CC7220-1
La Web de Datos
Primavera 2022

Lecture 1: Introduction

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The Web

The Web is now 3 decades old

The future of the Web?

What will the Web be like in 3 decades time?

The Semantic Web?

Semantic Web?

Semantic Web?

"The Semantic Web will bring structure to the meaningful content of Web pages, creating an environment where software agents roaming from page to page can readily carry out sophisticated tasks for users."

– *Berners-Lee et al. (2001) "The S[illegible]"*
Sci. American, 2[illegible]3.

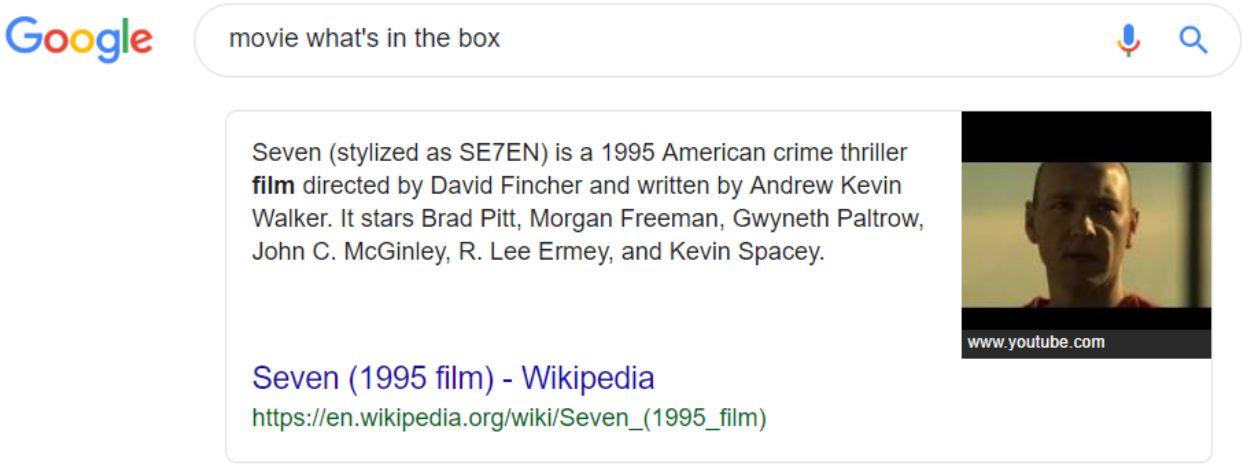
Consider answering: "What is the Web?"

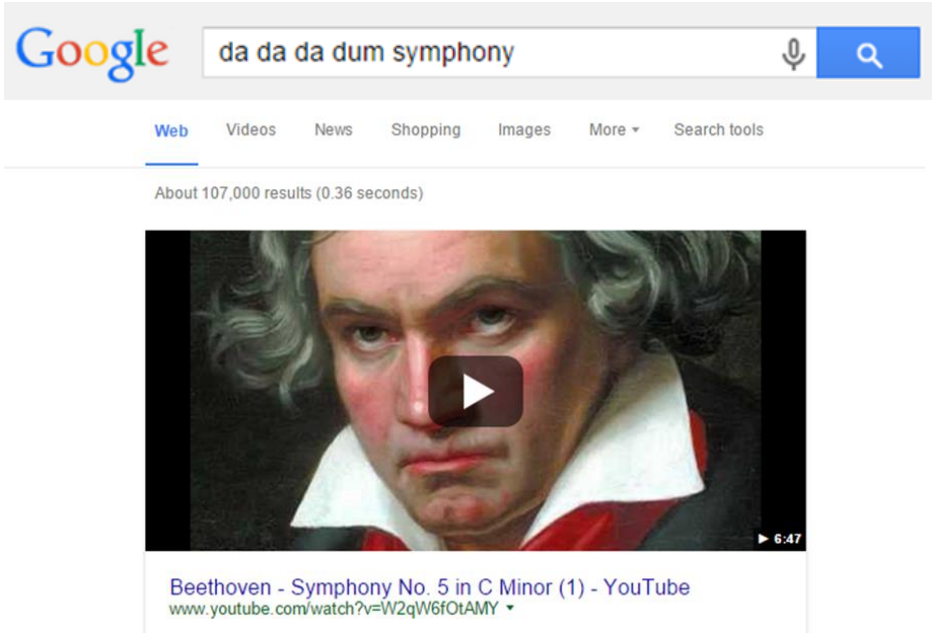
What's wrong with the current Web?

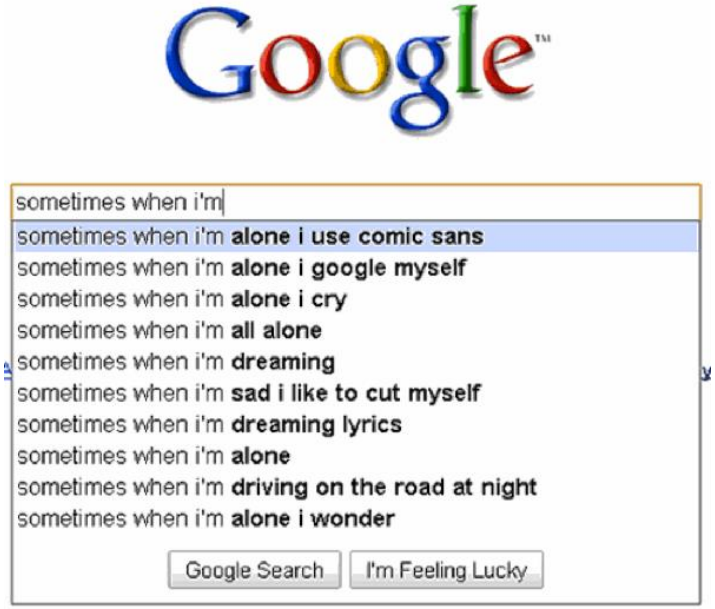
The current Web is great!

The current Web is great!

Google is also pretty great







Problem with the current Web: Literature veterans

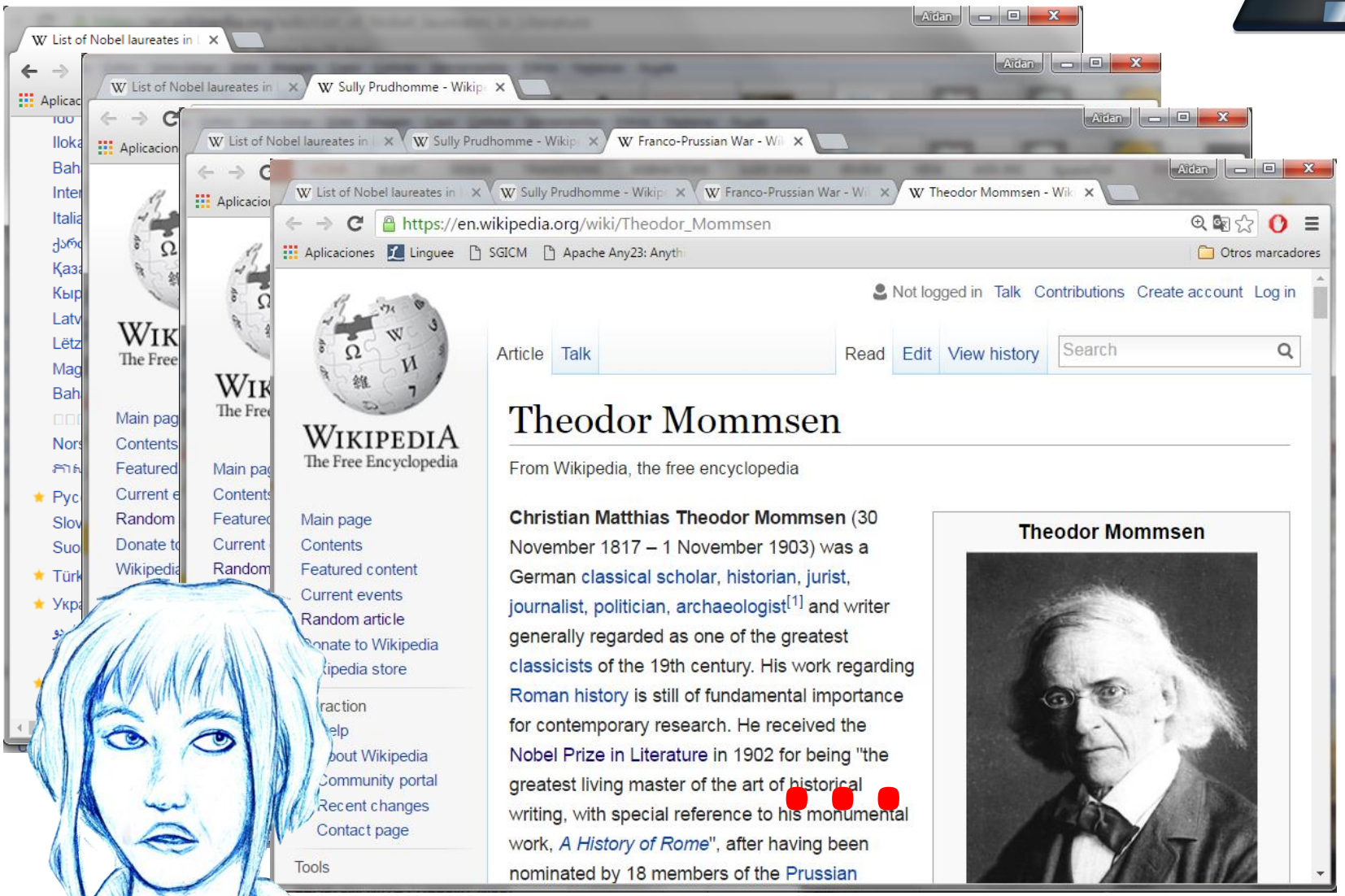
Doing a report for university …

Wants to find all:

- Nobel Prize winners in Literature
- Who fought in at least one war
- The year they won the prize
- And the year the war(s) started

… how would you solve this?

Lots of Wikipedia Tabs ...



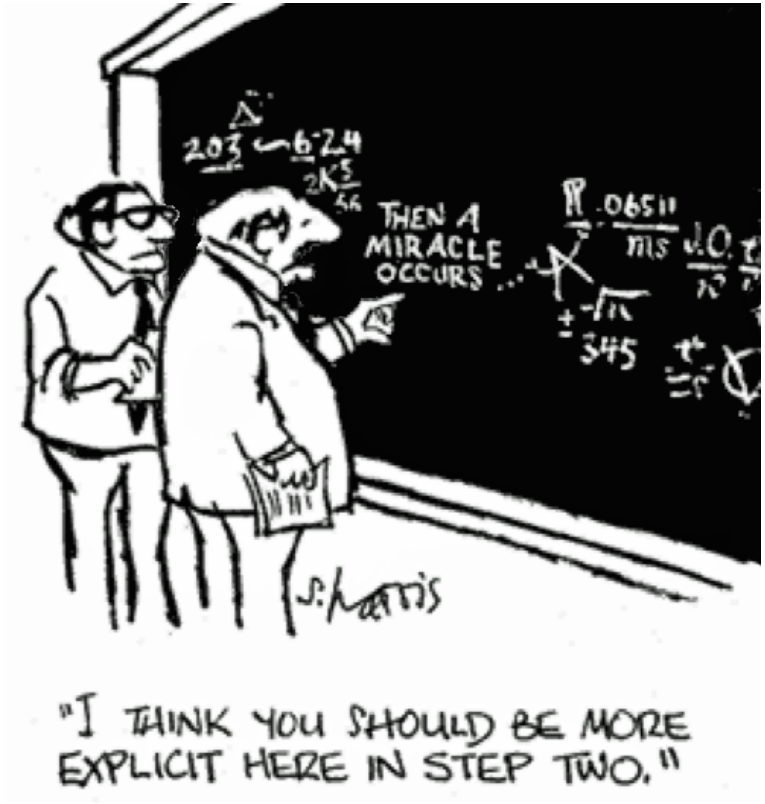
The Laureate Algorithm (3 decades on)

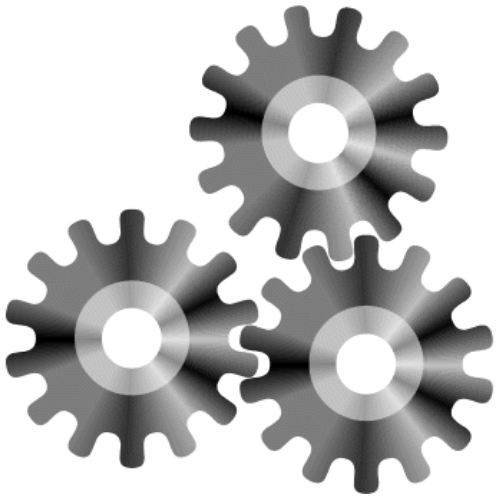
```
results := ∅
for all nobel-lit-winner in wiki-list
    year-prize := year of nobel-lit-winner
    wars := search "war", "conflict", "battle" in nobel-lit-winner
    for all war in wars
            year-war := starting year of war
            add nobel-lit-winner, year-prize, war, year-war to results
    end
end
return results
```

The Laureate Algorithm (6 decades on?)

nobel-lit-winner-and-wars := *magical-sem-web-results()*

return *nobel-lit-winner-and-wars*





Doing a report for university …

Wants to find all:

- Nobel Prize winners in Literature
- Who fought in at least one war
- The year they won the prize
- And the year the war(s) started

… why is this query hard on the current Web?

So what's the problem ...

The current Web is document-centric

http://ex.org/Ireland

http://ex.org/Dublin

```
<html>

</html>
```

The current Web is document-centric

http://ex.org/Ireland

http://ex.org/Dublin

```
<html>
 <body>
  <h1>Ireland</h1>
  <div class="flag"><img src="flag.jpg" /></div>
  <p>Ireland is a European country.</p>
  <p>Its capital is <a href="http://ex.org/Dublin">Dublin</a>.</p>
  ...
 </body>
</html>
```

(Most of it) Makes sense to humans

http://ex.org/Ireland

Ireland

Ireland is a European country.

Its capital is Dublin.

http://ex.org/Dublin

Dublin

Dublin is Ireland's capital.

Its population is one million.

… ASSUMING THEY SPEAK THE LANGUAGE

http://ex.org/Ireland

Ireland

Ireland is a European country.

Its capital is Dublin.

http://ex.cl/Dublín

Dublín

Dublín es la capital de Irlanda.

Su población es un millón.

Even worse for machines

`http://ex.org/Ireland`

Ireland

Ireland is a European country.

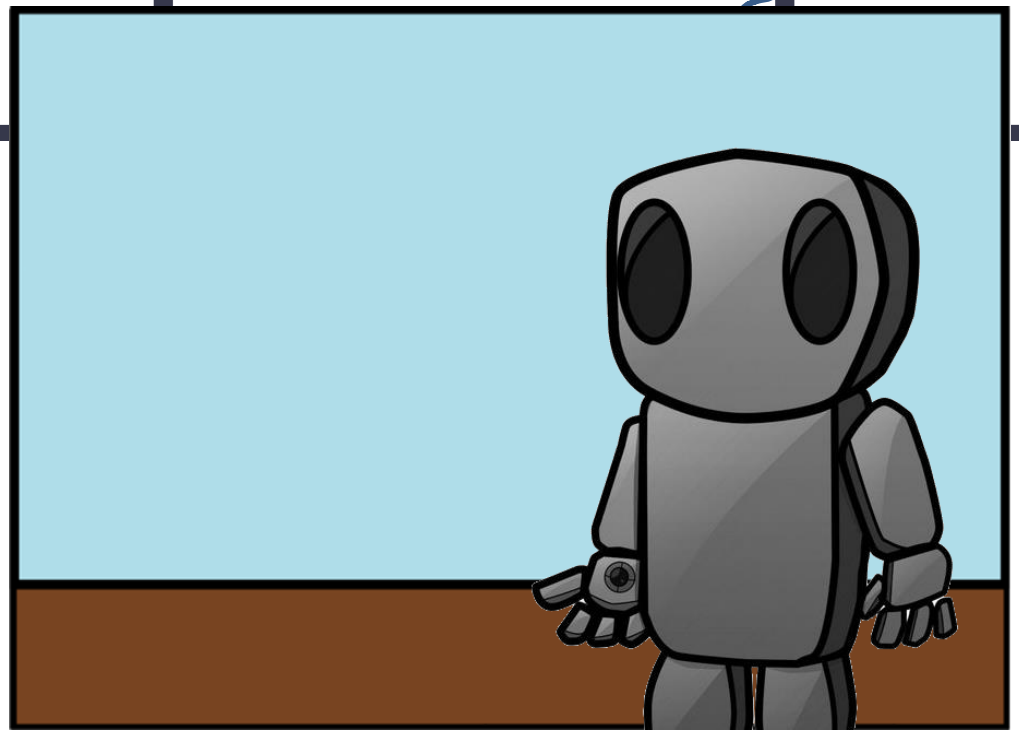
Its capital is Dublin.

`http://ex.cl/Dublín`

Dublín

Dublín es la capital de Irlanda.

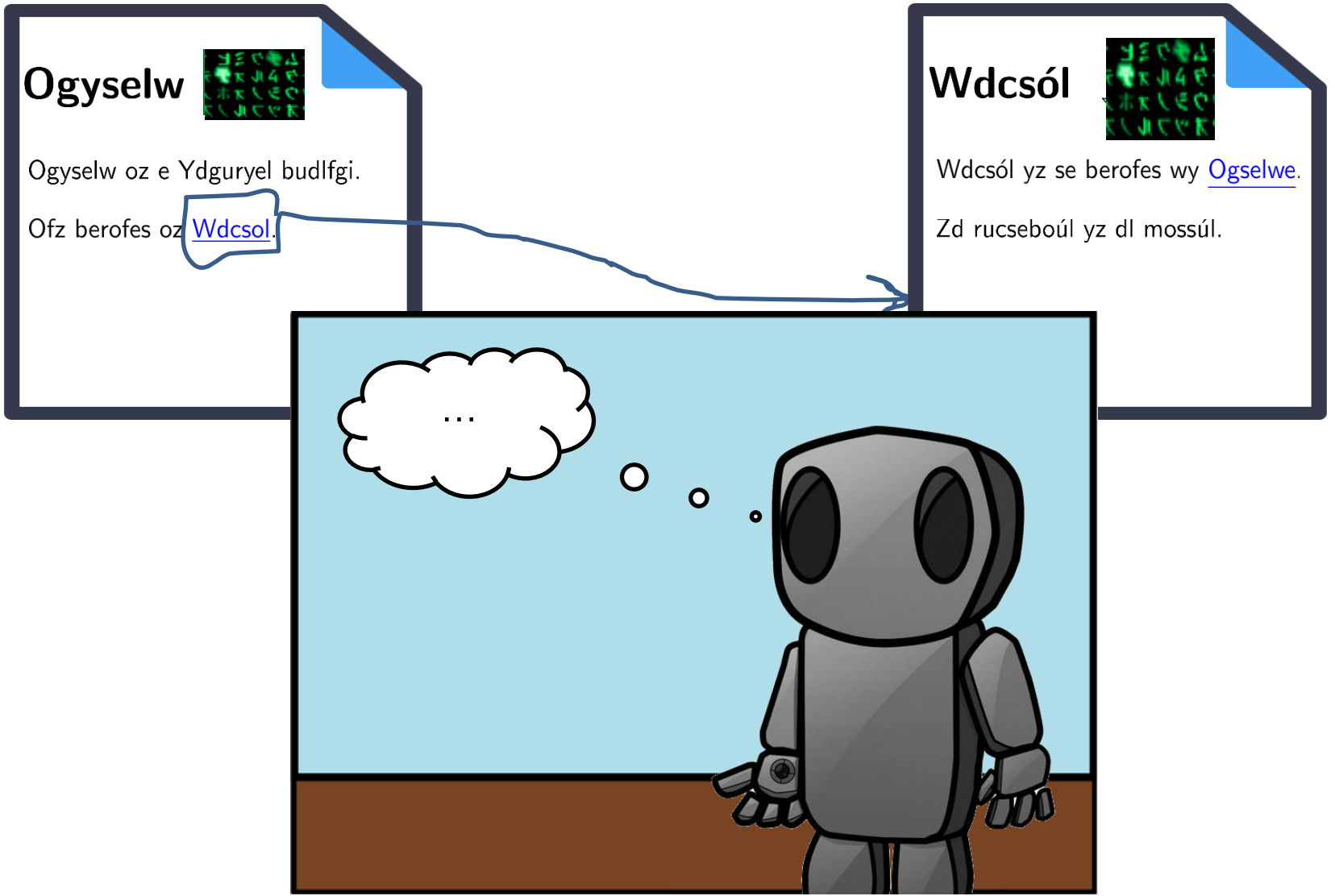
Su población es un millón.



Ytyl nugzy pug mebholyz

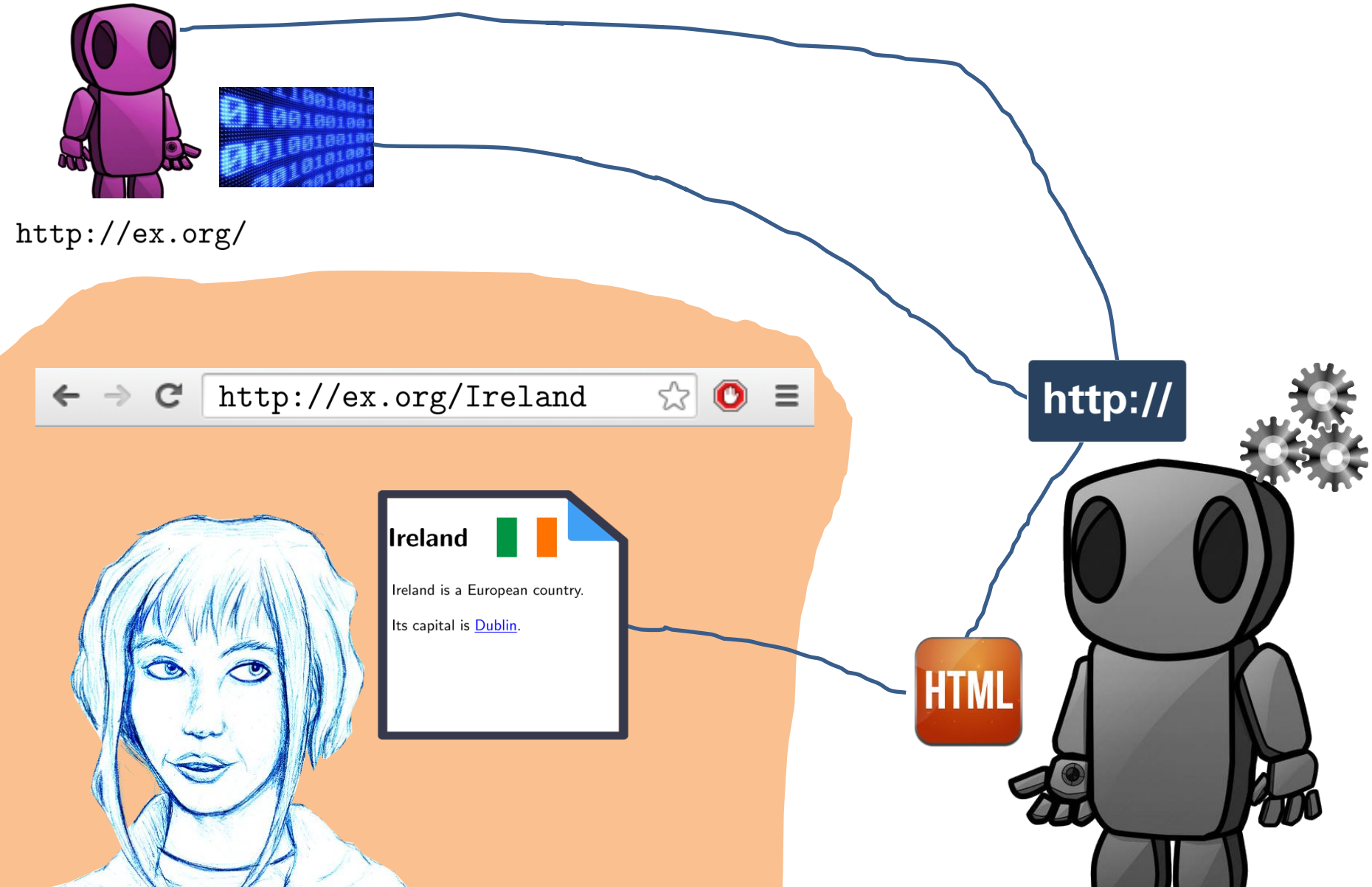
http://ex.org/Ogyselw

http://ex.cl/Wdcsól

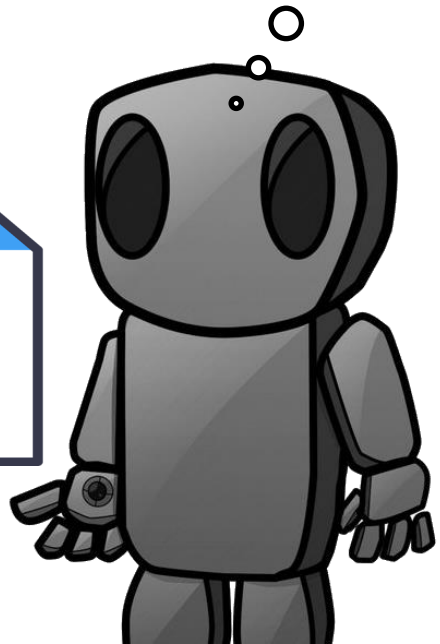


So what's the problem ...

What machines can do: Fetch documents



What machines can do: Find documents



ireland ogyselw

What machines cannot do: Combine sources

http://ex.org/Ogyselw

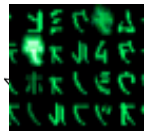
Ogyselw

Ogyselw oz e Ydguryel budlfgi.

Ofz berofes oz Wdcsol.

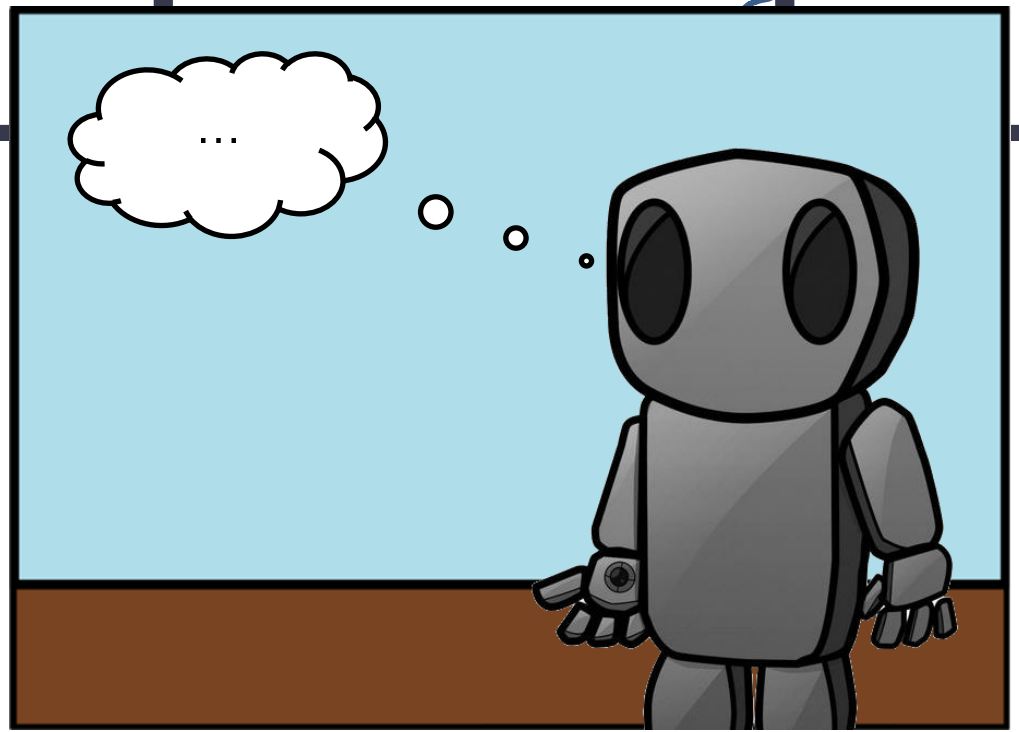
http://ex.cl/Wdcsól

Wdcsól



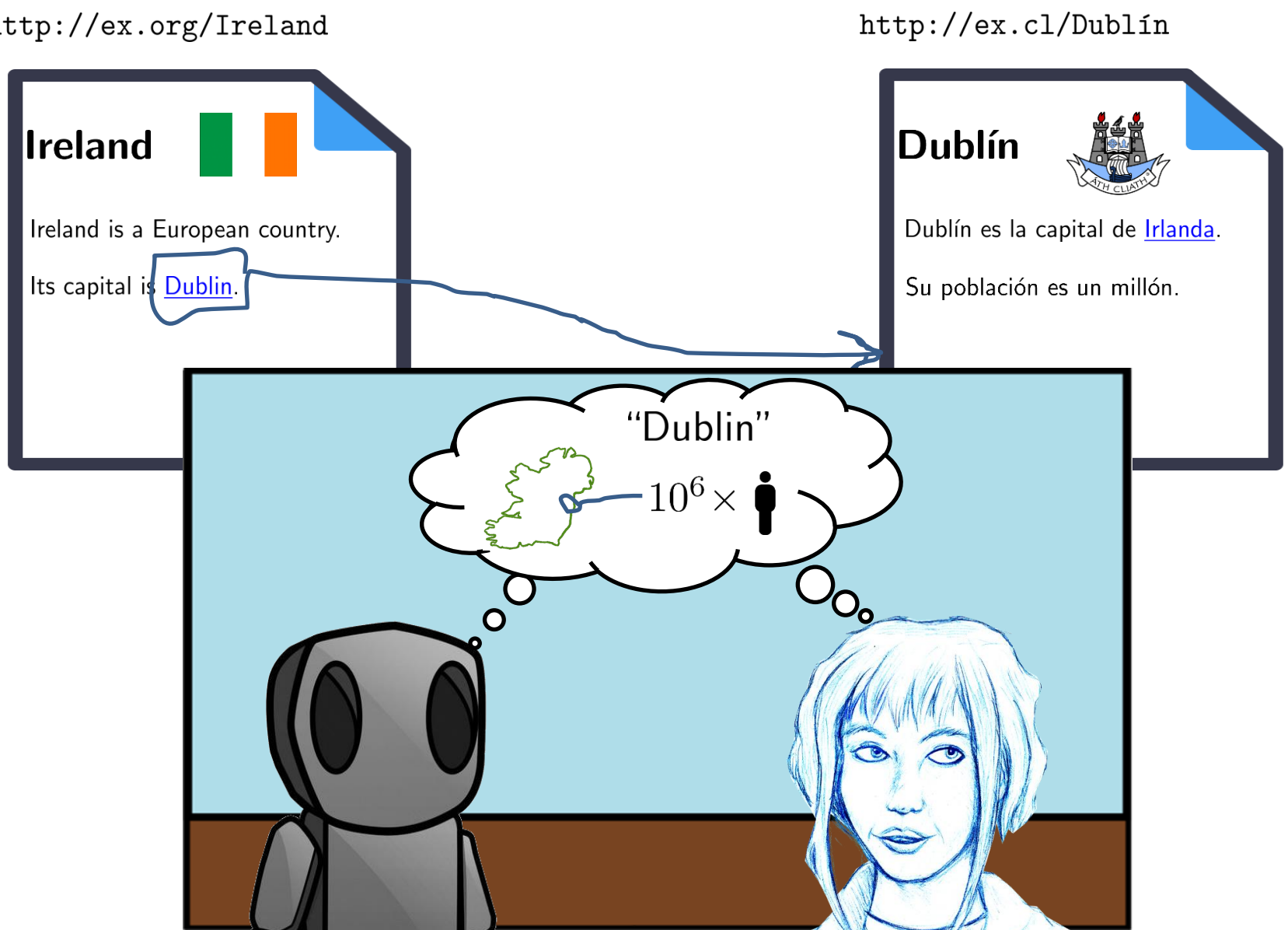
Wdcsól yz se berofes wy Ogselwe.

Zd rucseboúl yz dl mossúl.

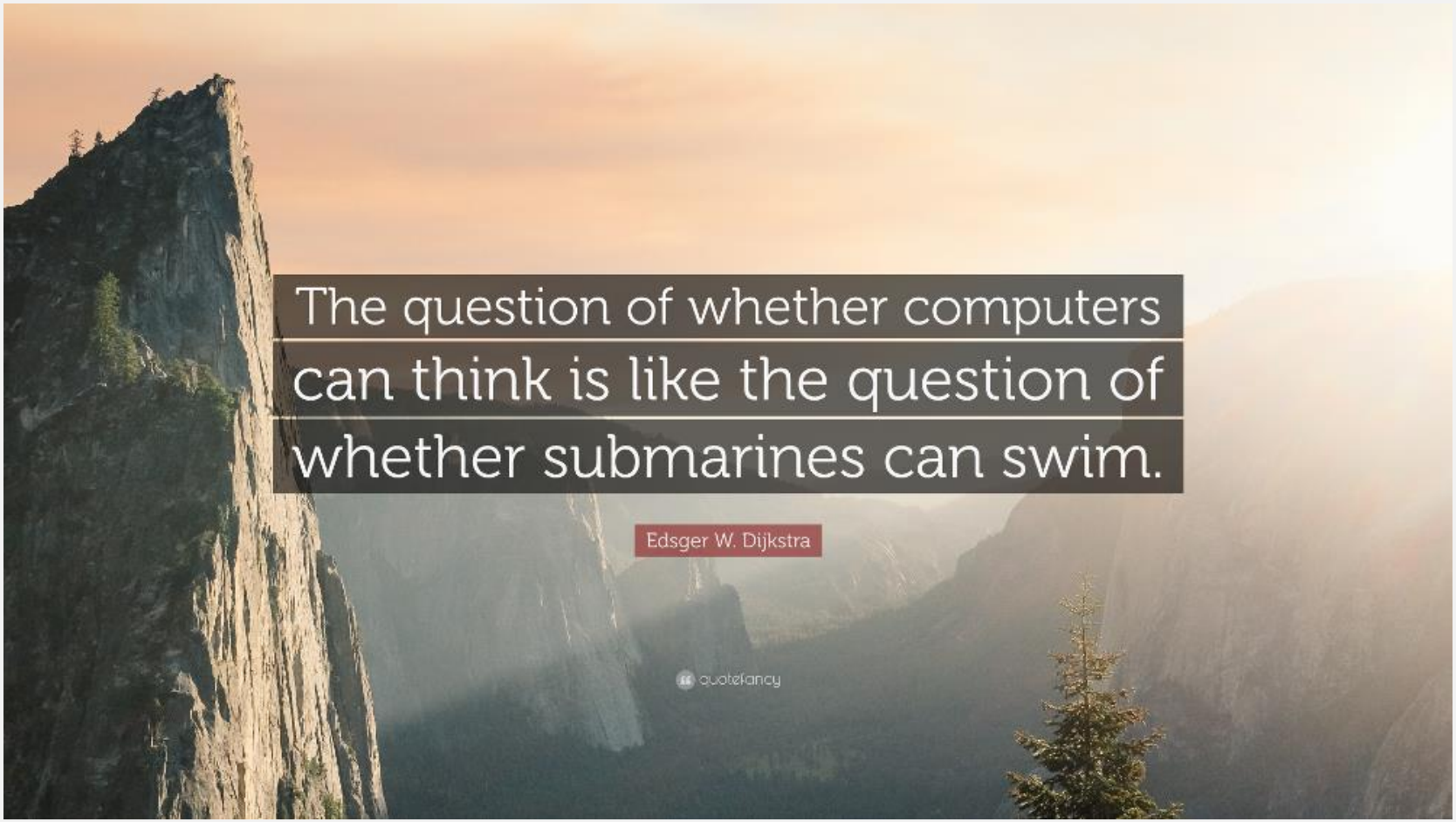


Towards a semantic web

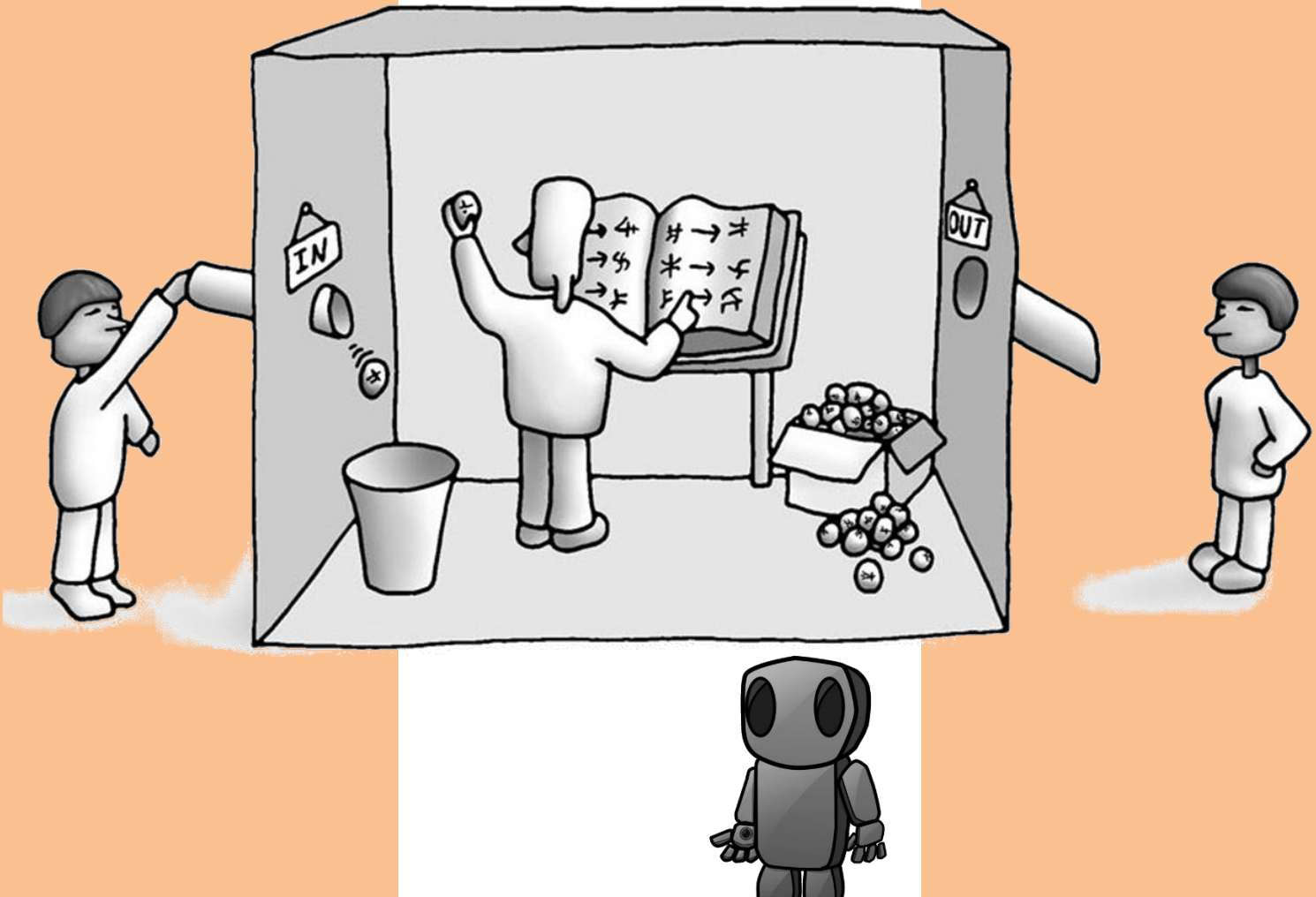
Machines that "understand" the Web?



Edsger W. Dijkstra



Searle's Chinese Room ...



Searle's Chinese Room (Natural Language)

`http://ex.org/Ogyselw`

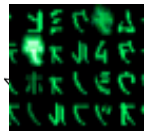
Ogyselw

Ogyselw oz e Ydguryel budlfgi.

Ofz berofes oz Wdcsol.

`http://ex.org/Wdcsol`

Wdcsol



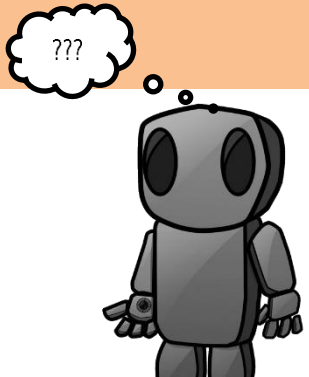
Wdcsol oz fhy berofes up Ogyselw.

Ofz rurdsefoul oz uly mossoul.

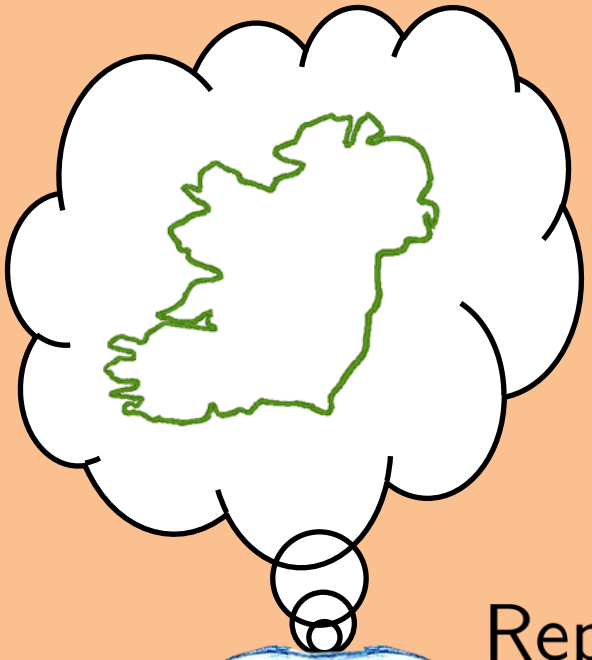
Input: "Nhef oz fhy rurdsefoul up fhy berofes up Ogyselw?"

... what should the output be?

Output: "uly mossoul"



Multiple names, one thing ...

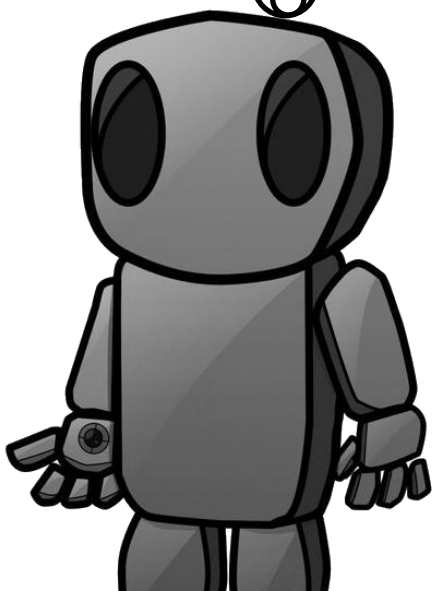


Ireland

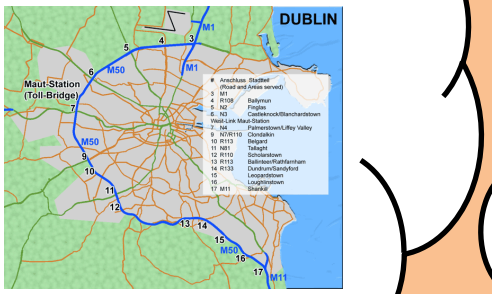
IE

Irlanda

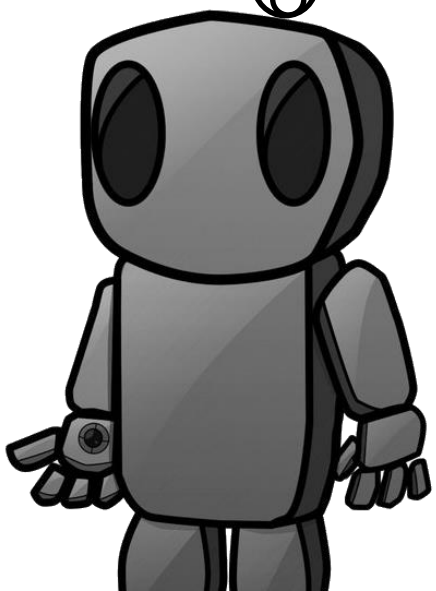
Rep. of Ireland



One name, multiple things …



Dublín



Multiple ways to say the same thing ...

Dublin's population is one million.

Dublin has a population of one million.

Dublin's population is 1,000,000.

Dublin has 1,000,000 inhabitants.

One million people live in Dublin.

[Dublin] Its population is one million.

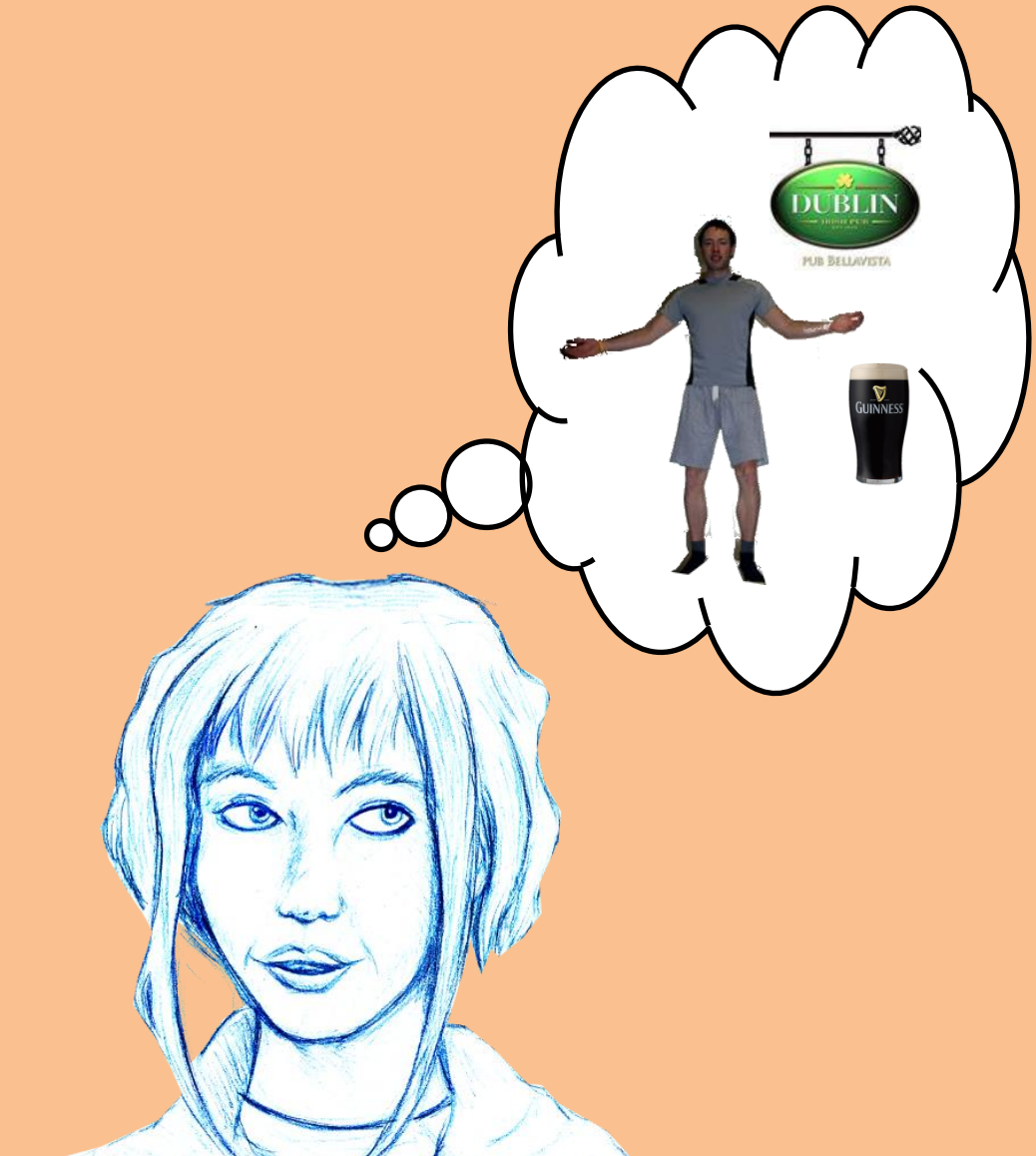
La población de Dublín es un millón.

Multiple meanings for the same saying ...

Sherlock saw the man using binoculars.

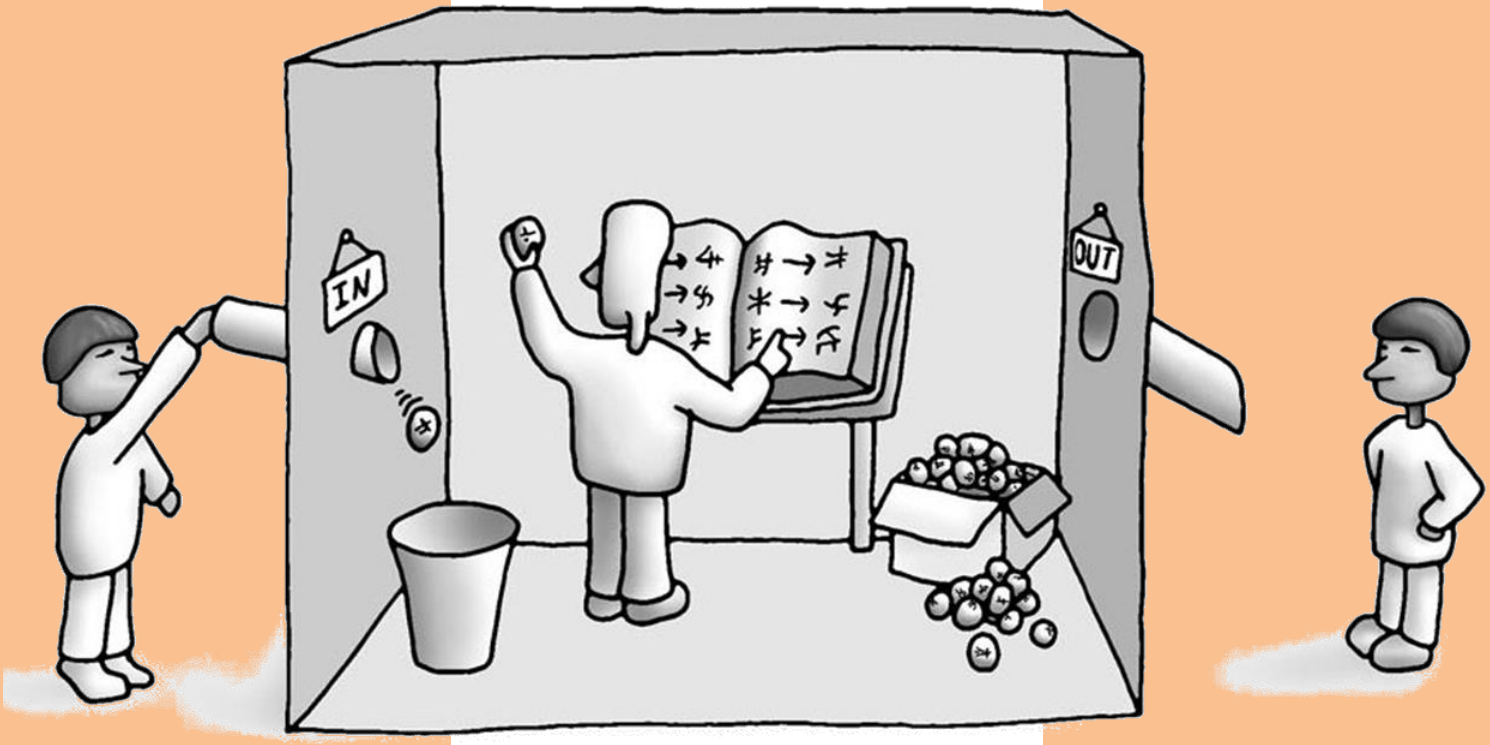
Not saying what is meant ...

Fred está arriba la pelota.



The Semantic Gap

What if we could "structure" everything …



One symbol, one meaning ...

Ireland

IE

Irlanda

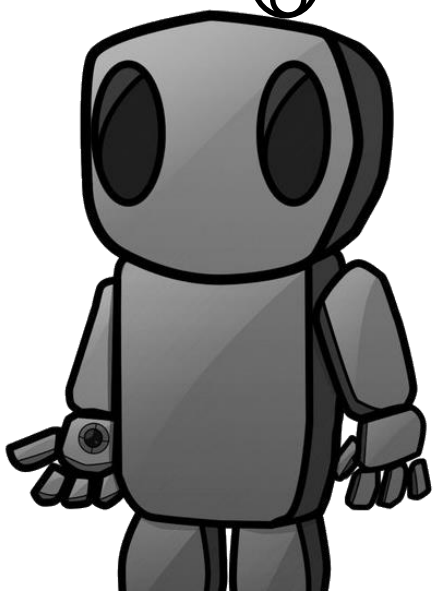
Rep. of Ireland

♇

☿

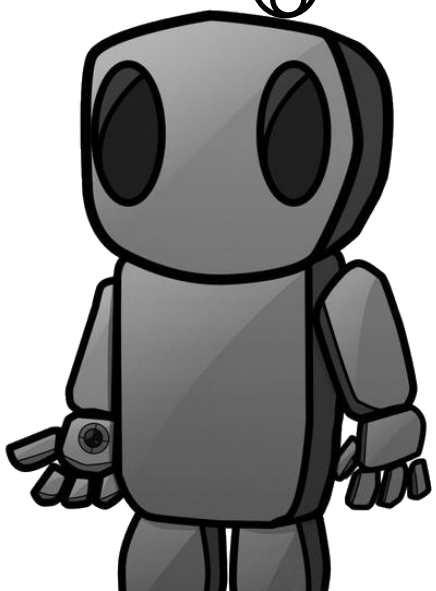
☾

♄



One symbol, *one* meaning …

Dublín



One (simple) way to say one thing ...

Dublin's population is one million.

Dublin has a population of one million.

Dublin's population is 1,000,000.

Dublin has 1,000,000 inhabitants.

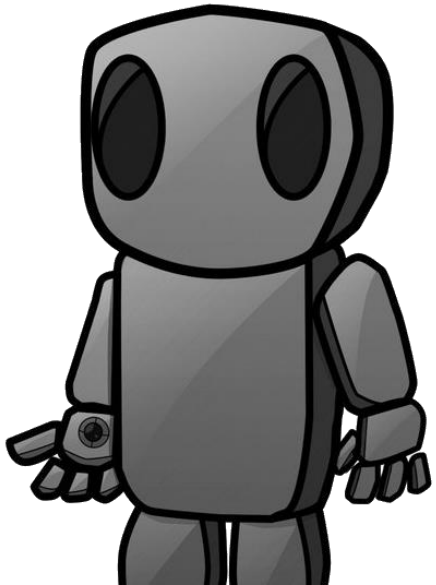
One million people live in Dublin.

[Dublin] Its population is one million.

La población de Dublín es un millón.

(Dublin,population,1000000)

(♅,♂,1000000)



Searle's Chinese Room (Natural Language)

`http://ex.org/Ogyselw`

Ogyselw

Ogyselw oz e Ydguryel budlfgi.

Ofz berofes oz Wdcsol.

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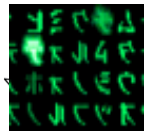
Wdcsol 

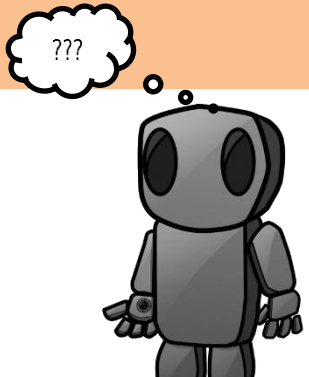
Wdcsol oz fhy berofes up Ogyselw.

Ofz rurdsefoul oz uly mossoul.

Input: "Nhef oz fhy rurdsefoul up fhy berofes up Ogyselw?"

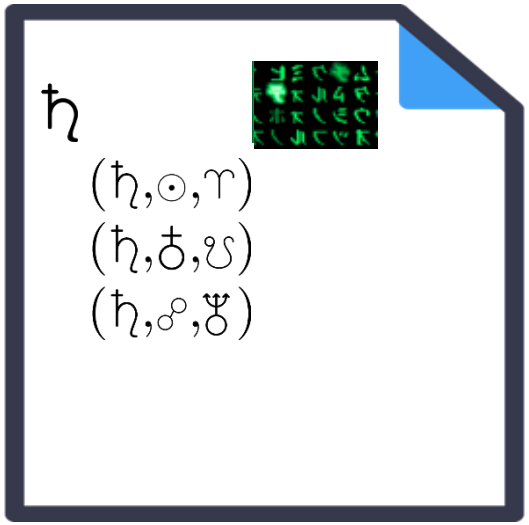
... what should the output be?

Output: "uly mossoul"

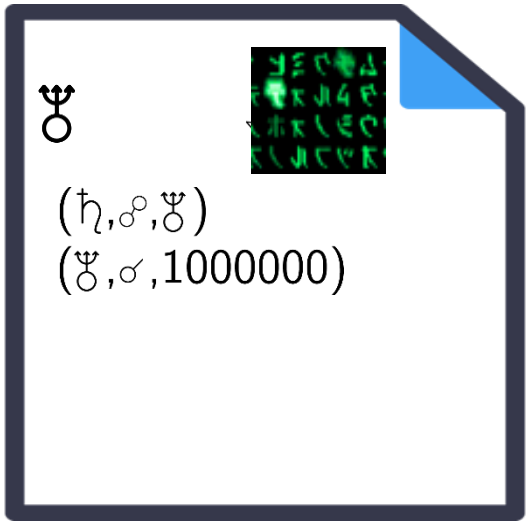


Searle's Chinese Room (Symbolic)

http://ex.org/♄



http://ex.org/♅



Input: "$(♄,♂,x)$, $(x,♂,y)$?"

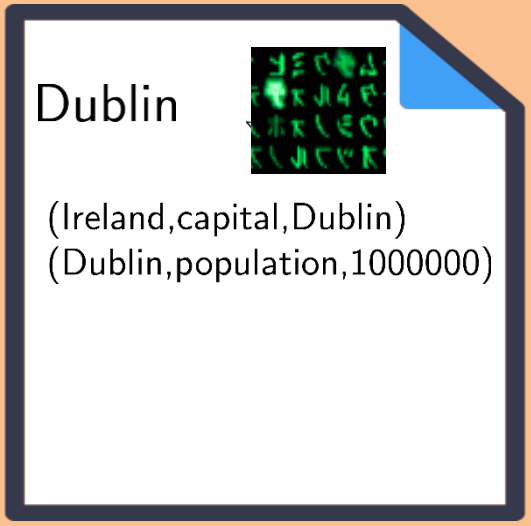
... what should the output be?

Output: $\{(x \mapsto ♅, y \mapsto 1000000)\}$

Searle's Chinese Room (Symbolic)

`http://ex.org/Ireland`

`http://ex.org/Dublin`



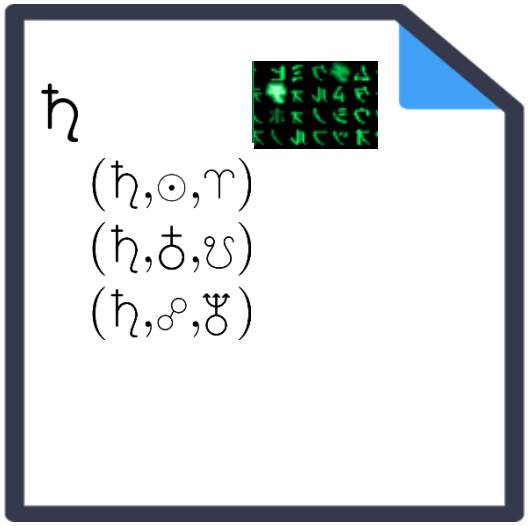
Input: "(Ireland,capital,x), (x,population,y)?"

... what should the output be?

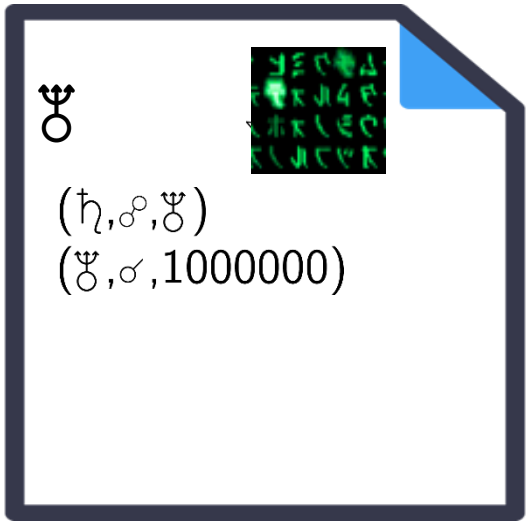
Output: $\{(x \mapsto \text{Dublin}, y \mapsto 1000000)\}$

Searle's Chinese Room II

http://ex.org/♄



http://ex.org/♆



Input: "$(x,\odot,y)$?"

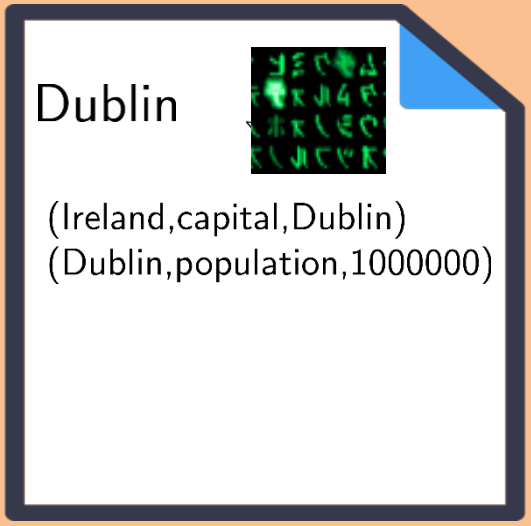
... what should the output be?

Output: $\{(x \mapsto \text{♄}, y \mapsto \text{♈})\}$

Searle's Chinese Room II

`http://ex.org/Ireland`

`http://ex.org/Dublin`



Input: "(x,partOf,y)?"

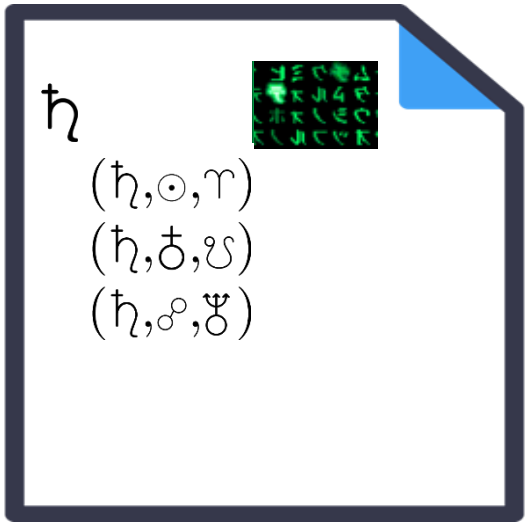
... what should the output be?

Output: $\{(x \mapsto \text{Ireland}, y \mapsto \text{Europe})$

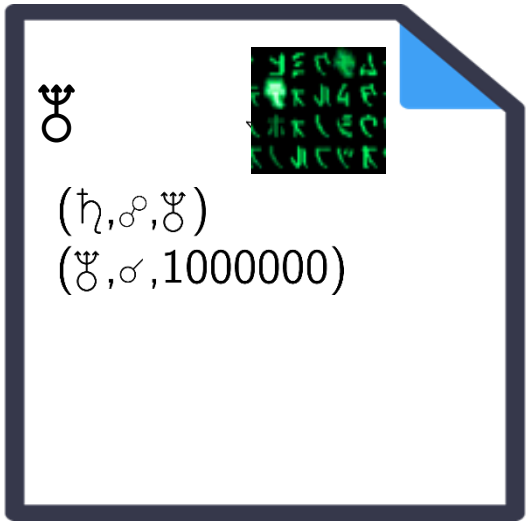
$(x \mapsto \text{Dublin}, y \mapsto \text{Ireland})?$

Searle's Chinese Room II

http://ex.org/♄



http://ex.org/♅



Rule: "$(b,\male,a) \to (a,\odot,b)$"

Input: "$(x,\odot,y)$?"

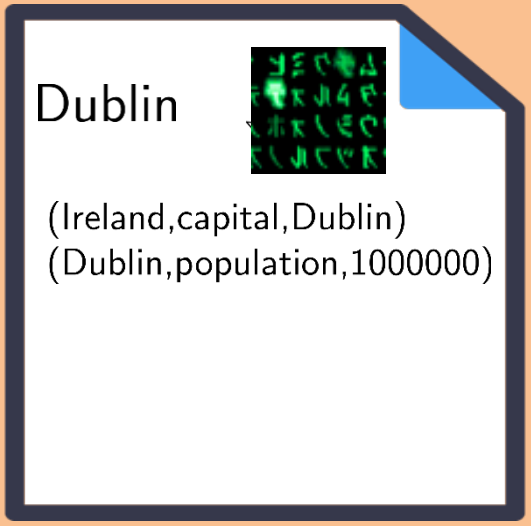
... what should the output be?

Output: $\{(x \mapsto ♄, y \mapsto ♈), (x \mapsto ♅, y \mapsto ♄)\}$

Searle's Chinese Room II

`http://ex.org/Ireland`

`http://ex.org/Dublin`



Rule: "$(b$,capital,$a)$ $\rightarrow$ $(a$,partOf,$b)$"

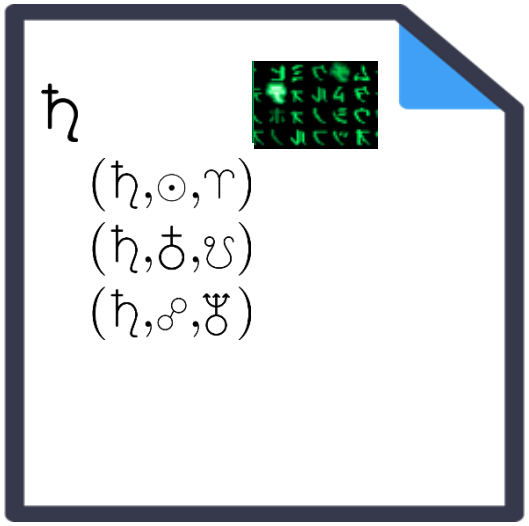
Input: "$(x$,partOf,$y)$?"

... what should the output be?

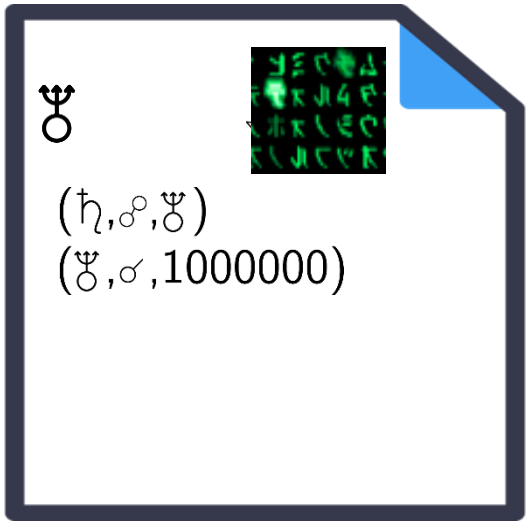
Output: $\{(x \mapsto$ Ireland, $y \mapsto$ Europe),
$(x \mapsto$ Dublin, $y \mapsto$ Ireland$)\}$
$(x \mapsto$ Dublin, $y \mapsto$ Europe$)$?

Searle's Chinese Room II

http://ex.org/♄



http://ex.org/♅



Rules: "$(b,\male,a) \rightarrow (a,\odot,b)$"

"$(a,\odot,b),\ (b,\odot,c) \rightarrow (a,\odot,c)$"

Input: "$(x,\odot,y)$?"

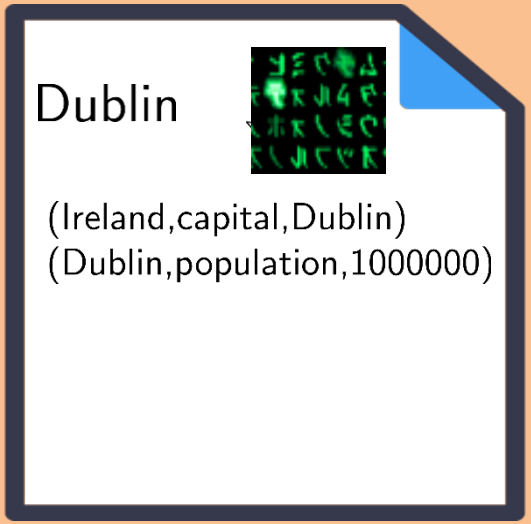
... what should the output be?

Output: $\{(x \mapsto ♄, y \mapsto ♈), (x \mapsto ♅, y \mapsto ♄), (x \mapsto ♅, y \mapsto ♈)\}$

Searle's Chinese Room II

`http://ex.org/Ireland`

`http://ex.org/Dublin`



Rules: "$(b$,capital,$a)$ → $(a$,partOf,$b)$"
"$(a$,partOf,$b)$, $(b$,partOf,$c)$ → $(a$,partOf,$c)$"

Input: "$(x$,partOf,$y)$?"

... what should the output be?

Output: $\{(x \mapsto \text{Ireland}, y \mapsto \text{Europe}),$
$(x \mapsto \text{Dublin}, y \mapsto \text{Ireland}),$
$(x \mapsto \text{Dublin}, y \mapsto \text{Europe})\}$

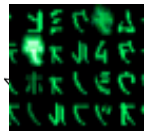
* More or less

Semantic Web: Data, Logic, Query

Data:

Ireland

(Ireland,partOf,Europe)
(Ireland,isA,Country)
(Ireland,capital,Dublin)

Dublin 

(Ireland,capital,Dublin)
(Dublin,population,1000000)

Logic: “$(b$,capital,$a)$ $\rightarrow$ $(a$,partOf,$b)$”
“$(a$,partOf,$b)$, $(b$,partOf,$c)$ $\rightarrow$ $(a$,partOf,$c)$”

Query: “$(x$,partOf,$y)$?”

Output: $\{(x \mapsto \text{Ireland}, y \mapsto \text{Europe}),$
$(x \mapsto \text{Dublin}, y \mapsto \text{Ireland}),$
$(x \mapsto \text{Dublin}, y \mapsto \text{Europe})\}$

The Semantic Web now?

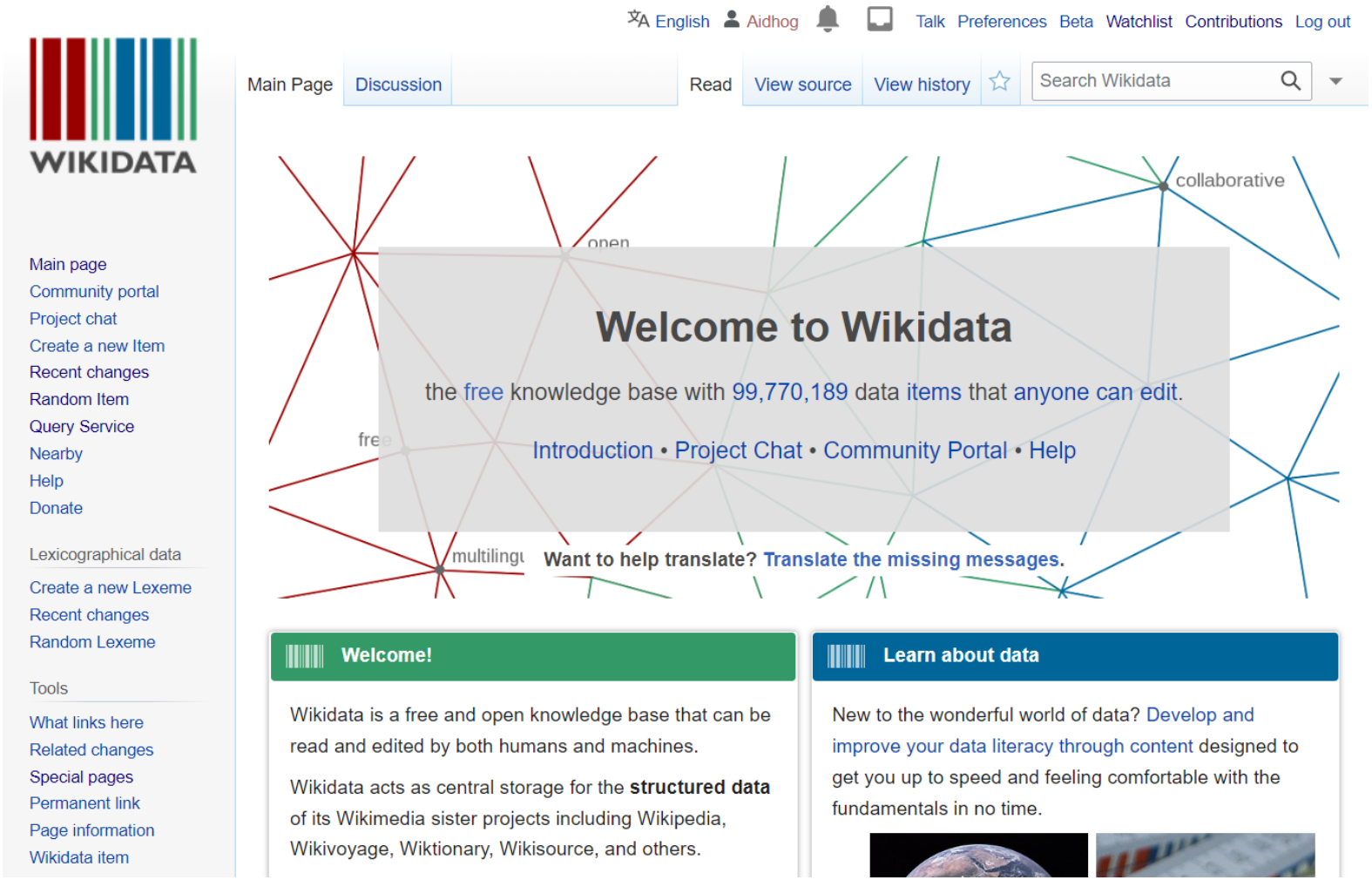
The Semantic Web is now about 20 years old

… so where is it then?

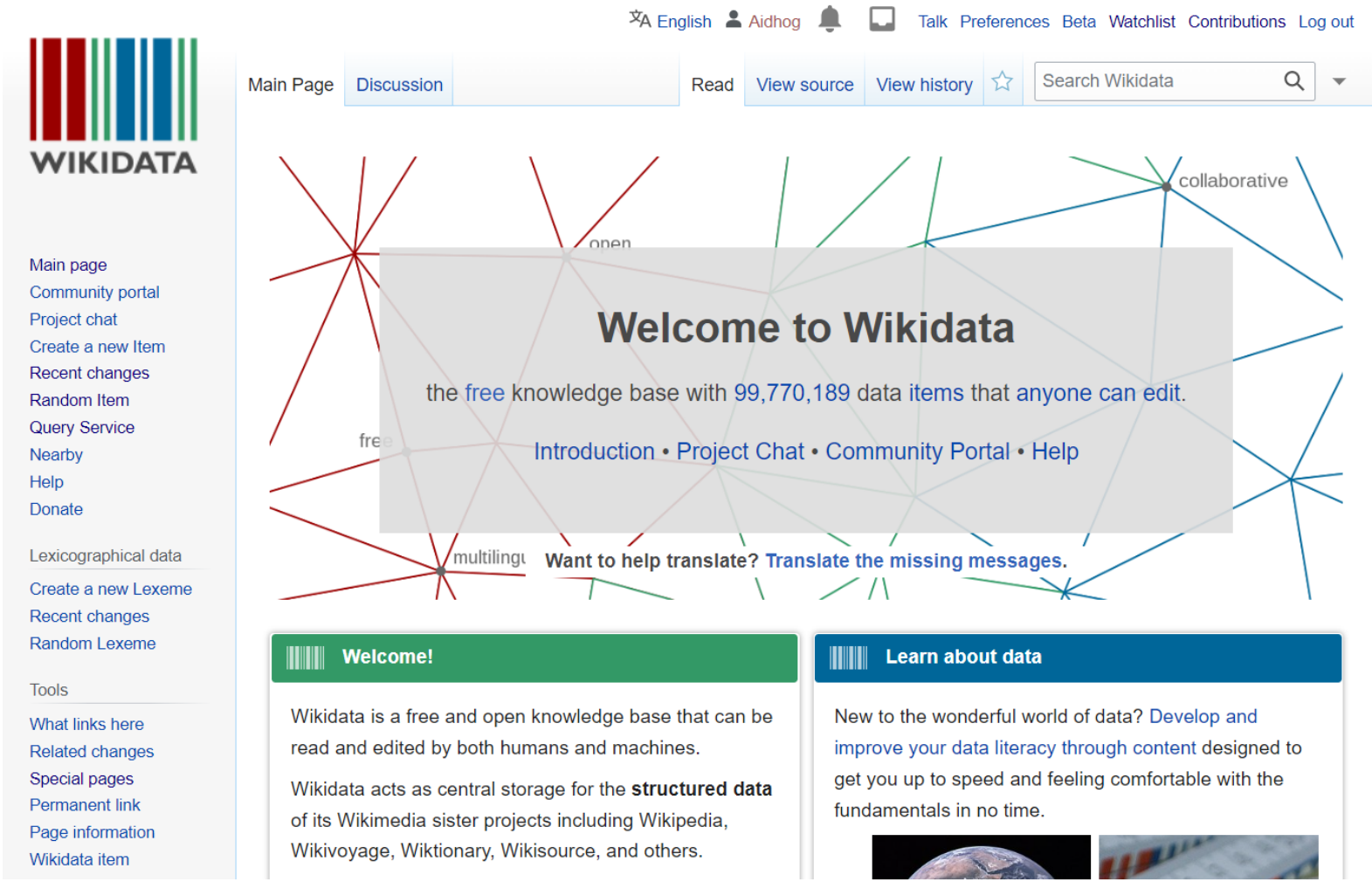
Hidden within the Web ...

Wikidata: A Wikipedia for data

What is Wikidata?



Why is Wikidata?



Problem 1: Different language versions manually edited by users

Alexis Sánchez

Sánchez with Chile in 2013

Personal information	
Full name	Alexis Alejandro Sánchez Sánchez[1]
Date of birth	19 December 1988 (age 26)[1][2]
Place of birth	Tocopilla, Chile[3][2]

National team‡			
2007	Chile U20	12	(2)
2006–	Chile	82	(26)

Alexis Sánchez

Datos personales
Nombre completo Alexis Alejandro Sánchez Sánchez

Carrera internacional	
Selección	Chile
Part. (goles)	82 (26)
Debut	2006

Alexis

Alexis Sánchez im Dezember 2011

Spielerinformationen	
Voller Name	Alexis Alejandro Sánchez Sánchez
Geburtstag	19. Dezember 1988
Geburtsort	Tocopilla, Chile

Nationalmannschaft[2]		
2007	Chile U-20	
2006–	Chile	76 (25)

Problem 2: Complex lists of things manually edited by users

Not logged in Talk Contributions Create account Log in

Article Talk Read Edit View history Search

Chile national football team

From Wikipedia, the free encyclopedia

Most capped players [edit]

As of September 1, 2016

*Players in **bold** are still active, at least at club level.*

#	Name	International Career	Caps	Goals
1.	**Claudio Bravo**	2004 –	106	0
2.	**Alexis Sánchez**	2006 –	102	34
3.	**Gary Medel**	2007 –	96	7
4.	**Gonzalo Jara**	2006 –	95	3

Top goalscorers [edit]

As of September 1, 2016

*Players in **bold** are still active, at least at club level.*

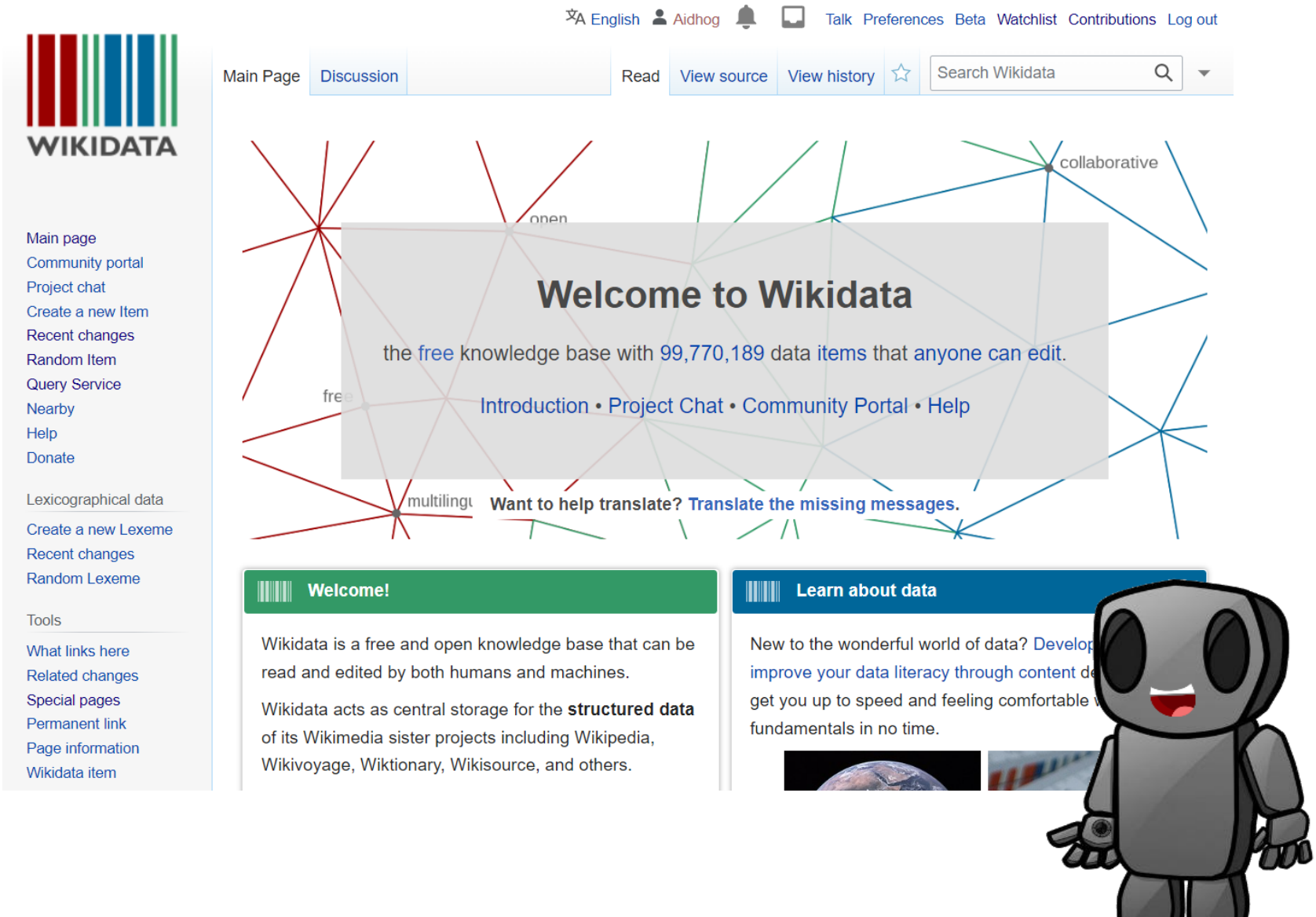
#	Name	International Career	Goals	Caps
1.	Marcelo Salas	1994–2007	37	70
2.	Iván Zamorano	1987–2001	34	69
2.	**Alexis Sánchez** (list)	2006 –	34	102

Alexis scores a goal …

Now an army of human editors has to manually update a bunch of articles:

different languages, lists, …

Solution: Wikidata



WIKIDATA

Alexis Alejandro Sánchez Sánchez (Q180553)

Chilean footballer

Chiqui

edit

In more languages

Statements

sex or gender	male	edit
	1 reference	
	+ add	
member of sports team	Cobreloa	edit
	1 reference	
	Udinese Calcio	edit
	1 reference	
	Arsenal F.C	edit
	1 reference	
	Club Atlético River Plate	edit

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Permanent link
Page information
Concept URI
Cite this page

Alexis Sánchez (Q180553)

futbolista chileno editar

Alexis Sánchez Sánchez | AS9 | Alexis Alejandro Sánchez Sánchez | AS7 | Alexis Alejandro Sánchez | Alexis Sánches | Alexis Sanchez | Alexis Sanches

▸ En más idiomas

Página principal
Portal de la comunidad
Café
Crear un elemento nuevo
Elemento por título
Cambios recientes
Elemento aleatorio
Cercanos
Ayuda
Donaciones

Imprimir/exportar
Crear un libro
Descargar como PDF
Versión para imprimir

Herramientas
Lo que enlaza aquí
Cambios relacionados
Páginas especiales
Enlace permanente
Información de la página
Concept URI
Citar esta página

Declaraciones

sexo	masculino	editar
	▸ 1 referencia	
		+ añadir
miembro del equipo deportivo	Club de Deportes Cobreloa	editar
	▸ 1 referencia	
	Udinese Calcio	editar
	▸ 1 referencia	
	Arsenal Football Club	editar
	▸ 1 referencia	

Alexis Sánchez (Q180553)

chilenischer Fußballspieler

bearbeiten

Alexis Alejandro Sánchez Sánchez | Alexis Sanchez | Alexis Alejandro Sanchez Sanchez

In weiteren Sprachen

Hauptseite
Gemeinschaftsportal
Forum
Ein neues Datenobjekt erstellen
Datenobjekte nach Titel
Letzte Änderungen
Zufälliges Datenobjekt
In der Nähe
Hilfe
Spenden

Drucken/exportieren
Buch erstellen
Als PDF herunterladen
Druckversion

Werkzeuge
Links auf diese Seite
Änderungen an verlinkten Seiten
Spezialseiten
Permanenter Link
Seiteninformationen
Konzept-URI
Seite zitieren

Aussagen

Geschlecht	männlich 1 Fundstelle	bearbeiten
		+ hinzufügen
Mitglied von Sportmannschaft oder -verein	CD Cobreloa 1 Fundstelle	bearbeiten
	Udinese Calcio 1 Fundstelle	bearbeiten
	FC Arsenal 1 Fundstelle	bearbeiten
	CA River Plate	bearbeiten

Санчес, Алексис (Q180553)

Описание не заполнено

редактировать

Алексис Санчес

На других языках

Утверждения

пол	мужской	редактировать
	1 источник	
		+ добавить
член спортивной команды	Кобрелоа	редактировать
	1 источник	
	Удинезе	редактировать
	1 источник	
	Арсенал	редактировать
	1 источник	
	Ривер Плейт	редактировать

Заглавная страница
Портал сообщества
Форум
Создание нового элемента
Элементы по заголовку
Свежие правки
Случайный элемент
Рядом
Справка
Пожертвования

Печать/экспорт
Создать книгу
Скачать как PDF
Версия для печати

Инструменты
Ссылки сюда
Связанные правки
Спецстраницы
Постоянная ссылка
Сведения о странице
URI концепта
Цитировать страницу

അലക്സിസ് സാഞ്ചസ് (Q180553)

പ്രധാന താൾ
സാമൂഹികകവാടം
Project chat
പുതിയൊരു ഇനം സൃഷ്ടിക്കുക
ഇനം തലക്കെട്ടനുസരിച്ച്
സമീപകാല മാറ്റങ്ങൾ
ഏതെങ്കിലും താൾ
സമീപസ്ഥം
സഹായം
സംഭാവന

അച്ചടിയ്ക്കുക/കയറ്റുമതി ചെയ്യുക
പുസ്തകം സൃഷ്ടിക്കുക
PDF ആയി ഡൗൺലോഡ് ചെയ്യുക
അച്ചടിരൂപം

ഉപകരണങ്ങൾ
ഈ താളിലേക്കുള്ള കണ്ണികൾ
അനുബന്ധ മാറ്റങ്ങൾ
പ്രത്യേക താളുകൾ
സ്ഥിരംകണ്ണി

വിവരണമൊന്നും നിർവചിച്ചിട്ടില്ല
അപരനാമങ്ങളൊന്നും കണ്ടെത്താനായില്ല.

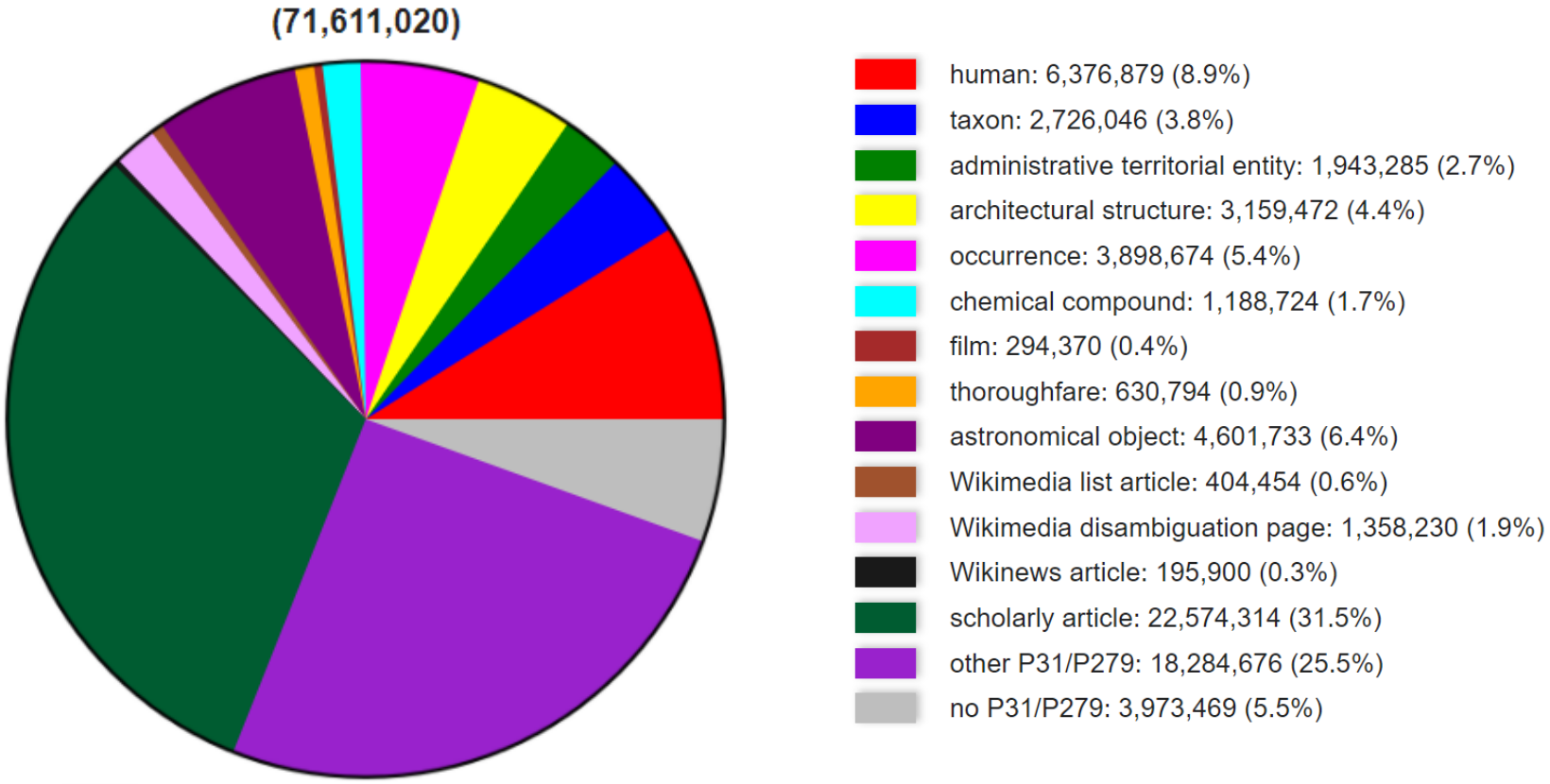
തിരുത്തുക

▸ കൂടുതൽ ഭാഷകളിൽ

Statements

ലിംഗം	പുരുഷൻ ▸ 1 സ്രോതസ്സ്	തിരുത്തുക
		+ ചേർക്കുക
member of sports team *ഇംഗ്ലീഷ്*	Cobreloa *ഇംഗ്ലീഷ്* ▸ 1 സ്രോതസ്സ്	തിരുത്തുക
	Udinese Calcio *ഇംഗ്ലീഷ്* ▸ 1 സ്രോതസ്സ്	തിരുത്തുക
	ആഴ്സണൽ എഫ്.സി. ▸ 1 സ്രോതസ്സ്	തിരുത്തുക
	Club Atlético River Plate *ഇംഗ്ലീഷ്*	തിരുത്തുക

What does Wikidata describe?



- 22,986 active users

https://www.wikidata.org/wiki/Wikidata:Statistics

Use-case: Info-Boxes

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The Free Encyclopedia

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Atacama Pathfinder Experiment

From Wikipedia, the free encyclopedia

The **Atacama Pathfinder Experiment** (**APEX**) is a radio telescope 5,100 meters above sea level, at the Llano de Chajnantor Observatory in the Atacama desert in northern Chile, 50 km east of San Pedro de Atacama built and operated by 3 European research institutes. The main dish has a diameter of 12 m and consists of 264 aluminium panels with an average surface accuracy of 17 micrometres (rms). The telescope was officially inaugurated on September 25, 2005.

The APEX telescope is a modified ALMA (Atacama Large Millimeter Array) prototype antenna and is at the site of the ALMA observatory. APEX is designed to work at sub-millimetre wavelengths, in the 0.2 to 1.5 mm range — between infrared light and radio waves — and to find targets that ALMA will be able to study in greater detail. Submillimetre astronomy provides a window into the cold, dusty and distant Universe, but the faint signals from space are heavily absorbed by water vapour in the Earth's atmosphere. Chajnantor was chosen as the location for such a telescope because the region is one of the driest on the planet and is more than 750

Atacama Pathfinder Experiment

The APEX telescope

Observatory	Llano de Chajnantor Observatory
Location(s)	Atacama Desert, Chile
Coordinates	23°00′21″S 67°45′33″W
Organization	Edit this at Wikidata Observatory Max Planck Institute for Radio Astronomy Onsala Space Observatory
Altitude	5,100 m (16,700 ft)
Wavelength	0.2, 1.5 mm (1.50, 0.20 THz)
First light	2004
Telescope style	Cassegrain reflector Cosmic microwave background experiment Radio telescope

Use-case: Info-Boxes

WIKIPEDIA
The Free Encyclopedia

Article Talk

Atacama Pathfinder Experiment

From Wikipedia, the free encyclopedia

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Atacama Pathfinder Experiment (Q753076)

radio telescope

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instance of	radio telescope	edit
	0 references	
	+ add reference	
	Cassegrain reflector	edit
	0 references	
	+ add reference	

Atacama Pathfinder Experiment

The APEX telescope

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Use-case: Quality Checks

List of all person who do not have an age between 0 and 130. Update: 22:21, 10 September 2018 (UTC)

Item	Birth	Death	Age
Tuti Yusupova (Q1038827)	1880-07-01	2015-03-28	134
Karni Mata (Q1106783)	1387-10-02	1538-03-23	150
no label (Q11556831)	1185-01-01	1392-01-01	207
Minamoto no Chikayuki (Q11564306)	1185-01-01	1333-01-01	148
Bir Narayan Chaudhuri (Q11854281)	1857-00-00	1998-04-20	141
no label (Q12123094)	1091-00-00	1228-00-00	137
no label (Q12218744)	1819-00-00	1954-00-00	135
Maftei Pop (Q12734691)	1804-01-01	1952-03-15	148
Habib Miyan (Q1365575)	1868-05-20	2008-08-19	140
Egyō (Q1392070)	805-01-01	1185-01-01	380
Xu Xun (Q1428729)	239-01-01	374-01-01	135
Zaro Aga (Q148028)	1777-01-01	1934-06-29	157
Charles Étienne Guillaume Blandin de Chalain (Q15967550)	1740-06-07	1958-01-01	217
Javier Pereira (Q15999178)	1789-00-00	1958-00-00	169
Chen Jun (Q16077971)	881-00-00	1324-00-00	443
Jules Granier (Q16842647)	1770-01-01	1906-04-07	136
Genson (Q18115051)	1700-01-01	1950-01-01	250
Liutwin (Q18222784)	1200-01-01	1350-01-01	150
Salah (Q1827950)	-2068-00-00	-1635-00-00	433

Use-case: Quality Checks

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Tuti Yusupova (Q1038827)	1880-07-01	2015-03-28	134
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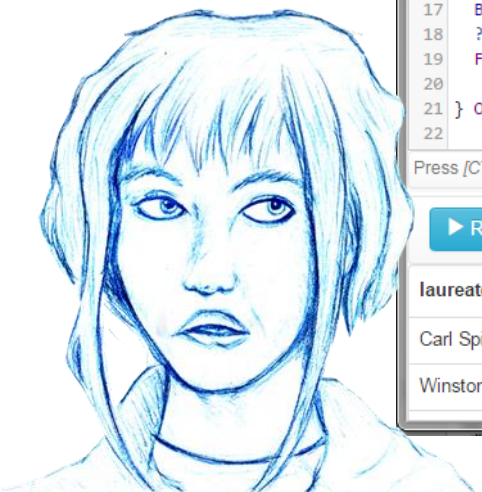
no label (Q11556831)	1185-01-01	1392-01-01	207
Minamoto no Chikayuki (Q11564306)	1185-01-01	1333-01-01	148
Julius Fessler (Q55677113)	1982-05-04	1937-10-27	-45
Max Hallbauer (Q55678777)	1851-12-04	1818-10-08	-34
Ernst Keiter (Q55679293)	1943-10-28	1907-10-30	-36
Franz Friedrich Theodor Steinhauer (Q55680095)	1849-12-25	1822-12-21	-28
Johann Joseph Schoder (Q55680781)	1918-12-07	1884-12-12	-34
Paul Kaspar Helbling (Q55681272)	2012-06-05	2011-06-20	-1
Gustaf Bolinger (Q55683866)	1988-12-19	1957-07-16	-32
Joseph Marcus Jaffé (Q55683961)	1867-03-11	1841-04-12	-26
Johann Baptist Hau (Q55683983)	1782-08-14	1758-12-26	-24
Wilhelm Klaubert (Q55684184)	1557-08-17	1526-10-03	-31
Dieterich Johann Krüger (Q55684826)	1742-06-23	1726-08-22	-16
Alfred Reichenbecher (Q55684894)	1884-01-26	1664-03-05	-220
Johann Ludwig Winckler (Q55901640)	1963-05-08	1767-08-08	-196
Johann Heremberck (Q55902890)	1811-01-01	1489-01-01	-322
Salah (Q1827950)	-2068-00-00	-1635-00-00	433

Use-case: Query Service



Wikidata Query Service

https://query.wikidata.org/#PREFIX%20wd%3A%20%3Chttp%3A%2F%2Fwww.wikidata.org%2Fentity%2F%3

Wikidata Query Service | Examples | Prefixes | Tools | Help | English

```
PREFIX wd: <http://www.wikidata.org/entity/>
PREFIX wdt: <http://www.wikidata.org/prop/direct/>
PREFIX p: <http://www.wikidata.org/prop/>
PREFIX ps: <http://www.wikidata.org/prop/statement/>
PREFIX pq: <http://www.wikidata.org/prop/qualifier/>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>

SELECT DISTINCT ?laureateName ?awardYear ?warName ?warYear
WHERE {
  ?laureate p:P166 ?award .            # Winner of some prize
  ?award ps:P166 wd:Q37922 .           # Prize is Nobel Pr. in Lit.
  ?award pq:P585 ?awardDate .          # Get the date of the award
  BIND(YEAR(?awardDate) as ?awardYear) # Get the year of the award
  ?laureate wdt:P607 ?war .            # Find war(s) laureate was in
  ?war rdfs:label ?warName .           # Get name(s) of war(s)
  ?war wdt:P580 ?warStart  .           # Get date the war started
  BIND(YEAR(?warStart) as ?warYear)    # Get year from date
  ?laureate rdfs:label ?laureateName . # Get name of laureate
  FILTER(lang(?warName)="en"           # Filter for English
    && lang(?laureateName)="en")       #  ...  names only
} ORDER BY ?awardYear                  # Order by year
```

Find award received Nobel Prize in Literature

Show

Limit

Press [CTRL-SPACE] to activate auto completion.

Data updated a few seconds ago

Run | Clear | 12 Results in 1589 ms | Display | Download | Link

laureateName	awardYear	warName	warYear
Carl Spitteler	1919	World War I	1914
Winston Churchill	1953	World War I	1914

Use-case: Query Service

Wikidata Query Service

https://query.wikidata.org/#PREFIX%20wd%3A%20%3Chttp%3A%2F%2Fwww.wikidata.org%2Fentity%2F%3

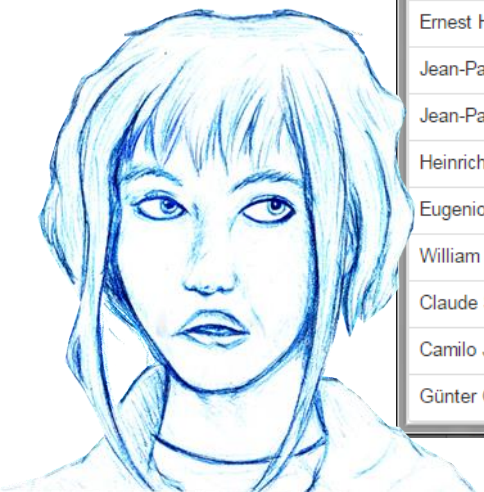
Aplicaciones Linguee SGICM Apache Any23: Anyth Otros marcadores

```
16   ?war wdt:P580 ?warStart  .          # Get date the war started
17   BIND(YEAR(?warStart) as ?warYear)   # Get year from date
18   ?laureate rdfs:label ?laureateName . # Get name of laureate
19   FILTER(lang(?warName)="en"          # Filter for English
20     && lang(?laureateName)="en")      #  ...  names only
21 } ORDER BY ?awardYear                 # Order by year
22
```

Press [CTRL-SPACE] to activate auto completion. Data updated a few seconds ago

Run Clear 12 Results in 1589 ms Display Download Link

laureateName	awardYear	warName	warYear
Carl Spitteler	1919	World War I	1914
Winston Churchill	1953	World War I	1914
Ernest Hemingway	1954	World War I	1914
Ernest Hemingway	1954	World War II	1939
Jean-Paul Sartre	1964	Algerian War	1954
Jean-Paul Sartre	1964	World War II	1939
Heinrich Böll	1972	World War II	1939
Eugenio Montale	1975	World War I	1914
William Golding	1983	World War II	1939
Claude Simon	1985	Spanish Civil War	1936
Camilo José Cela	1989	Spanish Civil War	1936
Günter Grass	1999	World War II	1939

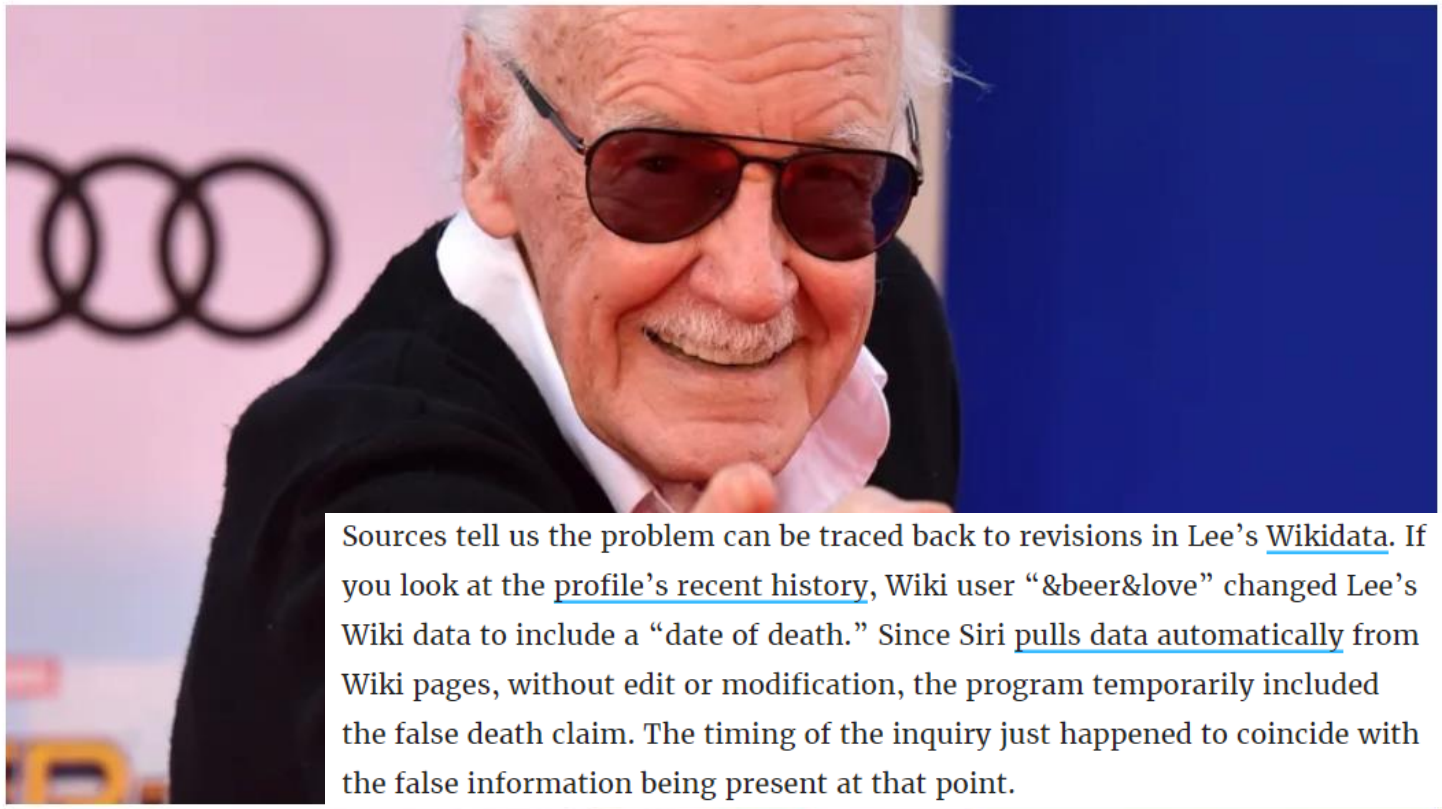


Used in Applications like Siri ...

Siri Erroneously Told People Stan Lee Was Dead

Beth Elderkin
7/03/18 2:45pm • Filed to: STAN LEE

17.4K 45 5

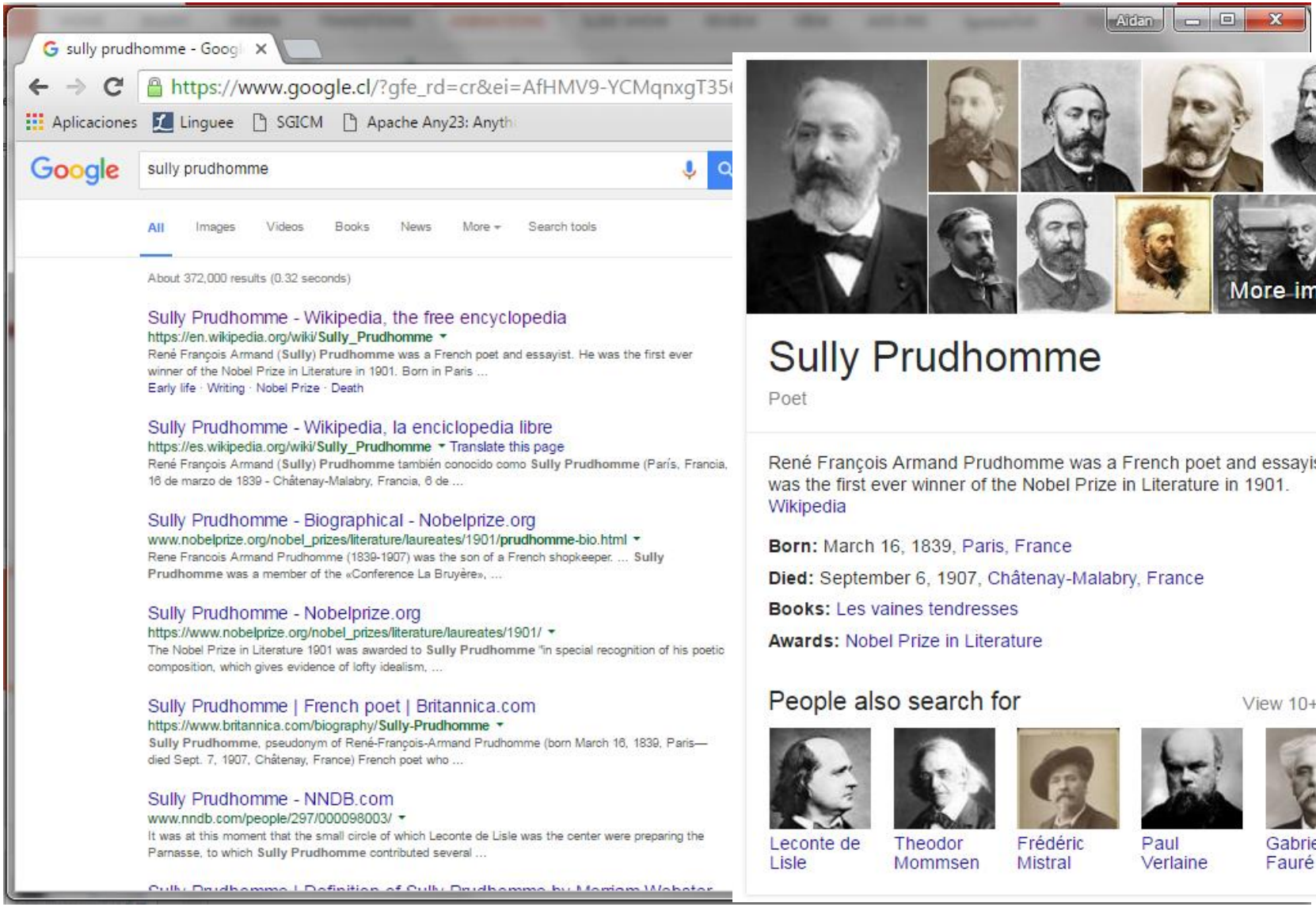


Sources tell us the problem can be traced back to revisions in Lee's Wikidata. If you look at the profile's recent history, Wiki user "&beer&love" changed Lee's Wiki data to include a "date of death." Since Siri pulls data automatically from Wiki pages, without edit or modification, the program temporarily included the false death claim. The timing of the inquiry just happened to coincide with the false information being present at that point.

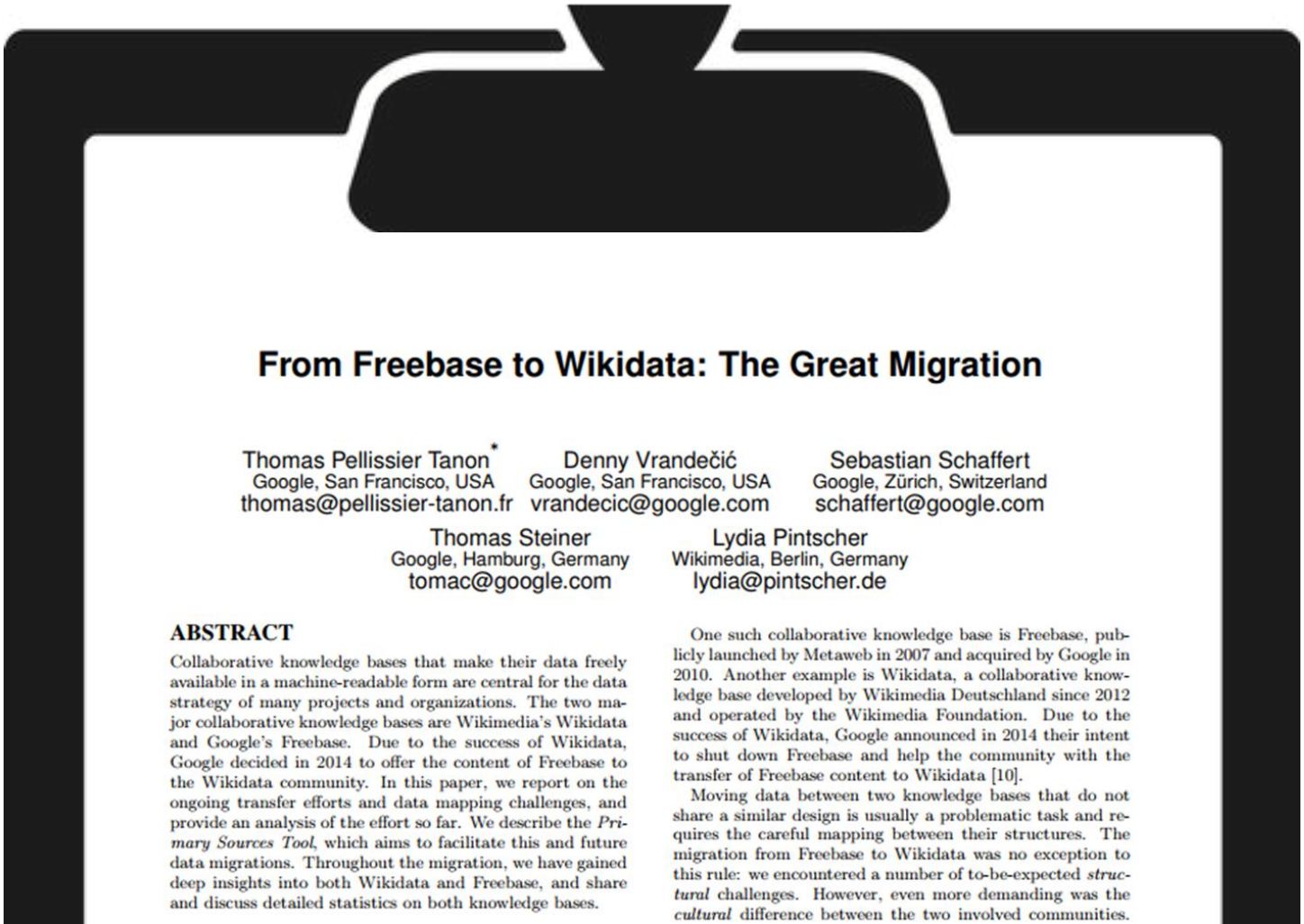
Stan Lee at the premiere of *Spider-Man: Homecoming*.
Photo: Alberto E. Rodriguez (Getty Images)

Google's Knowledge Graph

Google's Knowledge Panel



Using Semantic Web knowledge-bases



From Freebase to Wikidata: The Great Migration

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ABSTRACT

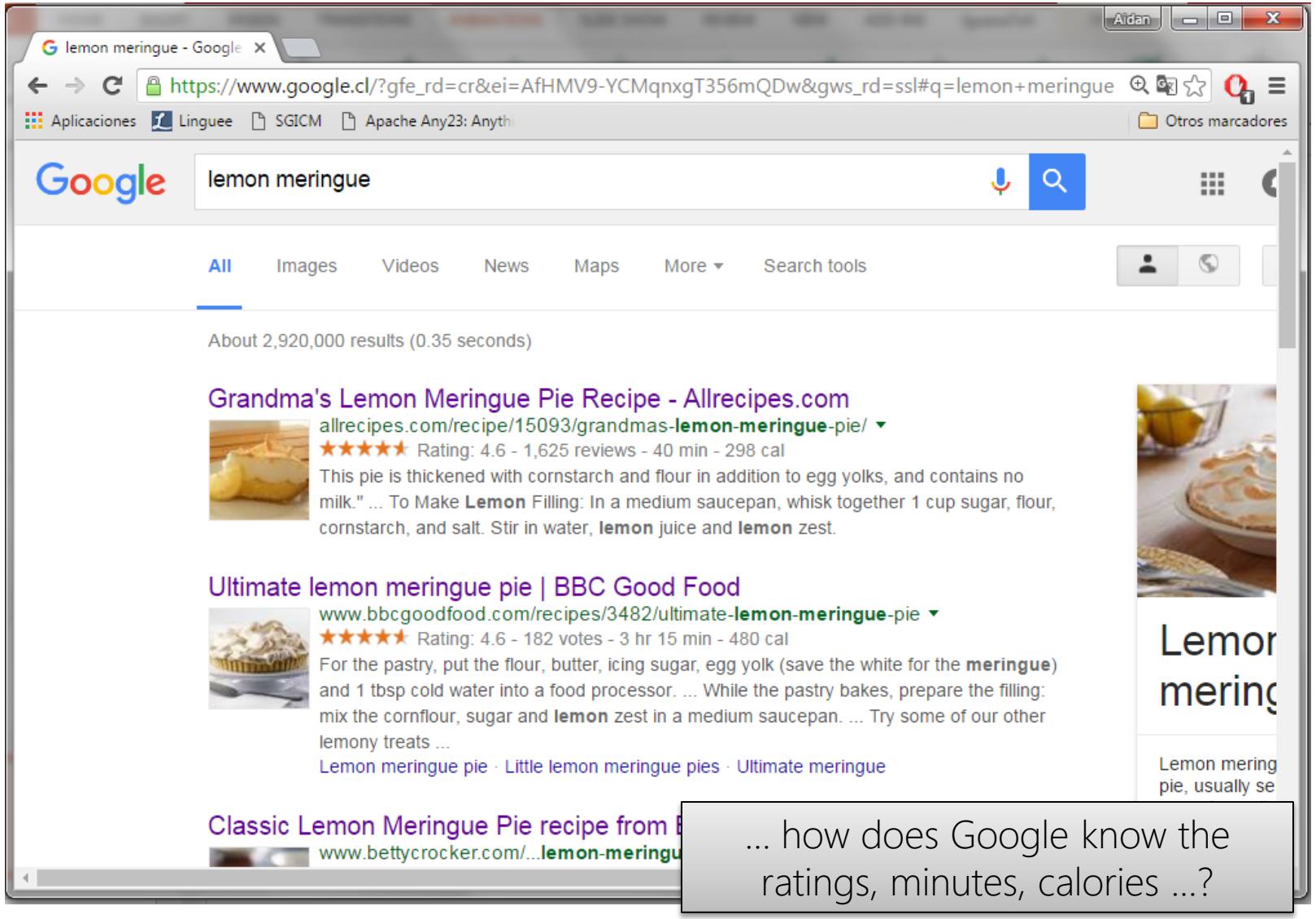
Collaborative knowledge bases that make their data freely available in a machine-readable form are central for the data strategy of many projects and organizations. The two major collaborative knowledge bases are Wikimedia's Wikidata and Google's Freebase. Due to the success of Wikidata, Google decided in 2014 to offer the content of Freebase to the Wikidata community. In this paper, we report on the ongoing transfer efforts and data mapping challenges, and provide an analysis of the effort so far. We describe the *Primary Sources Tool*, which aims to facilitate this and future data migrations. Throughout the migration, we have gained deep insights into both Wikidata and Freebase, and share and discuss detailed statistics on both knowledge bases.

One such collaborative knowledge base is Freebase, publicly launched by Metaweb in 2007 and acquired by Google in 2010. Another example is Wikidata, a collaborative knowledge base developed by Wikimedia Deutschland since 2012 and operated by the Wikimedia Foundation. Due to the success of Wikidata, Google announced in 2014 their intent to shut down Freebase and help the community with the transfer of Freebase content to Wikidata [10].

Moving data between two knowledge bases that do not share a similar design is usually a problematic task and requires the careful mapping between their structures. The migration from Freebase to Wikidata was no exception to this rule: we encountered a number of to-be-expected *structural* challenges. However, even more demanding was the *cultural* difference between the two involved communities.

Google's Rich Snippets

Fancy-looking search results …



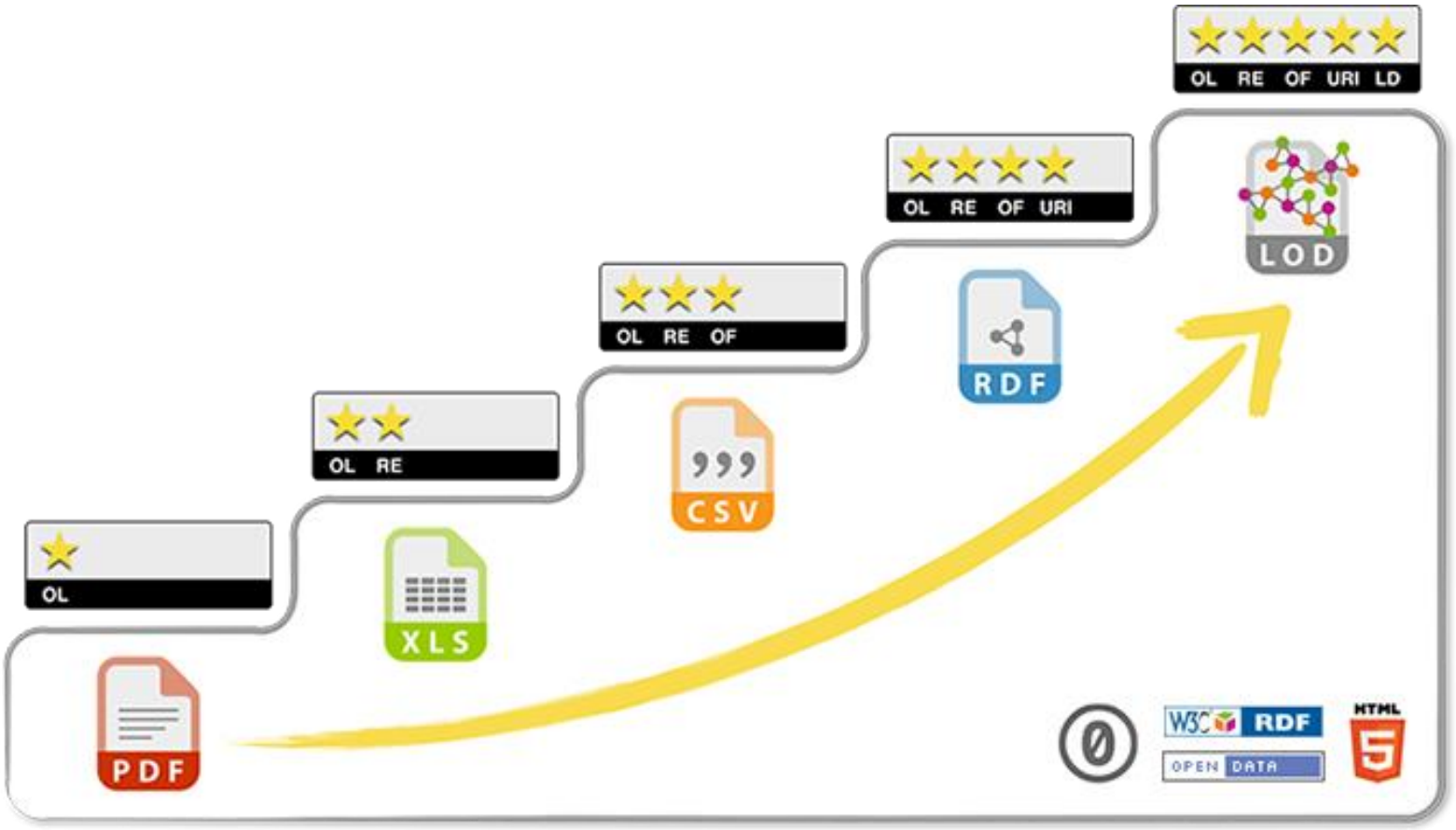
Publishers add structured data!

```
<ul class="nutrition" itemprop="nutrition" itemscope
  itemtype="http://schema.org/NutritionInformation">
  <li>
    <span class="nutrition__label">kcal</span>
    <span class="nutrition__value" itemprop="calories">480</span>
    ...
  </li>
</ul>
```

- ✓ Publishers get more clicks on their results
- ✓ Google gets data to make fancy results

Standards for Open Data: Linked Open Data

How to publish Open Data?



5-Star Linking Open Data Scheme

The Linked Data Cloud

About the course …

Topics covered

- RDF (triple-based data model)
- RDFS/OWL (ontological languages)
- SPARQL (query language)
- Linked Data / Web of Data
- RDB2RDF (importing databases to Sem. Web.)
- Shapes (validating RDF data)

Research course

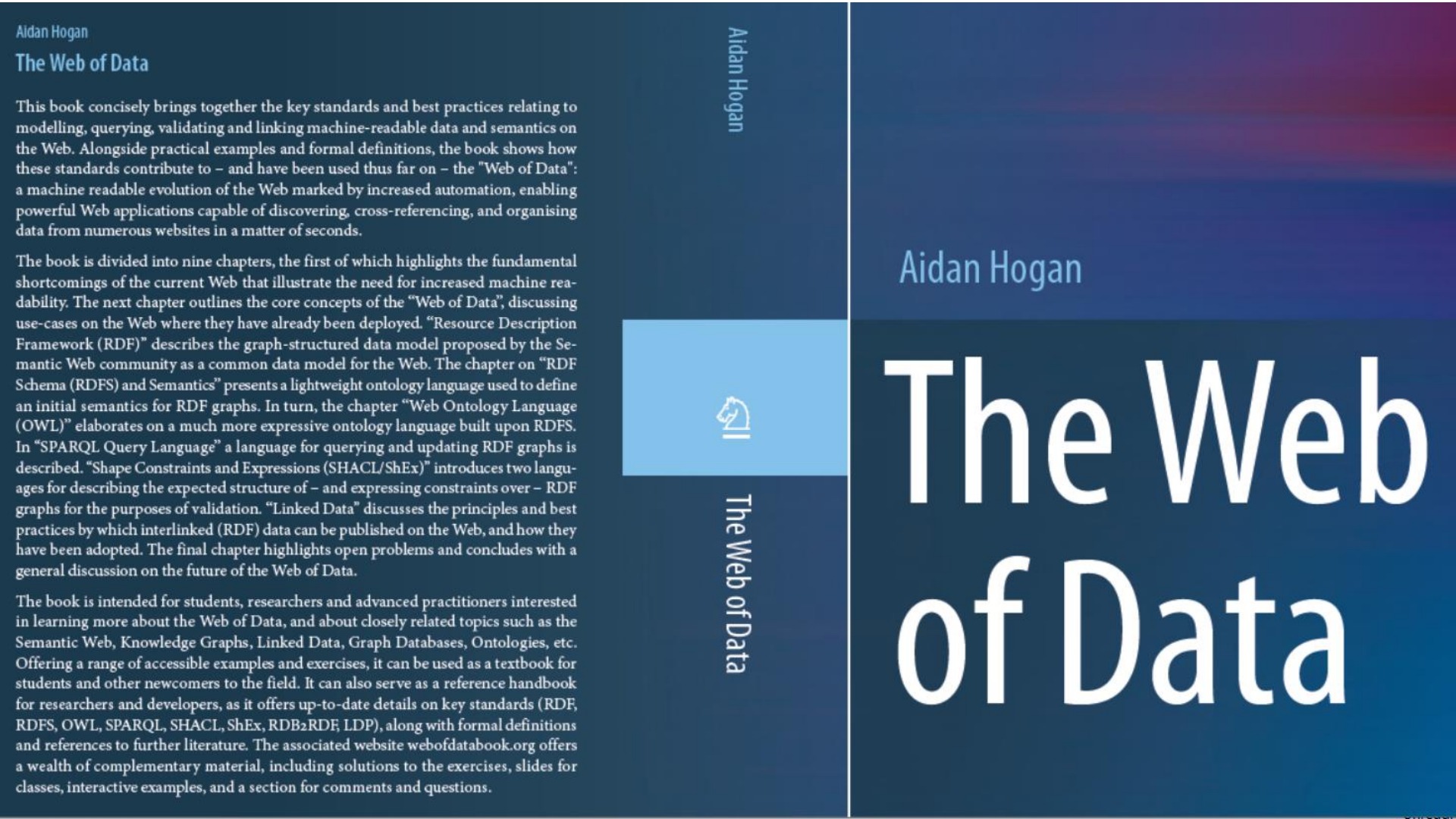
Structure of the course

- Each week:
  - Class on Monday (learn concepts)
  - Lab on Wednesday (see concepts in practice)
  - Auxiliar session on Friday (Q&A)

- Marking structure:

70%	labs
20%	project
10%	reading group

Bibliography



Outcomes: Learn About the Semantic Web!

- An ongoing research topic here in the DCC
- Apply database, logic, AI, etc., to the Web
- Mix of theory and practical exercises
- The future of the Web?

Questions?