

This is a synthetic attributes dataset. I have a hidden object in mind. You are allowed to ask me binary questions about the hidden object's attributes, so you c...

Here's the initial belief distribution, with all objects equally likely:

$$P(Object) = \frac{1}{25}$$

For all  $Object \in$

$\{2f, 5c, d1, 1c4, 22b, 25c, 2cb, 2ce, 3c8, 3fa, 3fb, 45e, 46c, 49d, 596, 5b8, 5c5, 5c7, 5e3, 624, 72e, 734, 735, 7c9, 7d1\}$

Let's start with a question: Does the hidden object have attribute 'a'?

Yes.

Okay, the hidden object has attribute 'a' = true.

Here's the updated belief distribution. Objects with 'a': true are now equally likely, and objects with 'a': false have a probability of 0.

Objects remaining:  $\{45e, 46c, 49d, 596, 5b8, 5c5, 5c7, 5e3, 624, 72e, 734, 735, 7c9, 7d1\}$

$$P(Object) = \frac{1}{14}$$

For all  $Object \in \{45e, 46c, 49d, 596, 5b8, 5c5, 5c7, 5e3, 624, 72e, 734, 735, 7c9, 7d1\}$

Let's ask another question: Does the hidden object have attribute 'b'?

Yes.

Okay, the hidden object has attribute 'a' = true and 'b' = true.

Here's the updated belief distribution. Objects with 'a': true AND 'b': true are now equally likely.

Objects remaining:  $\{624, 72e, 734, 735, 7c9, 7d1\}$

$$P(Object) = \frac{1}{6}$$

For all  $Object \in \{624, 72e, 734, 735, 7c9, 7d1\}$

Let's ask another question: Does the hidden object have attribute 'c'?

Yes.

Okay, the hidden object has attributes 'a' = true, 'b' = true, and 'c' = true.

Here's the updated belief distribution. Objects with 'a': true AND 'b': true AND 'c': true are now equally likely.

Objects remaining: {72e, 734, 735, 7c9, 7d1}

$$P(Object) = \frac{1}{5}$$

For all  $Object \in \{72e, 734, 735, 7c9, 7d1\}$

Let's ask another question: Does the hidden object have attribute 'f'?

No.

Okay, the hidden object has attributes 'a' = true, 'b' = true, 'c' = true, and 'f' = false.

Here's the updated belief distribution:

Objects remaining: {7c9, 7d1}

$$P(Object) = \frac{1}{2}$$

For all  $Object \in \{7c9, 7d1\}$

Let's ask another question: Does the hidden object have attribute 'g'?

No.

Okay, the hidden object has attributes 'a' = true, 'b' = true, 'c' = true, 'f' = false, and 'g' = false.

Here's the updated belief distribution:

Objects remaining: {7c9}

$$P(Object) = 1$$

The hidden object is **7c9**.

Since there's only one object left, we've distinguished the hidden object!