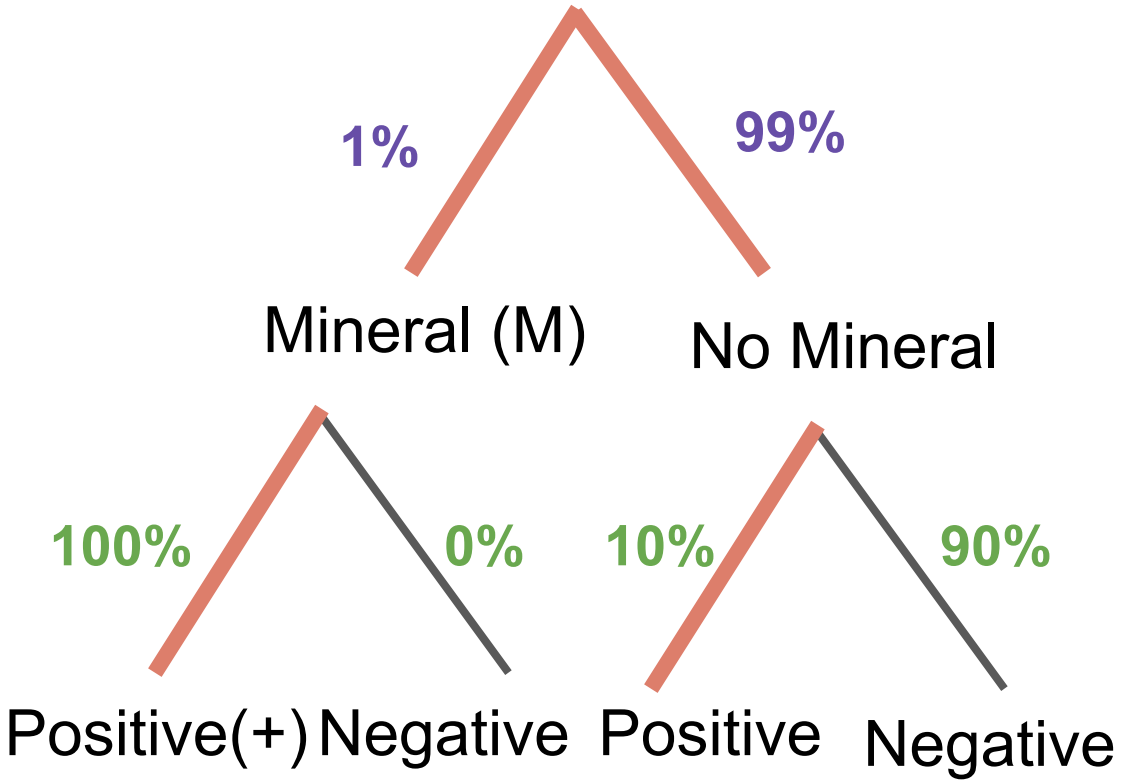
Probability tree.....

$$P(M|+) = \frac{P(M)P(+|M)}{P(+)}$$

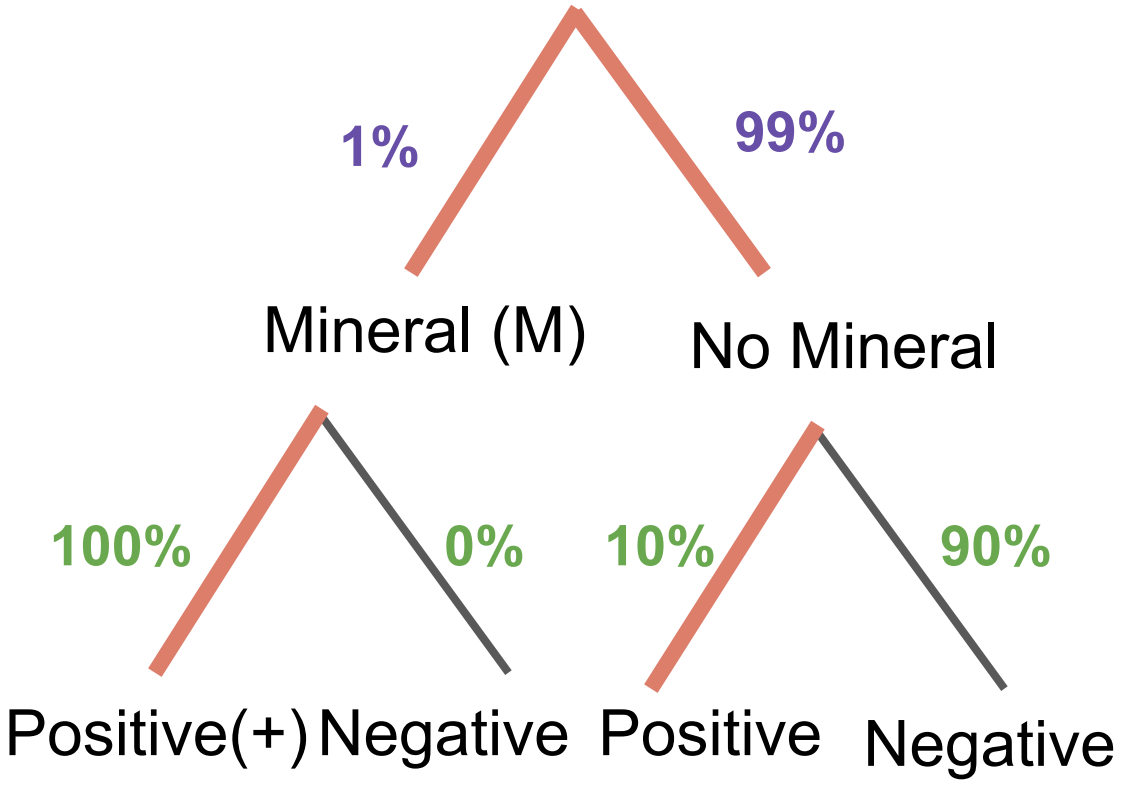
$$= \frac{0.01 \times 1}{P(+)}$$

$$= \frac{0.01 \times 1}{0.01x1+0.99x0.1}$$

$$= 0.092 = 9.2\%$$

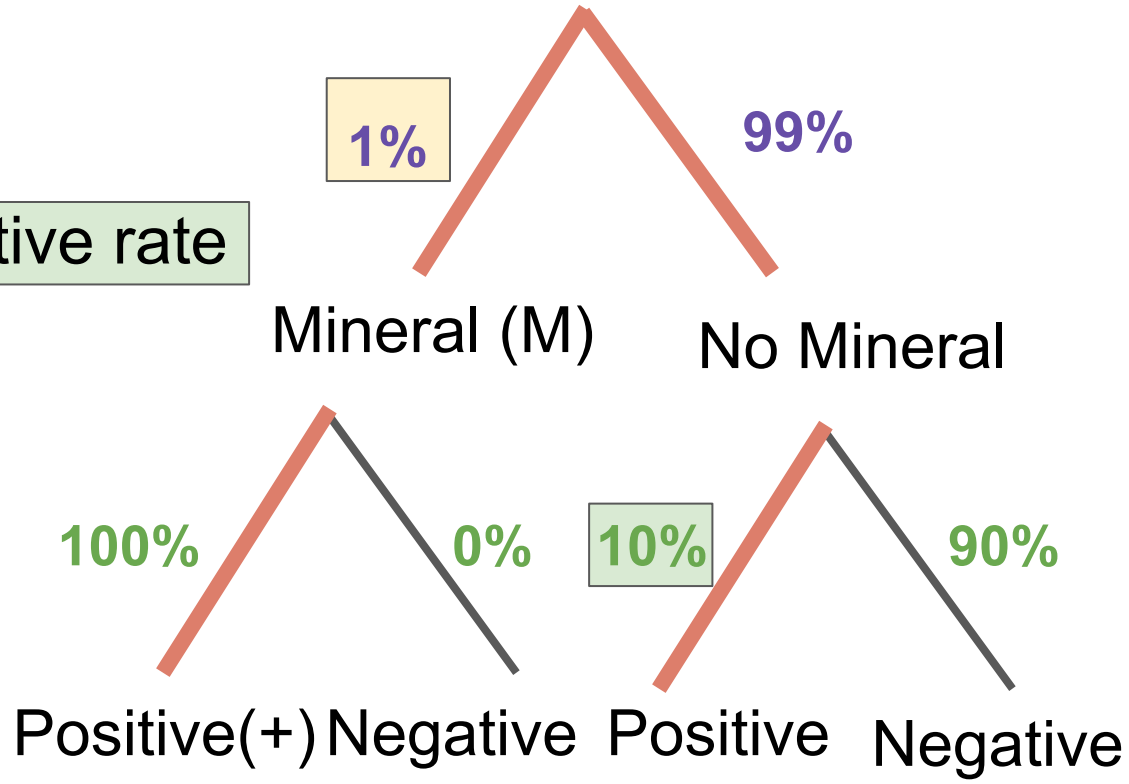


What is happening?



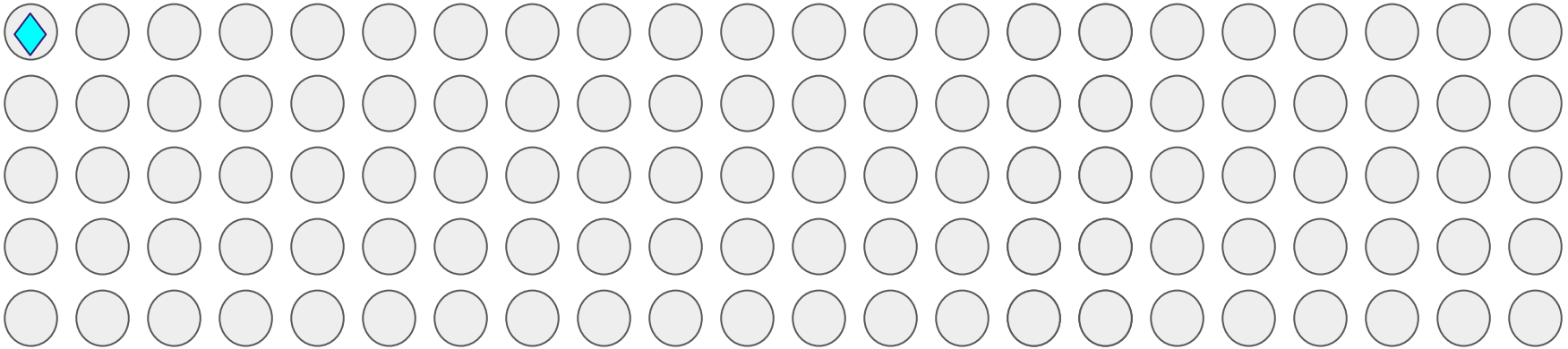
What is happening?

Base rate < False Positive rate



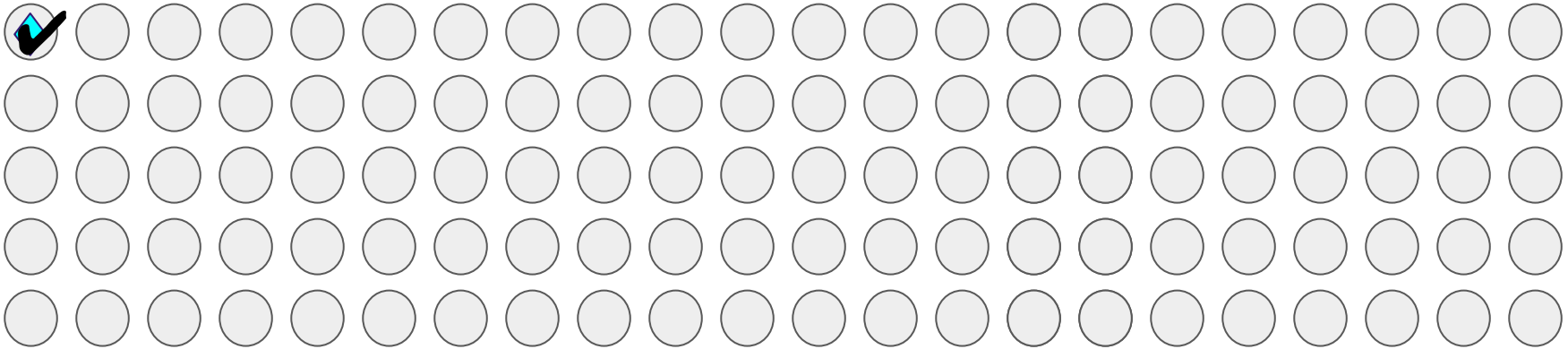
What is happening?

Base rate < False Positive rate



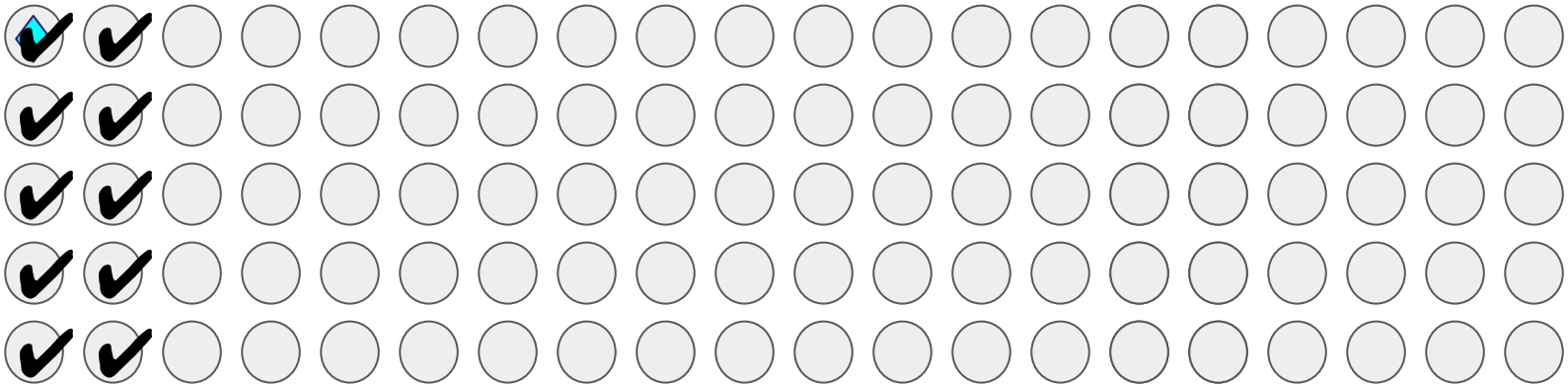
What is happening?

Base rate < False Positive rate



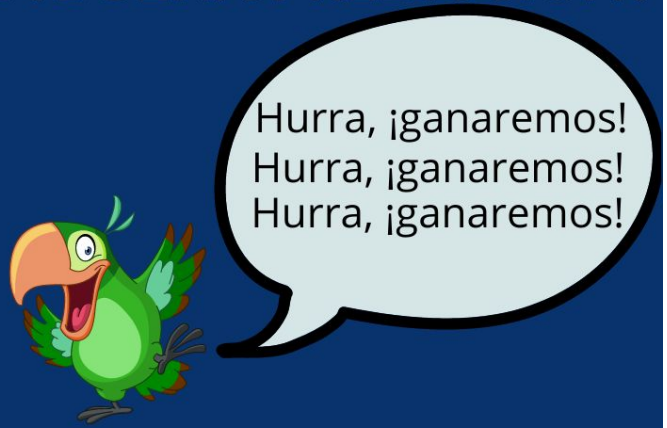
What is happening?

Base rate < False Positive rate



¿TENER ALTA SENSIBILIDAD IMPLICA UNA BUENA PREDICCIÓN?

El loro afirma que ganaremos el partido (siempre repite lo mismo, de hecho...)



$$\frac{\text{Verdaderos positivos}}{\text{Verdaderos positivos + Falsos Negativos}} = 1$$

Falsos Negativos → 0

SENSIBILIDAD = 100%