

Object Guessing Game



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 can figure out what it is. After receiving an answer, at each step you must print your current belief distribution about the possible hidden object. We can stop when there are no more distinguishing attributes between the remaining options. (You're not allowed to solve this using programming.)

```
"{
  "2f": {
    "a": false,
    "b": false,
    "c": false,
    "d": false,
    "e": false,
    "f": true,
    "g": false,
    "h": true,
    "i": true,
    "j": true,
    "k": true
  },
  "5c": {
    "a": false,
    "b": false,
    "c": false,
    "d": false,
    "e": true,
    "f": false,
    "g": true,
    "h": true,
    "i": true,
    "j": false,
    "k": false
  },
  "d1": {
    "a": false,
    "b": false,
    "c": false,
    "d": true,
    "e": true,
    "f": false,
    "g": true,
    "h": false,
    "i": false,
    "j": false,
```

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"k": true
},
" 1c4": {
"a": false,
"b": false,
"c": true,
"d": true,
"e": true,
"f": false,
"g": false,
"h": false,
"i": true,
"j": false,
"k": false
},
" 22b": {
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"b": true,
"c": false,
"d": false,
"e": false,
"f": true,
"g": false,
"h": true,
"i": false,
"j": true,
"k": true
},
" 25c": {
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"b": true,
"c": false,
"d": false,
"e": true,
"f": false,
"g": true,
"h": true,
"i": true,
"j": false,
"k": false
},
" 2cb": {
"a": false,
"b": true,
"c": false,
"d": true,
"e": true,
"f": false,
"g": false,
"h": true,
"i": false,

```

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    "j": true,
    "k": true
  },
  "2ce": {
    "a": false,
    "b": true,
    "c": false,
    "d": true,
    "e": true,
    "f": false,
    "g": false,
    "h": true,
    "i": true,
    "j": true,
    "k": false
  },
  "3c8": {
    "a": false,
    "b": true,
    "c": true,
    "d": true,
    "e": true,
    "f": false,
    "g": false,
    "h": true,
    "i": false,
    "j": false,
    "k": false
  },
  "3fa": {
    "a": false,
    "b": true,
    "c": true,
    "d": true,
    "e": true,
    "f": true,
    "g": true,
    "h": true,
    "i": false,
    "j": true,
    "k": false
  },
  "3fb": {
    "a": false,
    "b": true,
    "c": true,
    "d": true,
    "e": true,
    "f": true,
    "g": true,
    "h": true,

```

```

    "i": false,
    "j": true,
    "k": true
  },
  "45e": {
    "a": true,
    "b": false,
    "c": false,
    "d": false,
    "e": true,
    "f": false,
    "g": true,
    "h": true,
    "i": true,
    "j": true,
    "k": false
  },
  "46c": {
    "a": true,
    "b": false,
    "c": false,
    "d": false,
    "e": true,
    "f": true,
    "g": false,
    "h": true,
    "i": true,
    "j": false,
    "k": false
  },
  "49d": {
    "a": true,
    "b": false,
    "c": false,
    "d": true,
    "e": false,
    "f": false,
    "g": true,
    "h": true,
    "i": true,
    "j": false,
    "k": true
  },
  "596": {
    "a": true,
    "b": false,
    "c": true,
    "d": true,
    "e": false,
    "f": false,
    "g": true,

```

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"h": false,
"i": true,
"j": true,
"k": false
},
" 5b8": {
"a": true,
"b": false,
"c": true,
"d": true,
"e": false,
"f": true,
"g": true,
"h": true,
"i": false,
"j": false,
"k": false
},
" 5c5": {
"a": true,
"b": false,
"c": true,
"d": true,
"e": true,
"f": false,
"g": false,
"h": false,
"i": true,
"j": false,
"k": true
},
" 5c7": {
"a": true,
"b": false,
"c": true,
"d": true,
"e": true,
"f": false,
"g": false,
"h": false,
"i": true,
"j": true,
"k": true
},
" 5e3": {
"a": true,
"b": false,
"c": true,
"d": true,
"e": true,
"f": true,

```

```

"g": false,
"h": false,
"i": false,
"j": true,
"k": true
},
" 624": {
"a": true,
"b": true,
"c": false,
"d": false,
"e": false,
"f": true,
"g": false,
"h": false,
"i": true,
"j": false,
"k": false
},
" 72e": {
"a": true,
"b": true,
"c": true,
"d": false,
"e": false,
"f": true,
"g": false,
"h": true,
"i": true,
"j": true,
"k": false
},
" 734": {
"a": true,
"b": true,
"c": true,
"d": false,
"e": false,
"f": true,
"g": true,
"h": false,
"i": true,
"j": false,
"k": false
},
" 735": {
"a": true,
"b": true,
"c": true,
"d": false,
"e": false,

```

```
"f": true,
"g": true,
"h": false,
"i": true,
"j": false,
"k": true
},
"7c9": {
"a": true,
"b": true,
"c": true,
"d": true,
"e": true,
"f": false,
"g": false,
"h": true,
"i": false,
"j": false,
"k": true
},
"7d1": {
"a": true,
"b": true,
"c": true,
"d": true,
"e": true,
"f": false,
"g": true,
"h": false,
"i": false,
"j": false,
"k": true
}
}"
```

Great! I have the dataset and I'm ready to start narrowing down the hidden object.

There are 25 possible objects, each with 11 binary attributes (`a` through `k`).

Initial Belief Distribution:

At this point, all 25 objects are equally likely. That means each object has a probability of:

- $1 / 25 = 0.04$ (or 4%)

Now, I'll ask the first binary question.

Question 1:

Is attribute `a` true for the hidden object?



Yes.

Thanks!

Updating Belief:

You answered **Yes** to "Is attribute ``a`` true?"

Let's filter the dataset to only include objects where ``a` = true`.

Here are the objects that match:

- ``45e``
- ``46c``
- ``49d``
- ``596``
- ``5b8``
- ``5c5``
- ``5c7``
- ``5e3``
- ``624``
- ``72e``
- ``734``
- ``735``
- ``7c9``
- ``7d1``

That's 14 objects remaining.

Updated Belief Distribution:

Each of these 14 objects is now equally likely, with probability:

- $1 / 14 \approx 0.0714$ (or 7.14%)

Question 2:

Is attribute ``g`` true for the hidden object?



No.

Thanks!

Updating Belief:

You answered **No** to "Is attribute ``g`` true?"

We now filter the current list of 14 objects (where ``a` = true``) to only those where ``g` = false``.

Here are the matching objects:

- ``46c``
- ``5c5``
- ``5c7``
- ``5e3``
- ``624``
- ``72e``

That's 6 objects remaining.

Updated Belief Distribution:

Each of these 6 objects now has a probability of:

- $1 / 6 \approx 0.1667$ (or 16.67%)

Question 3:

Is attribute ``h`` true for the hidden object?



Yes.

Great!

Updating Belief:

You answered **Yes** to "Is attribute ``h`` true?"

From our list of 6 candidates (``a` = true``, ``g` = false``), we now filter for ``h` = true``.

Matching objects:

- ``46c``
- ``72e``

Only 2 objects remain.

Updated Belief Distribution:

- ``46c``: 0.5 (50%)
- ``72e``: 0.5 (50%)

Question 4:

Is attribute ``j`` true for the hidden object?



No.

Thanks!

Updating Belief:

You answered **No** to "Is attribute ``j`` true?"

From the two remaining candidates:

- ``46c``: ``j`` = `false``
- ``72e``: ``j`` = `true``

Only ``46c`` matches all the given conditions.

Final Belief Distribution:

- ``46c``: **100%** (This is the hidden object)

✅ **Conclusion: The hidden object is ``46c``.**



You forgot some objects like `7c9``.

You're right — let's go back and carefully recheck that step. Specifically, the step where I filtered the 14 objects with ``a`` = `true`` for ``g`` = `false``.

Let's walk through it again.

Step 1: Objects with ``a`` = `true`` (you answered Yes to ``a``)

These are:

- ``45e``
- ``46c``
- ``49d``
- ``596``

- `5b8`
- `5c5`
- `5c7`
- `5e3`
- `624`
- `72e`
- `734`
- `735`
- `7c9`
- `7d1`

(14 objects — same as before)

Step 2: Filter for `g = false` (you answered No to `g`)

Now check which of these have `g = false`:

- `46c`: `g = false`
- `5c5`: `g = false`
- `5c7`: `g = false`
- `5e3`: `g = false`
- `624`: `g = false`
- `72e`: `g = false`
- `7c9`: `g = false`

So **7 objects**, not 6. I incorrectly left out `7c9` earlier. Thank you for catching that.

Step 3: Filter for `h = true` (you answered Yes to `h`)

Now from these 7:

- `46c`: `h = true`
- `5c5`: `h = false`
- `5c7`: `h = false`
- `5e3`: `h = false`
- `624`: `h = false`
- `72e`: `h = true`
- `7c9`: `h = true`




Matching objects with `h = true`:

✓ `46c`, `72e`, `7c9`

So we actually had **3** remaining candidates at this point, not 2.

Step 4: Filter for `j = false` (you answered No to `j`)

Check `j` values for the 3 remaining:

- `46c`: `j = false` 
- `72e`: `j = true` 
- `7c9`: `j = false` 

So final candidates should have been:

- `46c`
 - `7c9`
-

Final Belief Distribution (Corrected):

- `46c`: 50%
- `7c9`: 50%

I mistakenly excluded `7c9` earlier — thanks for catching that.

Next Question:

To break the tie:

Is attribute `k` true for the hidden object?





Yes.

Thanks!

Updating Belief:

You answered **Yes** to “Is attribute `k` true?”

From the two final candidates:

- `46c`: `k = false` 
- `7c9`: `k = true` 

So only `7c9` remains.

Final Belief Distribution:

- `7c9`: 100%

✓ **Conclusion (Corrected):** The hidden object is ``7c9``.