Unit 4: Databases

Dave Abel

February 26th, 2016

Table Format

Product ID	Company	Prime	Price	# Ratings	Avg. Rating
4615253	Winsome Wood	TRUE	26.97	1,279	4
3249814	Crown Mark	TRUE	37.41	1,675	4
1235561	Lifetime	TRUE	51.88	931	4.5
4224	Lifetime	TRUE	31.58	1,003	5

Table: Primary Key

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Database Queries: *SQL*

- Examples:

```
SELECT company FROM alabamazon;
```

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Database Queries: *SQL*

- Examples:

```
SELECT company FROM alabamazon;
```

Company
Winsome Wood
Crown Mark
Lifetime
Lifetime

Database Queries: *SQL*

- Examples:

```
SELECT company FROM alabamazon where rating=“4”;
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Database Queries: *SQL*

- Examples:

```
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Database Queries: *SQL*

- Examples:

```
SELECT company FROM alabamazon;
```

Company
Winsome Wood
Crown Mark

Database Queries: *SQL*

- Examples: *aggregating functions*

```
SELECT count(*) FROM alabamazon where rating > 4;
```

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Database Queries: *SQL*

- Examples: *aggregating functions*

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SELECT count(*) FROM alabamazon where rating > 4;
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Reports: 2

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Replicated Database

- Idea: store the database more than once in other secure locations!

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Replicated Database

- One Idea: only change both.

Add: “82374, Dave’s Chairs, FALSE, 450, 1, 5”

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In Providence, RI

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In Portland, OR

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In Portland, OR

Two Way Database

- Databases can often carry *redundant* information.
- A Two Way database is a way to consolidate.

Two Way Database

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129384	Dave’s Chairs	FALSE	450	1	5	FALSE
33332341	Dave’s Chairs	FALSE	27	948	5	FALSE
9723	Dave’s Chairs	FALSE	12	44	5	FALSE
761	Dave’s Chairs	FALSE	900	2	5	FALSE

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Same info, less storage!

Clicker Question!

Episode #	Year	Host	Category	Answer
1	1984	Alex Trebek	CEREAL	Frosted Flakes
1	1984	Alex Trebek	PINK STARFISH	Patrick
1	1984	Alex Trebek	CEREAL	Raisin Brain
2	2005	Petunia Dursley	KINDS OF WOOD	Oak
2	2005	Petunia Dursley	KINDS OF WOOD	Birch
2	2005	Petunia Dursley	PLACES IN RHODE ISLAND	Providence
2	2005	Petunia Dursley	PLACES IN RHODE ISLAND	Pawtucket
3	2016	Dave Abel	DAVE'S OFFICE NUMBER	321

Q: The above table has 40 cells. How many cells *combined* would our smallest two way table have?

Clicker Question!

5 columns

8 rows

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Hint: which column(s) are redundant?

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[A] 21

[B] 22

[C] 26

[D] 32

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Hint: which column(s) are redundant?

Clicker Answer!

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[A] 21

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[C] 26

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Dictionaries

Word	Definition
Cottage	A small house, especially in a countryside
Hummus	A delicious sauce made from Garbanzo Beans
Brackish	(of water) A mixture of river water and sea water

Dictionaries

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Definition: a *dictionary* is a database with one primary key, and only one other column.

Dictionaries

Word	Definition
Cottage	A small house, especially in a countryside
Hummus	A delicious sauce made from Garbanzo Beans
Brackish	(of water) A mixture of river water and sea water

Useful any time we want to associate one piece of information with one other piece of information

Dictionaries

KEY (sound)	***VALUE***
“Siri, what is the weather like?”	<Query the weather>
“Siri, what is the date?”	<Query the date>
“Siri, what is your name?”	<Query response about my name>

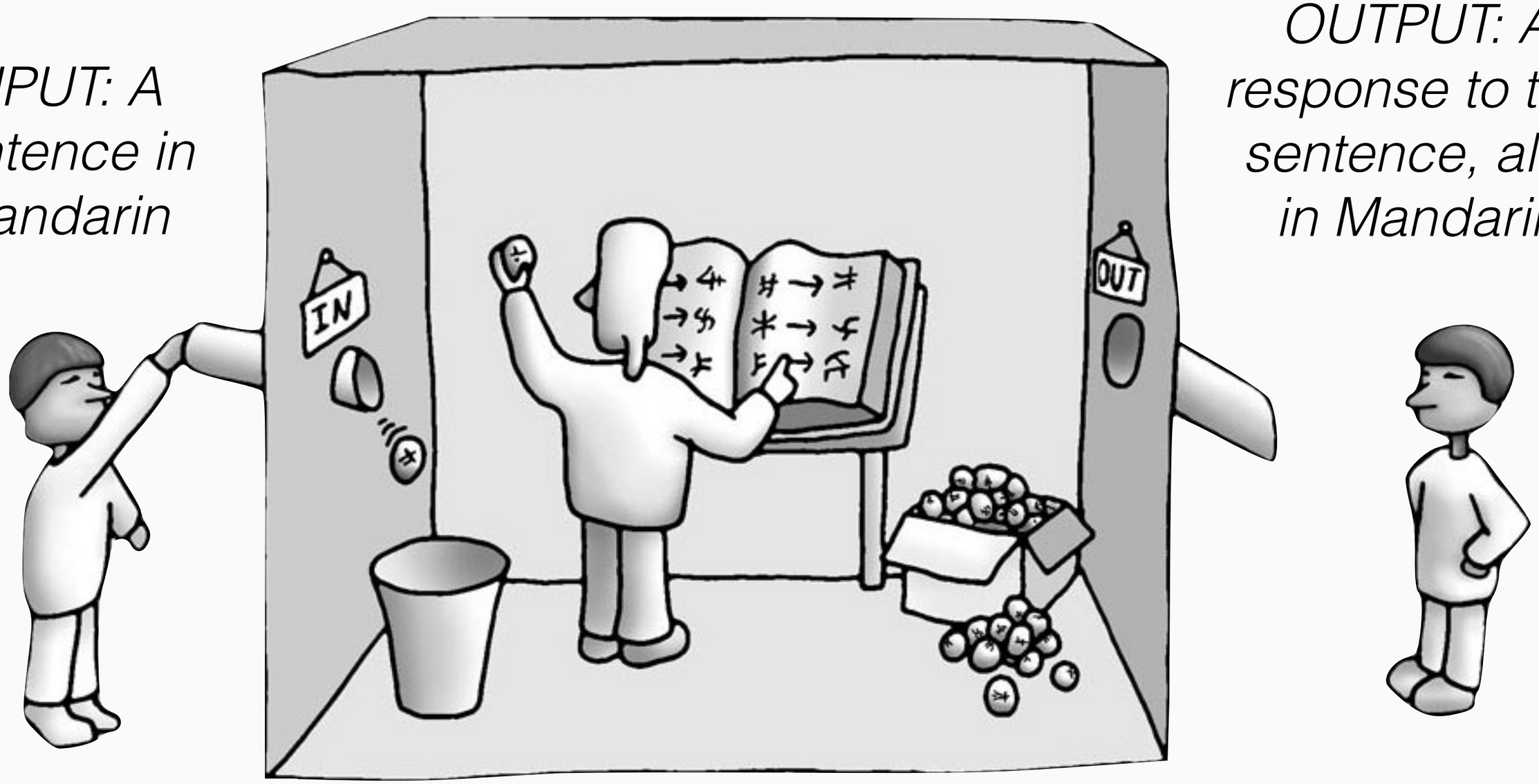
With a big enough table…

We can basically do this for any data type, as we saw in unit 1!

So we can get a “dictionary” where any data type is the key!

The Chinese Room

INPUT: A sentence in Mandarin



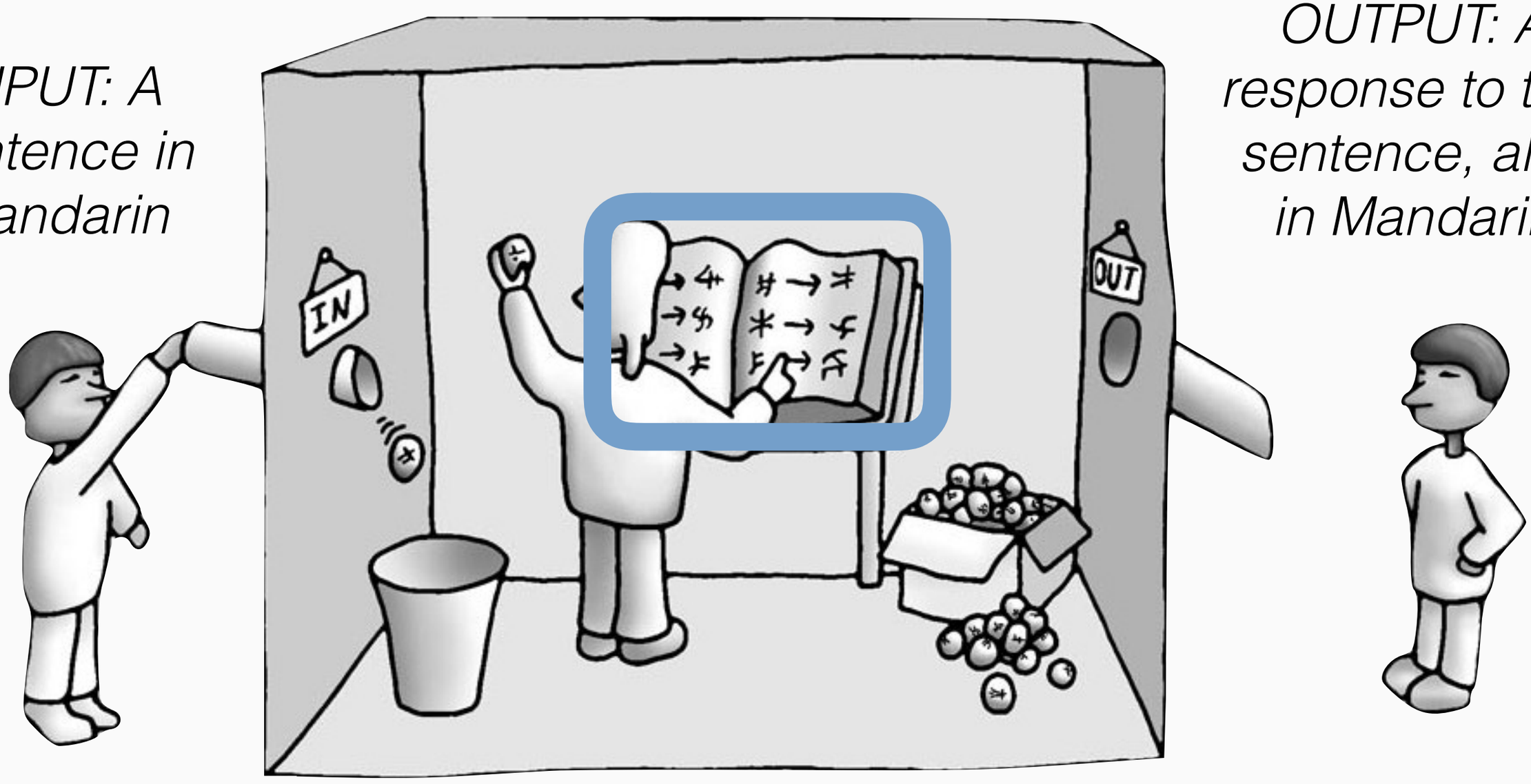
OUTPUT: A response to that sentence, also in Mandarin

http://america.pink/images/9/6/3/2/5/4/en/2-chinese-room.jpg

[Searle 1980]

The Chinese Room

INPUT: A sentence in Mandarin



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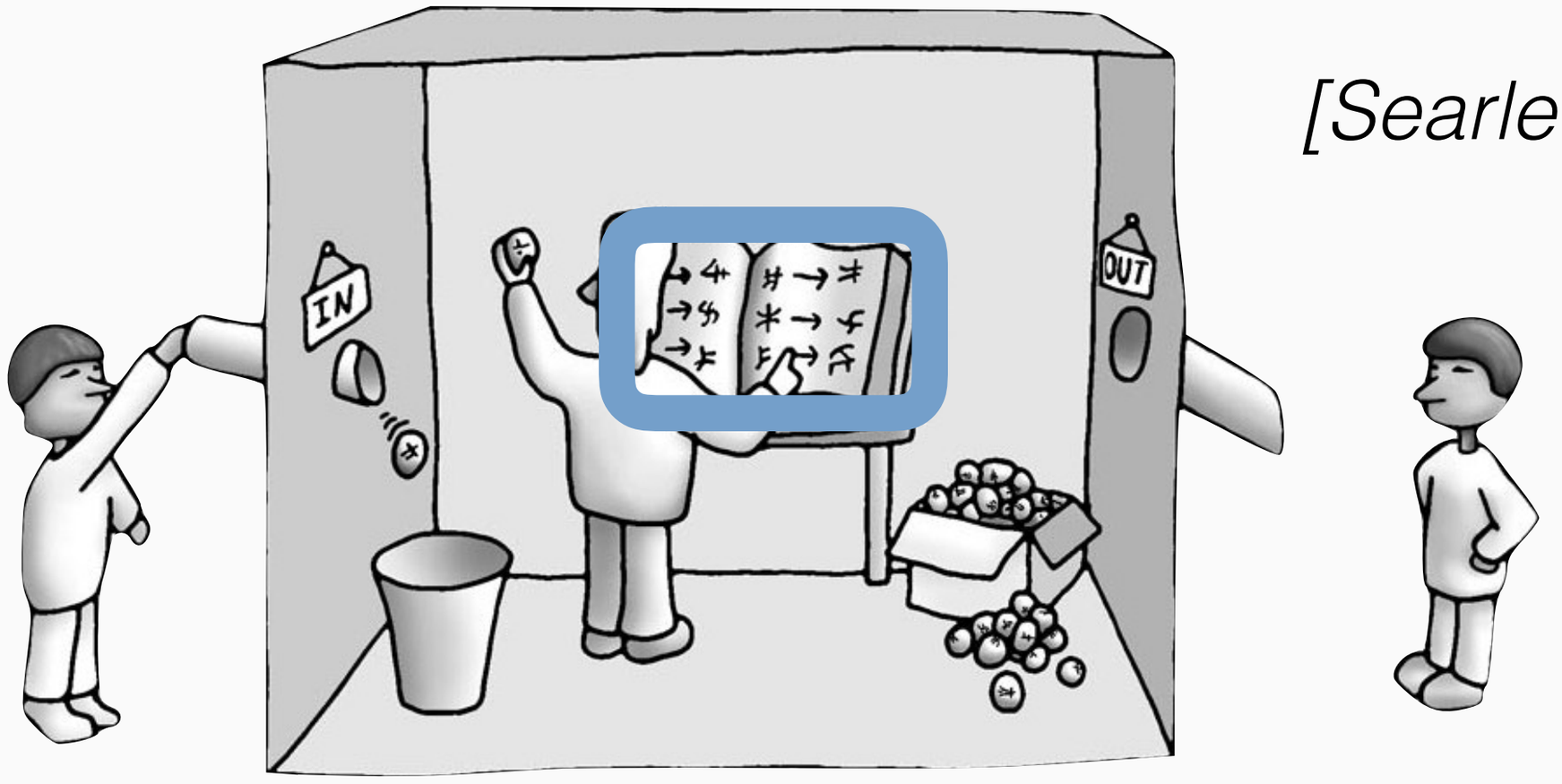
[Searle 1980]

The Chinese Room

[Searle 1980]

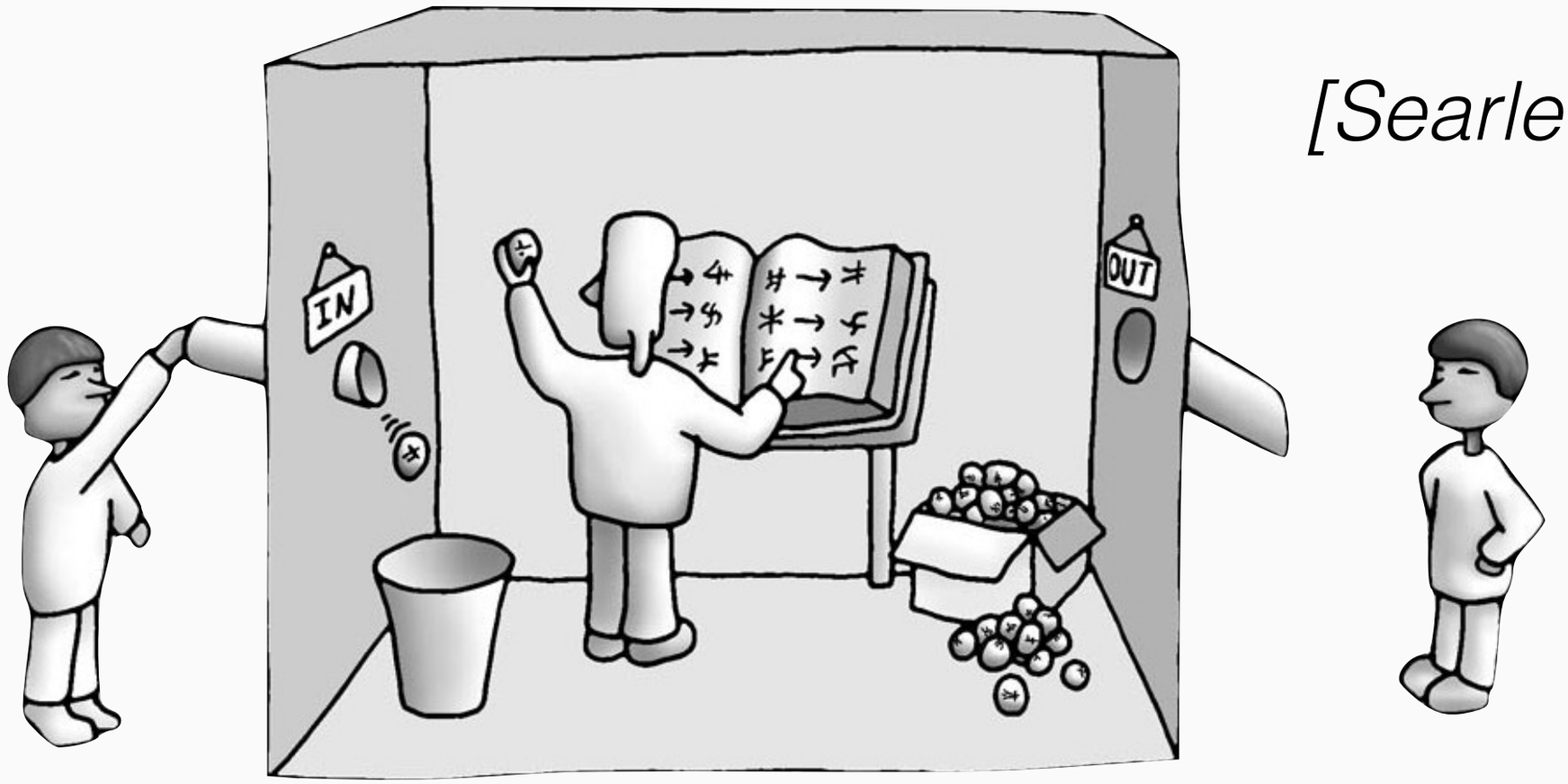


http://america.pink/images/9/6/3/2/5/4/en/2-chinese-room.jpg

Argument: Computers can never “understand” language?

Clicker Question!

[Searle 1980]



http://america.pink/images/9/6/3/2/5/4/en/2-chinese-room.jpg

[A] Computers will be able to understand language

[B] Computers will NOT be able to understand language

Dictionaries: Scratch!

Let's take a look!

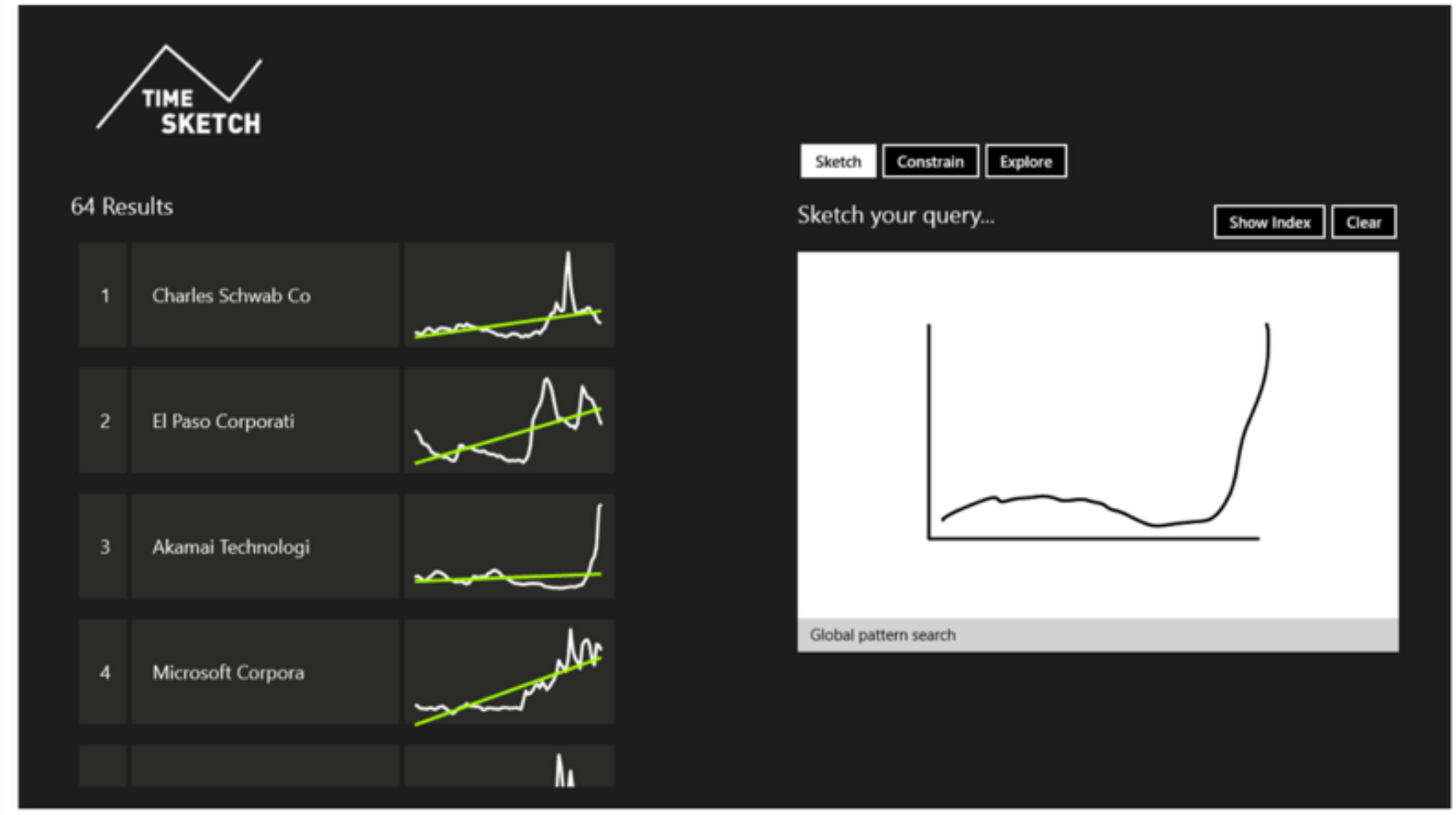
Reflection

- Databases are basically tables!
- Tables have *primary keys*
- Transactions must be used carefully..
- SQL
- Replicated Databases
- Two Way Database
- Dictionary

Visualizations!

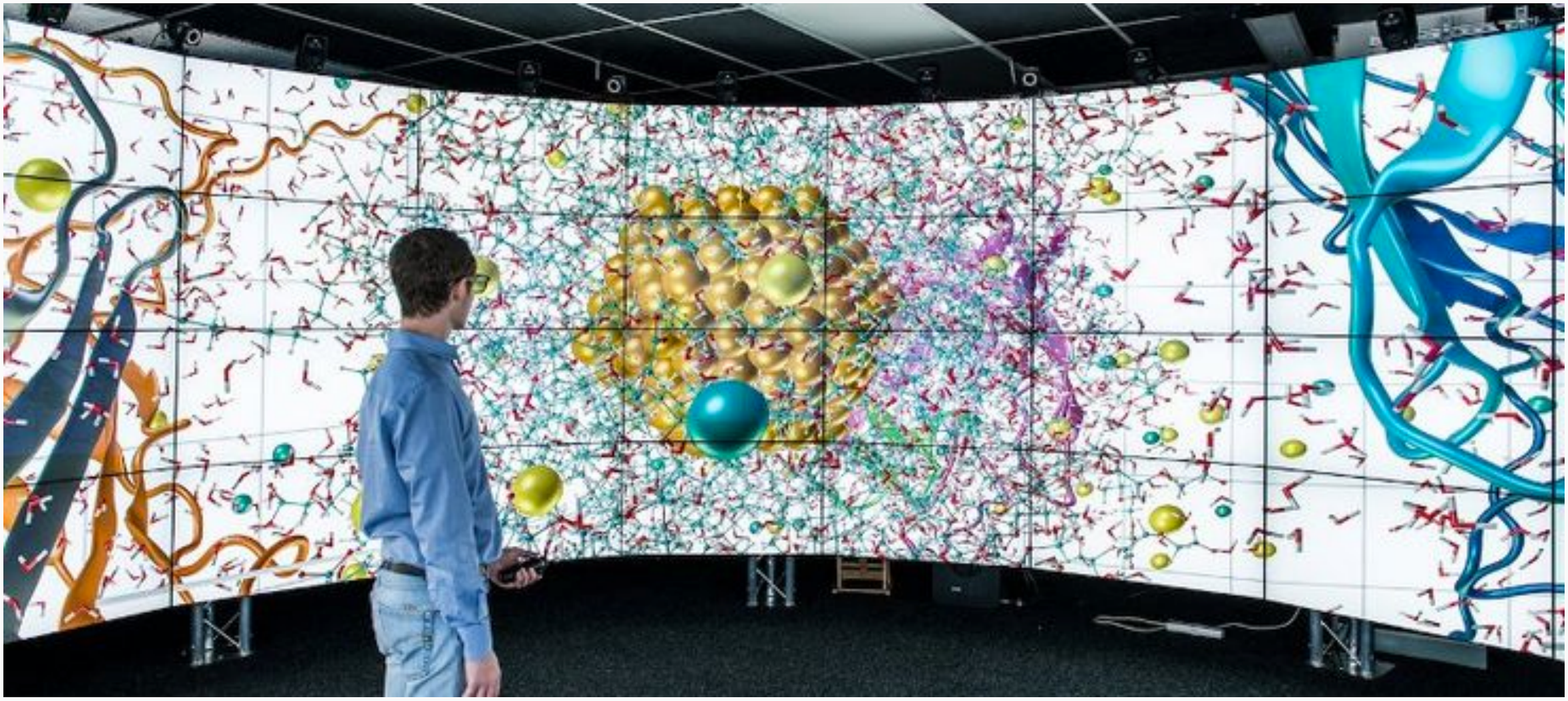
- Computers can read these big tables effectively…
- Not as easy for humans.
- Solution: Data Visualization!

Interact Visually!



[Eichmann '15]

Visualizing Data: Virtual Reality



Visualizing Data

- Current wind on Earth
- NYC Sunsets
- Biological Neural Network
- NBA shot chart visualizer
- NBA shot charts, Python
- Fashion Week

Datasets for Research!

- In Artificial Intelligence, datasets have led to *massive* advancements, especially in Computer Vision and Natural Language Processing.

- WordNet, BabelNet
- ImageNet, SUN, MSCOCO
- Average Images

Crowdsourcing

Crowdsourcing

Flower!

Plant!

Garden!

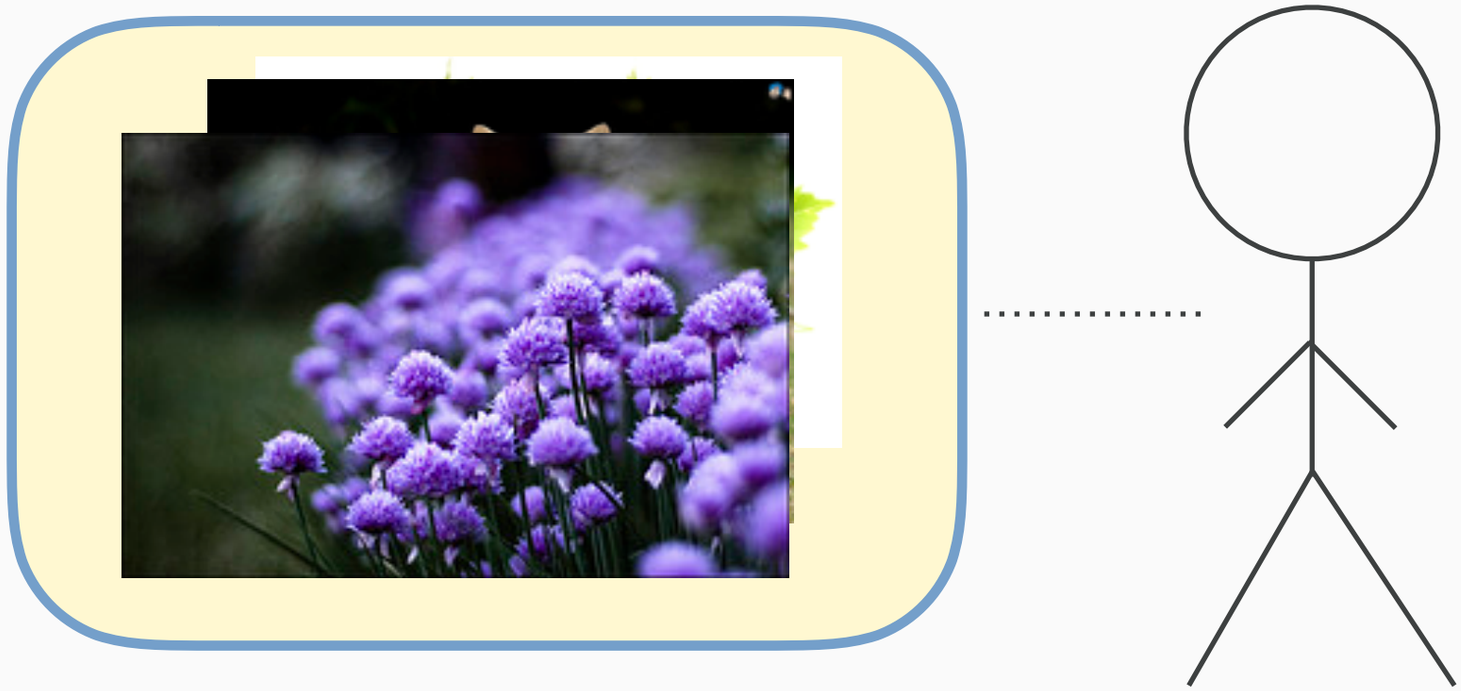
Crowdsourcing

Flower!

Plant!

Garden!

Crowdsourcing



Crowdsourcing

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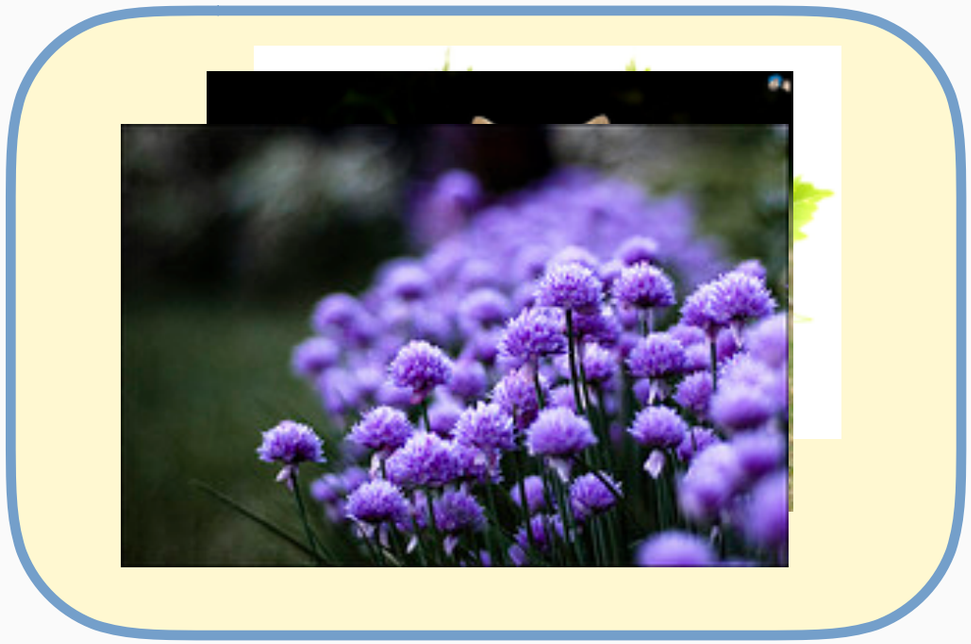

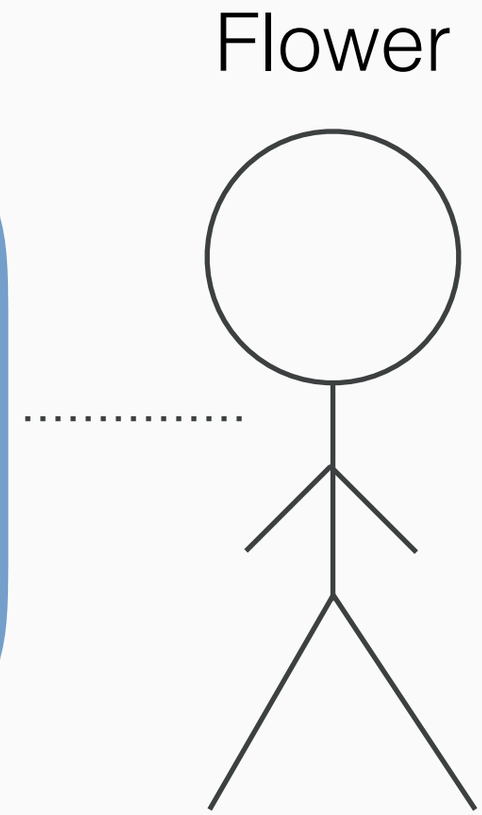

Crowdsourcing

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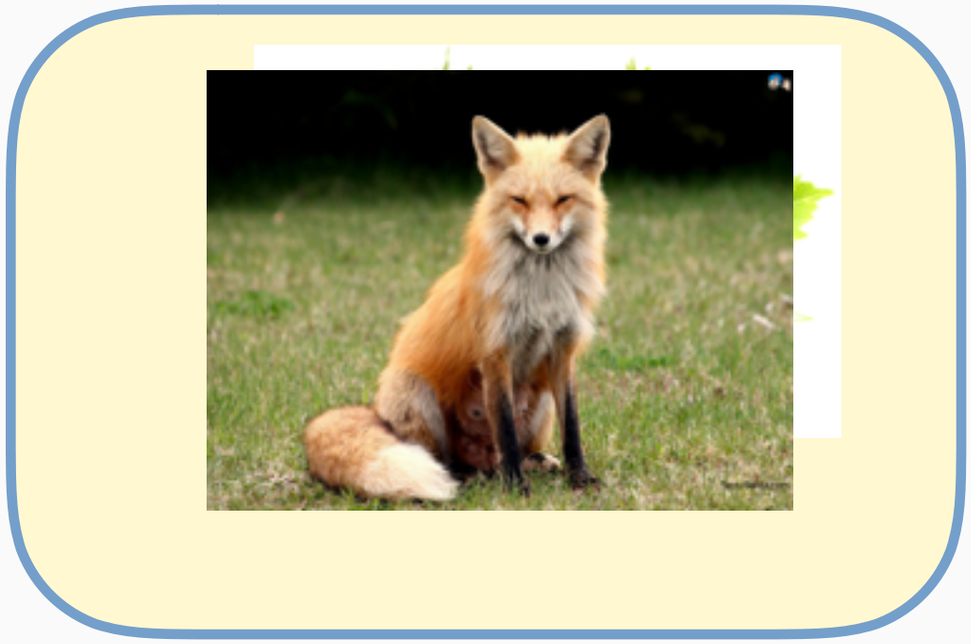
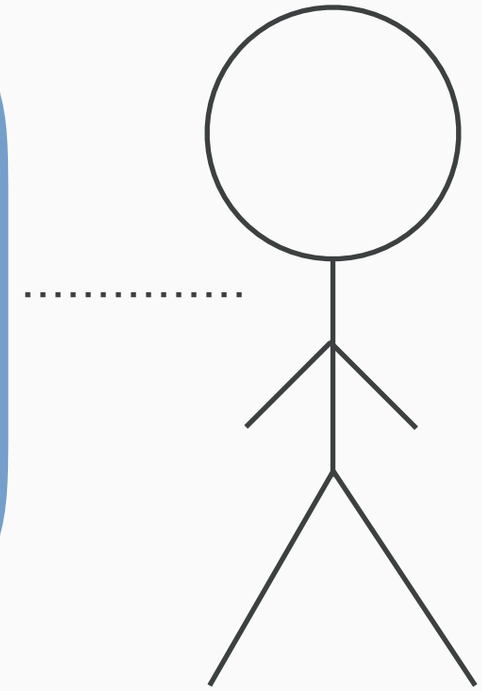
	Flower





Crowdsourcing

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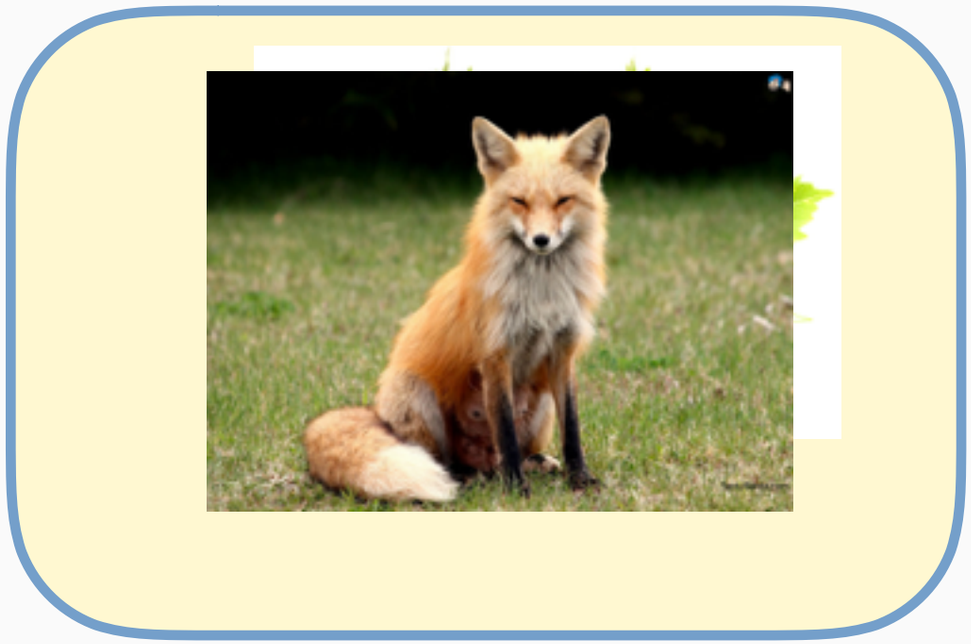
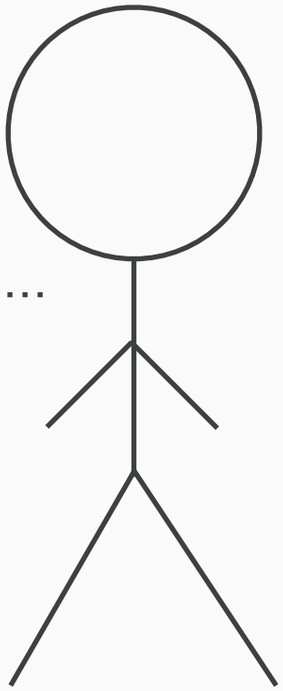
	Flower



Fox



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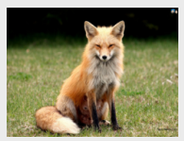
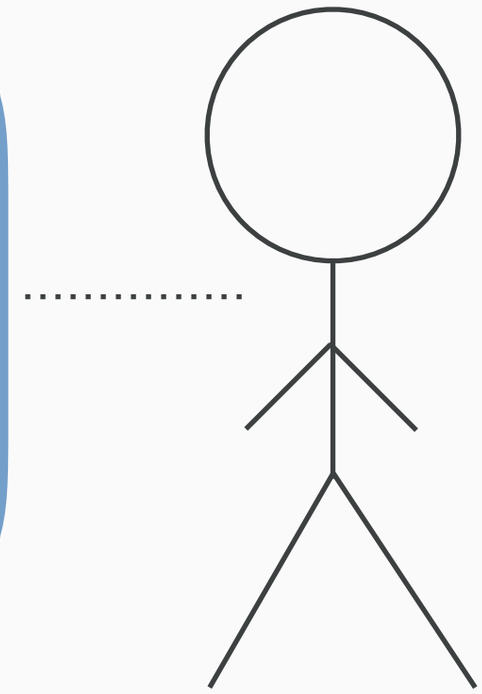
	Fox



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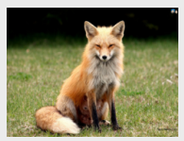
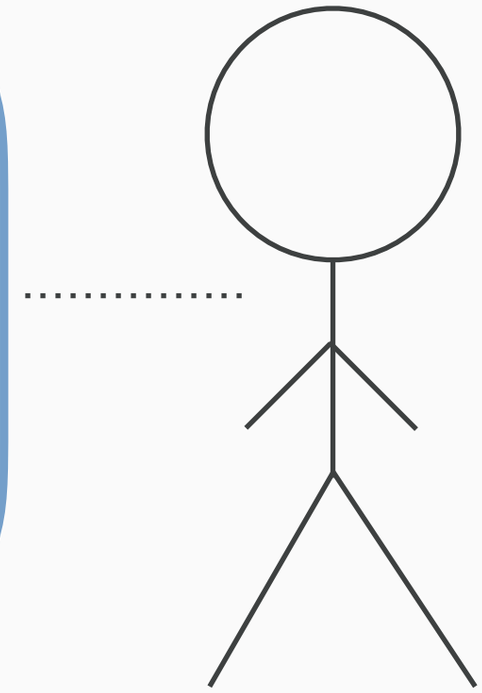
	Fox

Grapes



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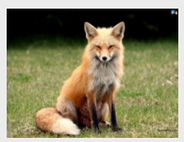	Fox
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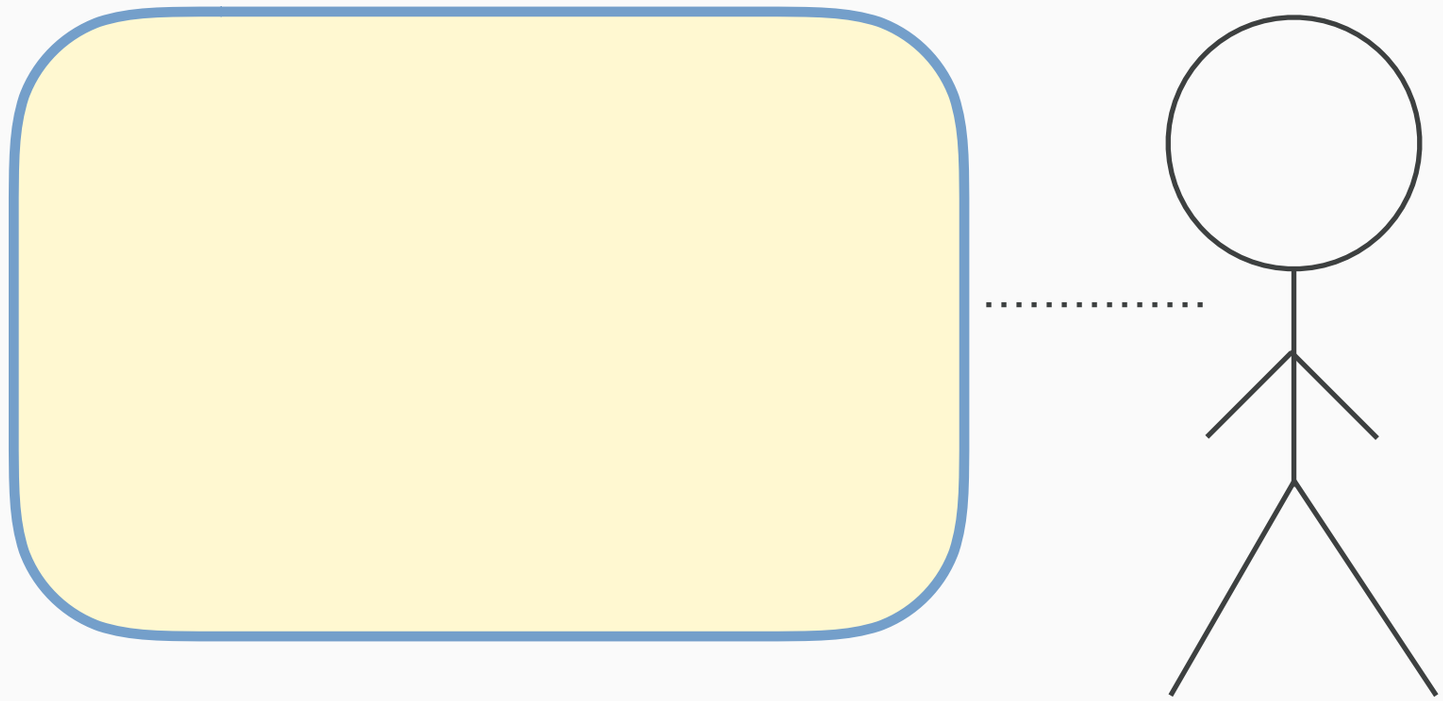

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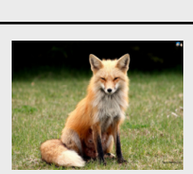	Fox
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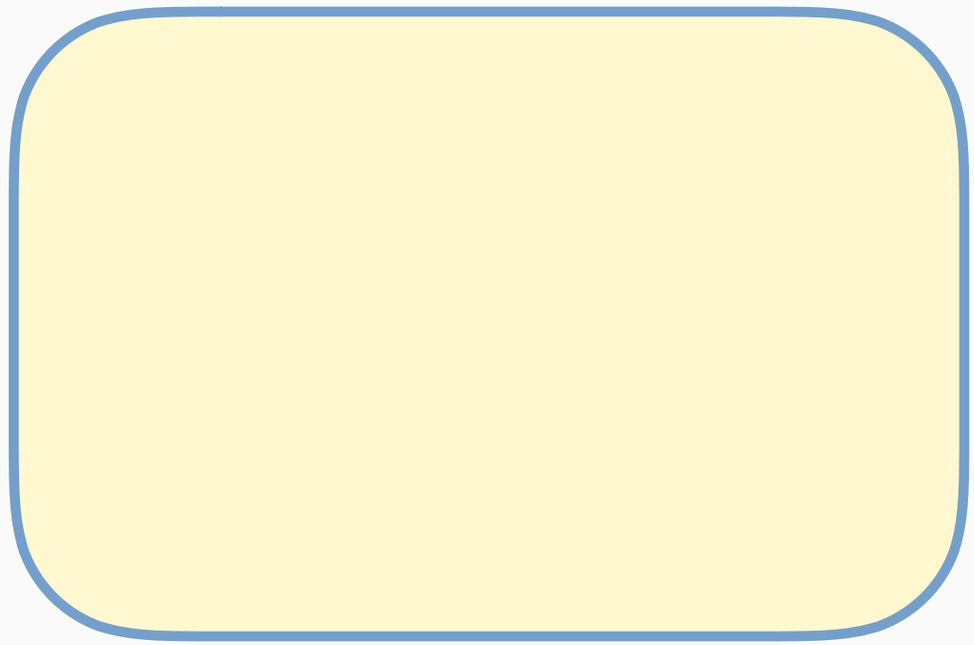

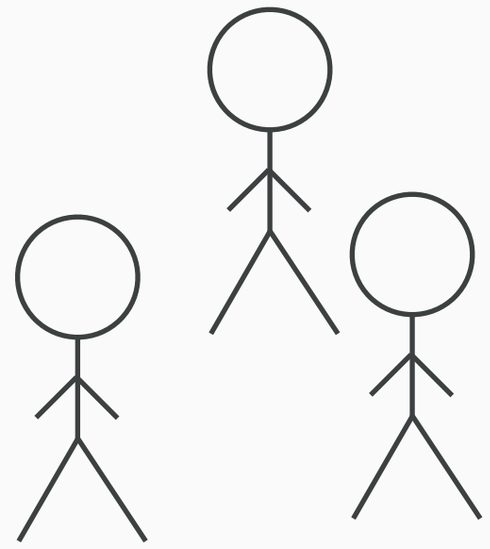

Crowdsourcing

Image	Label
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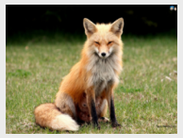	Fox
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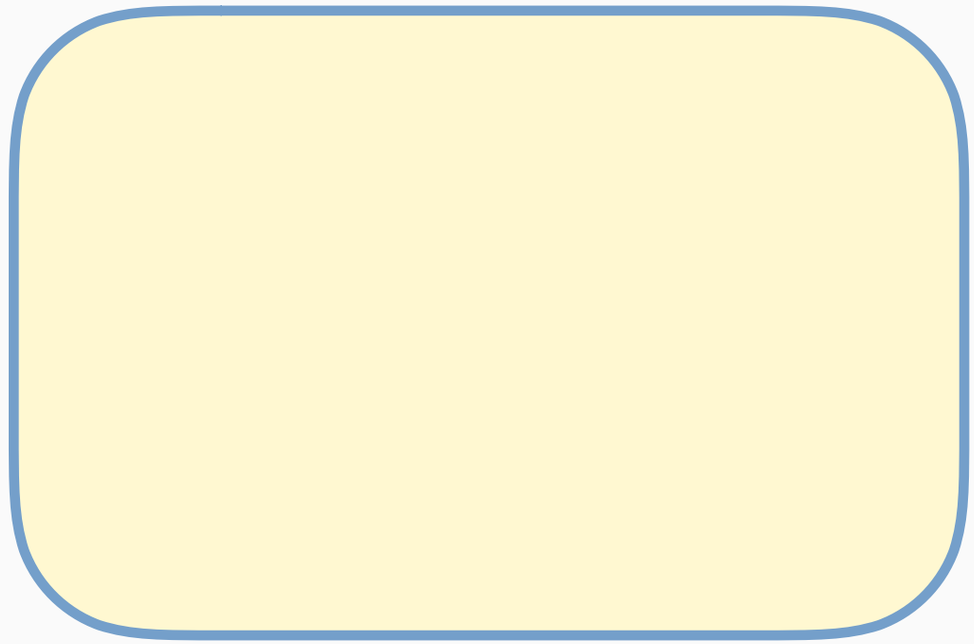

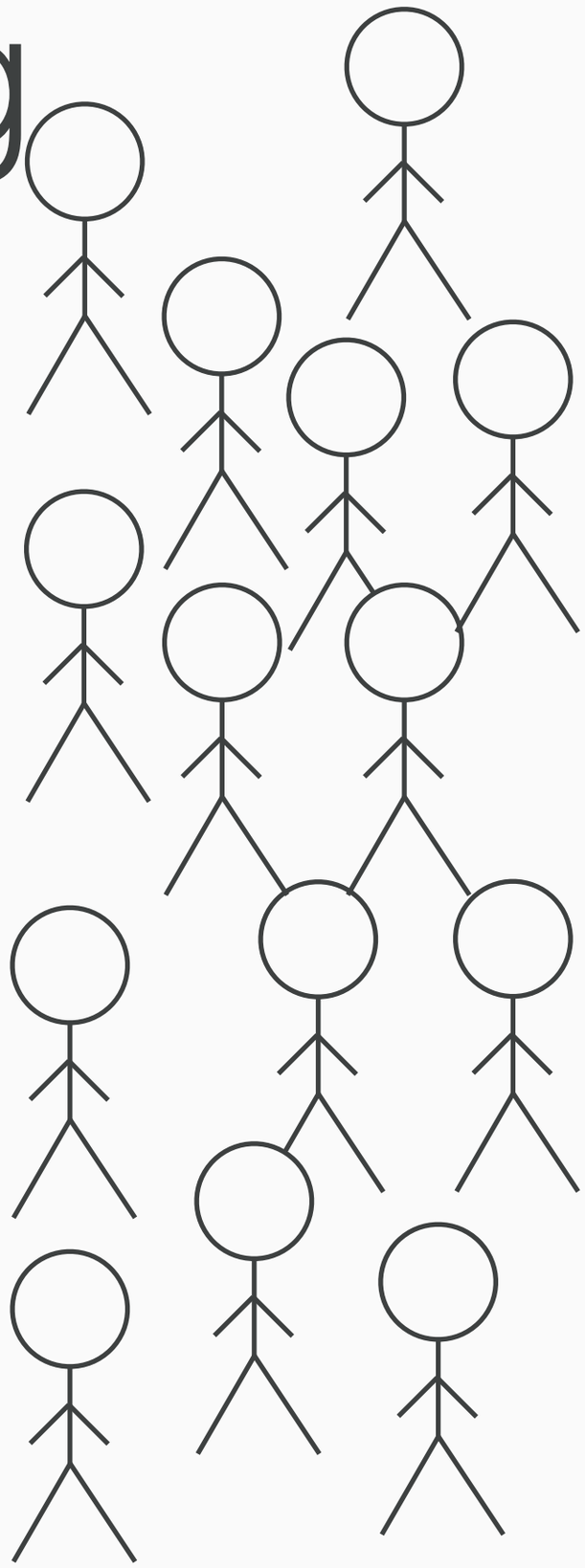

Crowdsourcing

Amazon Mechanical Turk

Crowdsourcing

Amazon Mechanical Turk

Foldit