

CC7220-1

LA WEB DE DATOS

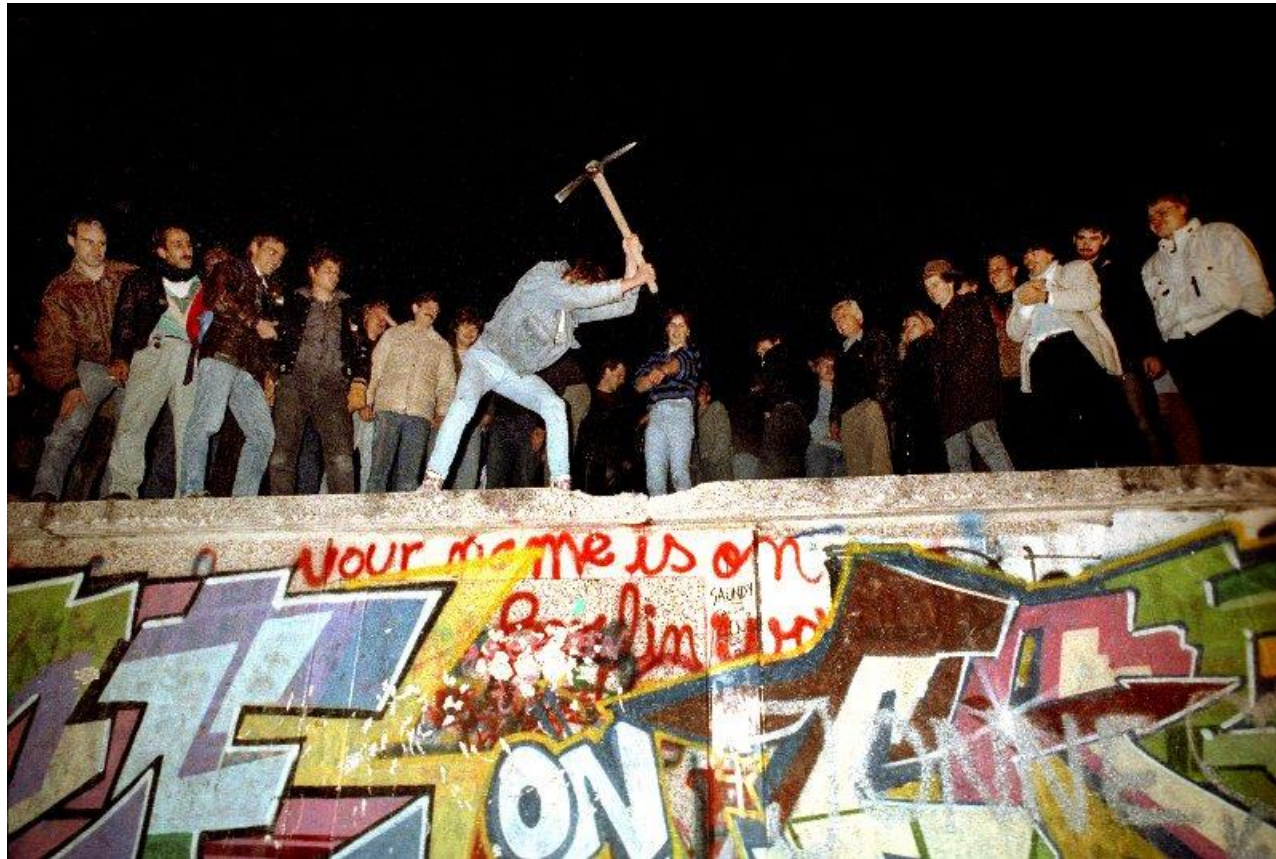
PRIMAVERA 2019

LECTURE 1: INTRODUCTION

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THE WEB

THE WEB IS NOW 30 YEARS OLD



THE FUTURE OF THE WEB?



What will the Web be like in 30 years time?



THE SEMANTIC WEB?

SEMANTIC WEB?

The Google logo is centered on the page, featuring its characteristic multi-colored letters: 'G' in blue, 'o' in red, 'o' in yellow, 'g' in blue, 'l' in green, and 'e' in red.

semantic web



Google Search

I'm Feeling Lucky

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."

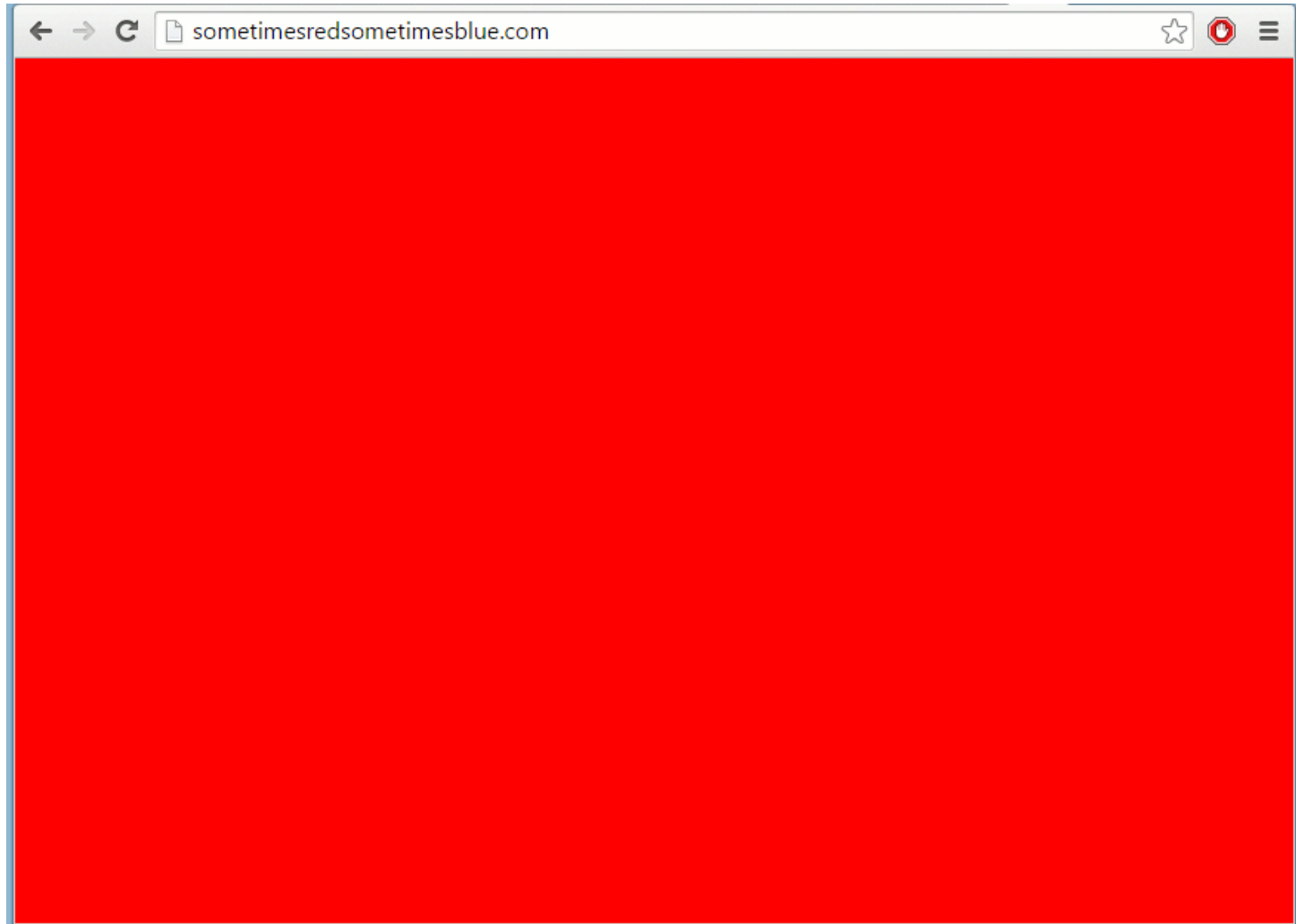
– Berners-Lee, "The Semantic Web" *American Scientist*. 284(5):34–43.



Consider answering: "What is the Web?"

WHAT'S WRONG WITH THE
CURRENT WEB?

THE CURRENT WEB IS FANTASTIC!



Google is also pretty great



movie what's in the box



Seven (stylized as SE7EN) is a 1995 American crime thriller **film** directed by David Fincher and written by Andrew Kevin Walker. It stars Brad Pitt, Morgan Freeman, Gwyneth Paltrow, John C. McGinley, R. Lee Ermey, and Kevin Spacey.



[Seven \(1995 film\) - Wikipedia](#)

[https://en.wikipedia.org/wiki/Seven_\(1995_film\)](https://en.wikipedia.org/wiki/Seven_(1995_film))



da da da dum symphony



[Web](#) [Videos](#) [News](#) [Shopping](#) [Images](#) [More](#) [Search tools](#)

About 107,000 results (0.36 seconds)



[Beethoven - Symphony No. 5 in C Minor \(1\) - YouTube](#)
www.youtube.com/watch?v=W2qW6fOtAMY



sometimes when i'm

- sometimes when i'm **alone i use comic sans**
- sometimes when i'm **alone i google myself**
- sometimes when i'm **alone i cry**
- sometimes when i'm **all alone**
- sometimes when i'm **dreaming**
- sometimes when i'm **sad i like to cut myself**
- sometimes when i'm **dreaming lyrics**
- sometimes when i'm **alone**
- sometimes when i'm **driving on the road at night**
- sometimes when i'm **alone i wonder**

Google Search

I'm Feeling Lucky

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 ...



W List of Nobel laureates in | x

W List of Nobel laureates in x W Sully Prudhomme - Wikip x

W List of Nobel laureates in x W Sully Prudhomme - Wikip x W Franco-Prussian War - Wikip x

W List of Nobel laureates in x W Sully Prudhomme - Wikip x W Franco-Prussian War - Wikip x W Theodor Mommsen - Wikip x

https://en.wikipedia.org/wiki/Theodor_Mommsen

Not logged in Talk Contributions Create account Log in

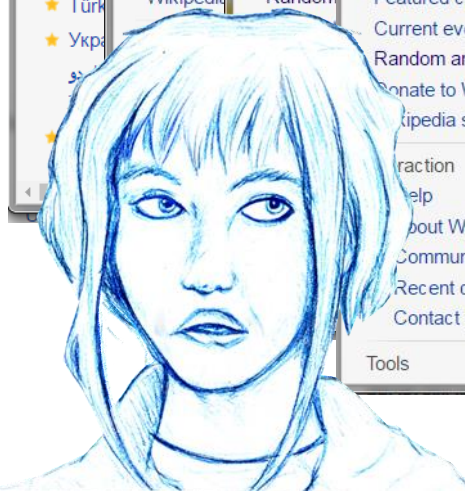
Article Talk Read Edit View history Search

Theodor Mommsen

From Wikipedia, the free encyclopedia

Christian Matthias Theodor Mommsen (30 November 1817 – 1 November 1903) was a German classical scholar, historian, jurist, journalist, politician, archaeologist^[1] and writer generally regarded as one of the greatest classicists of the 19th century. His work regarding Roman history is still of fundamental importance for contemporary research. He received the Nobel Prize in Literature in 1902 for being "the greatest living master of the art of historical writing, with special reference to his monumental work, *A History of Rome*", after having been nominated by 18 members of the Prussian

Theodor Mommsen



THE LAUREATE ALGORITHM (30 YEARS ON)



results := \emptyset

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

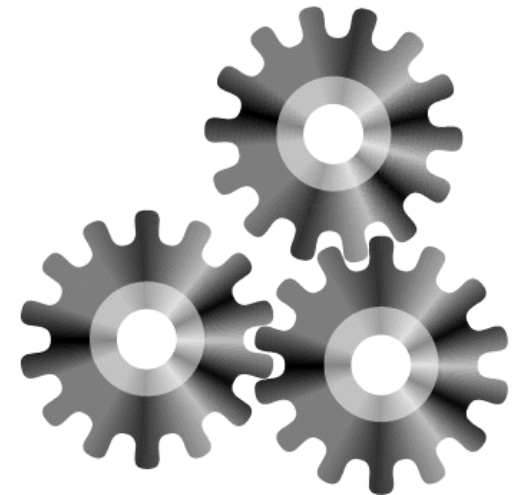
end

return *results*



THE LAUREATE ALGORITHM (60 YEARS 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?

PROBLEM WITH THE CURRENT WEB:
DESSERTS

GOING TO DINNER PARTY ...

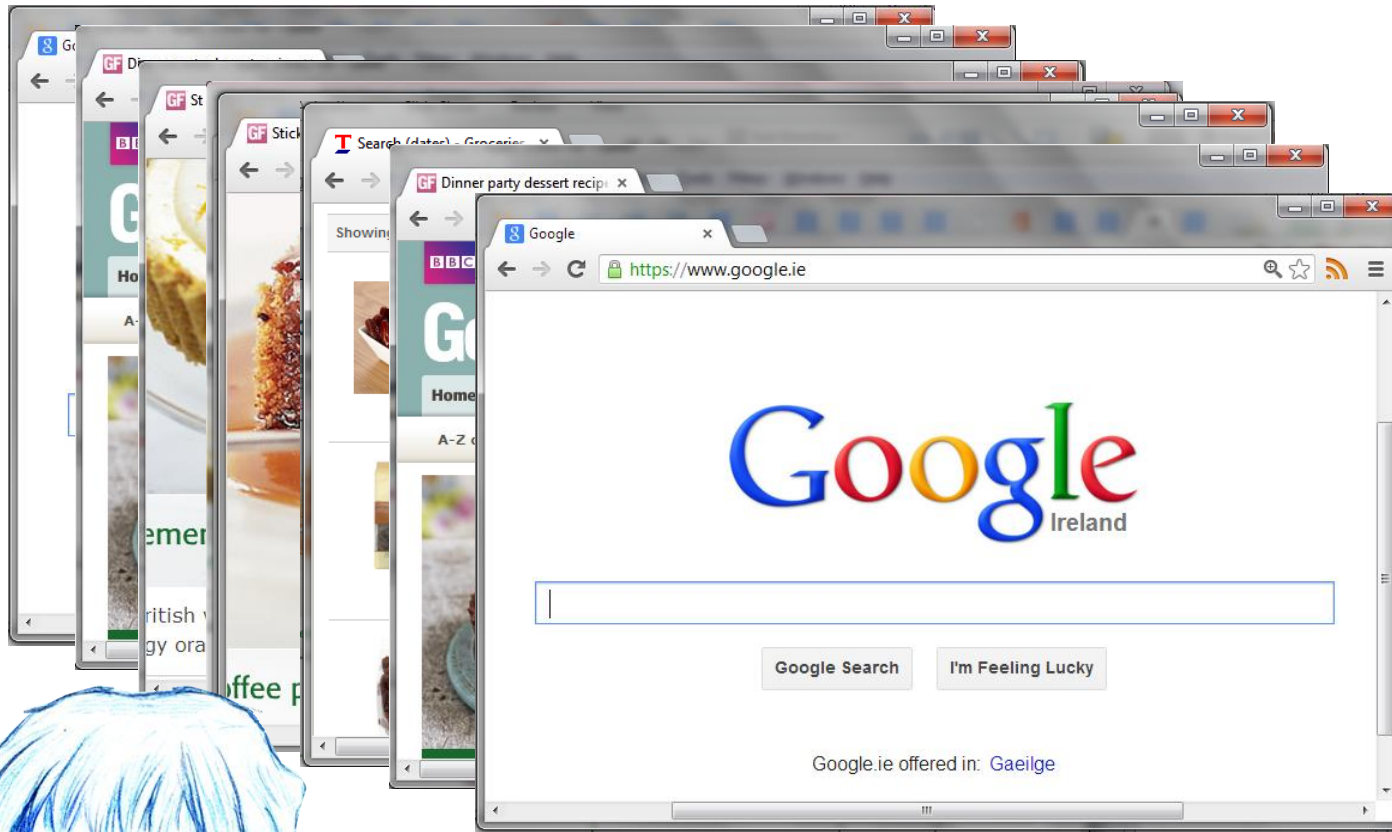


Looking for a recipe:

- Must be a dessert
- Must be citrus-free
- Ingredients available in local supermarket(s)
- Cheap (student)
- Must be delicious



USING THE CURRENT WEB ...



THE DESSERT ALGORITHM (30 YEARS ON)



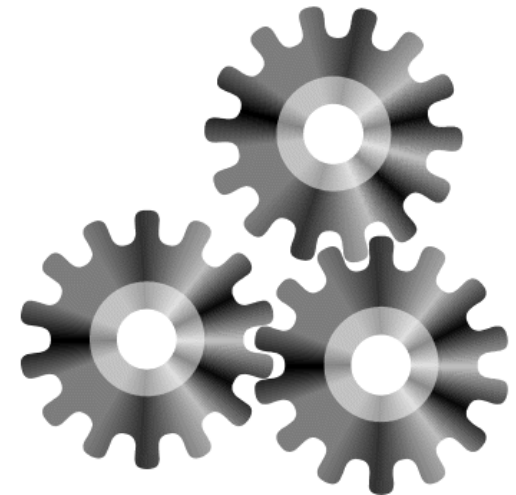
```
candidates := ∅
for all recipe-site in google-results
  for all dessert-recipe in recipe-site
    if dessert-recipe type looks-delicious
      suitable := true
      for all ingredient in dessert-recipe
        if searchNutrition(ingredient) type lemon or lime ...
          suitable := false
        else if searchShops(ingredient) type null or expensive
          suitable := false
        end
      end
      if suitable add dessert-recipe to candidates end
    end
  end
end
return candidates
```



THE DESSERT ALGORITHM (60 YEARS ON?)



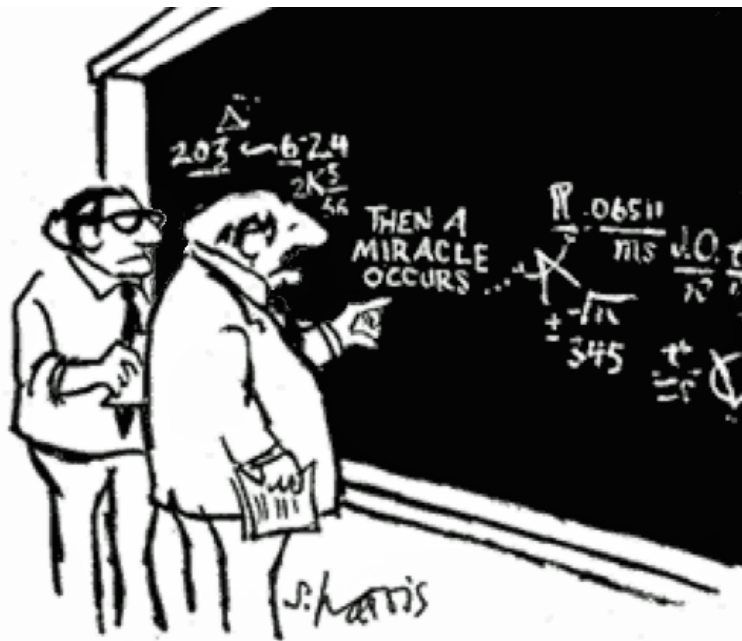
```
candidates :=  $\emptyset$   
for all safe-cheap-local-dessert-recipe in magical-sem-web-results()  
  if safe-cheap-local-dessert-recipe type looks-delicious  
    add safe-cheap-local-dessert-recipe to candidates end  
  end  
end  
return candidates
```



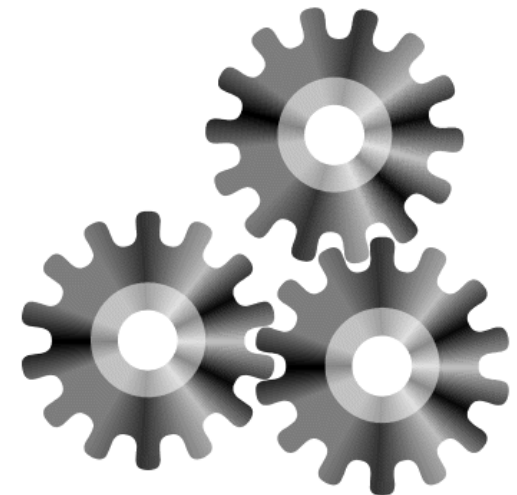
THE DESSERT ALGORITHM (60 YEARS ON?)



for all *safe-cheap-local-dessert-recipe* in [magical-sem-web-results\(\)](#)



"I THINK YOU SHOULD BE MORE EXPLICIT HERE IN STEP TWO."



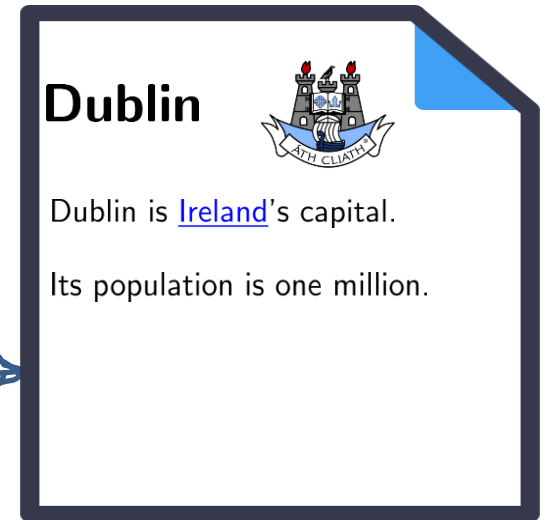
SO WHAT'S THE PROBLEM ...

THE CURRENT WEB IS DOCUMENT-CENTRIC

http://ex.org/Ireland



http://ex.org/Dublin



```
<html>
```

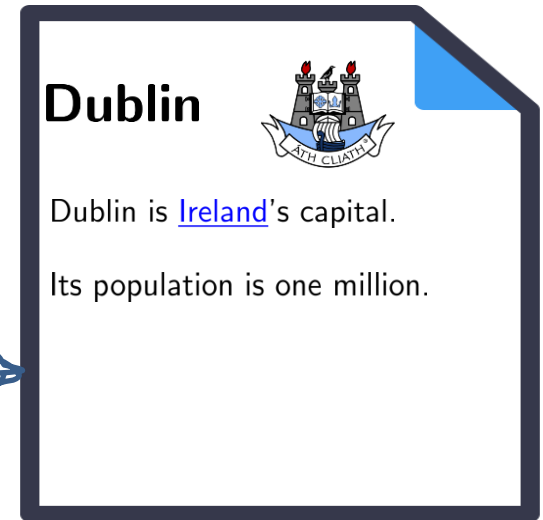
```
</html>
```

THE CURRENT WEB IS DOCUMENT-CENTRIC

http://ex.org/Ireland



http://ex.org/Dublin



```
<html>
  <body>
    <h1>Ireland</h1>
    <div class="flag"></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>

<http://ex.org/Dublin>

Ireland



Ireland is a European country.

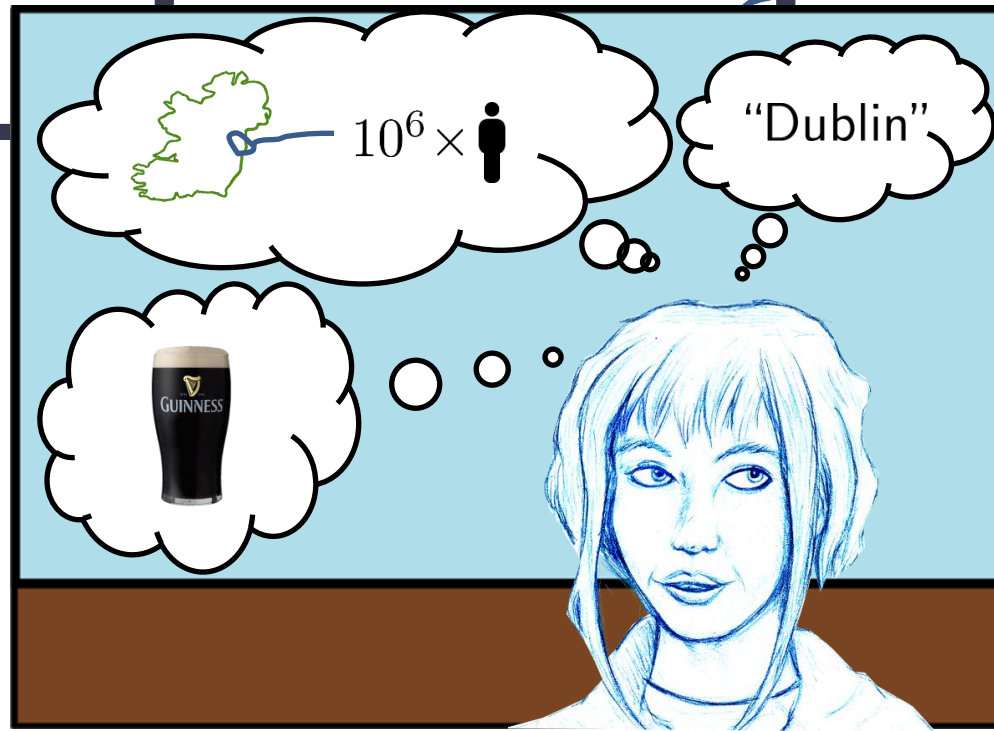
Its capital is [Dublin](#).

Dublin



Dublin is [Ireland](#)'s capital.

Its population is one million.



... ASSUMING THEY SPEAK THE LANGUAGE

<http://ex.org/Ireland>

<http://ex.cl/Dublín>

Ireland



Ireland is a European country.

Its capital is Dublin.

Dublín



Dublín es la capital de [Irlanda](#).

Su población es un millón.



EVEN WORSE FOR MACHINES

`http://ex.org/Ireland`

`http://ex.cl/Dublín`

Ireland



Ireland is a European country.

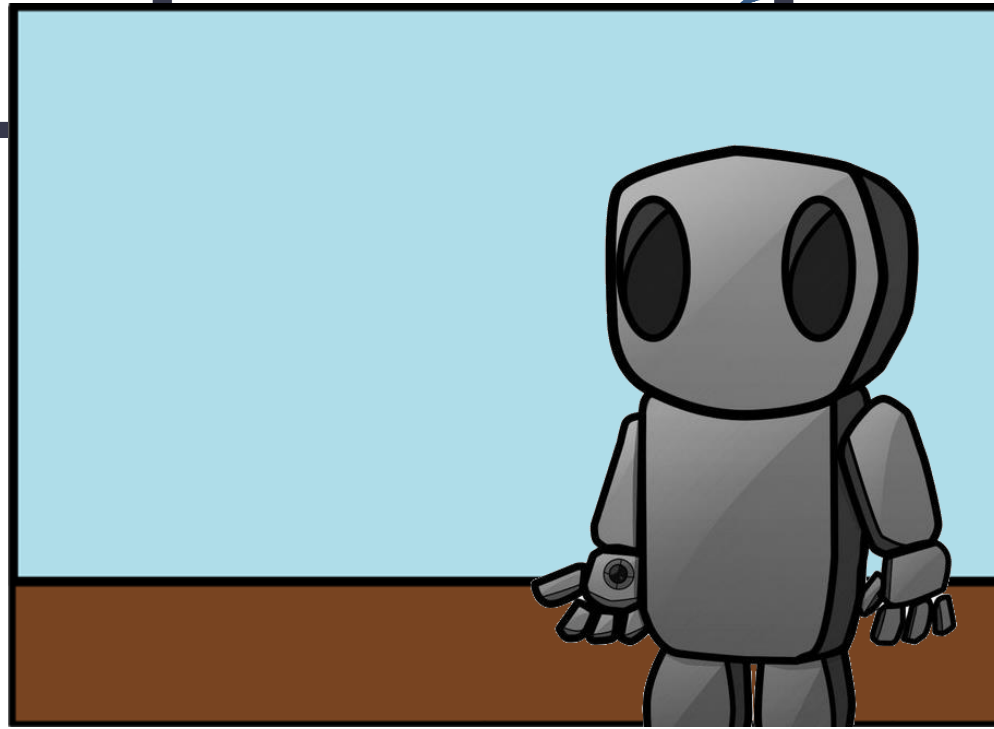
Its capital is [Dublin](#).

Dublín



Dublín es la capital de [Irlanda](#).

Su población es un millón.



YTYL NUGZY PUG MEBHOLYZ

`http://ex.org/0gyselw`

`http://ex.cl/Wdcsól`

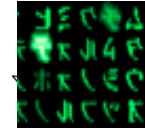
Ogyselw



Ogyselw oz e Ydguryel budlfgi.

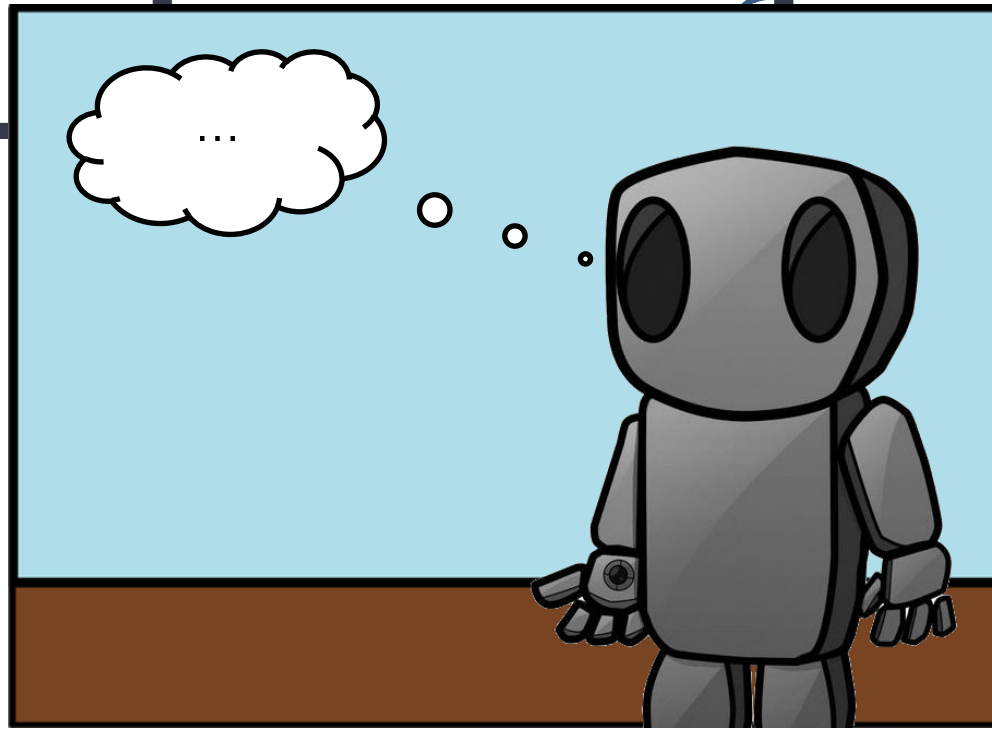
Ofz berofes oz [Wdcsol.](#)

Wdcsól



Wdcsól yz se berofes wy [Ogselwe.](#)

Zd rucseboúl yz dl mossúl.



SO WHAT'S THE PROBLEM ...

WHAT MACHINES CAN DO: FETCH DOCUMENTS



`http://ex.org/`



Ireland 

Ireland is a European country.

Its capital is [Dublin](#).

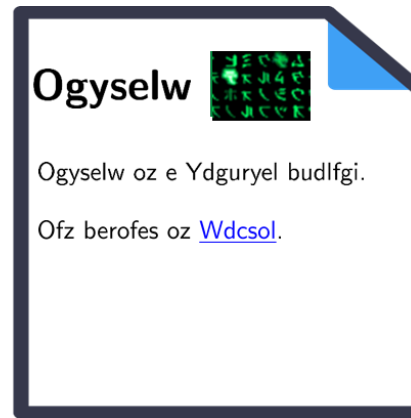
`http://`




HTML



WHAT MACHINES CAN DO: FIND DOCUMENTS

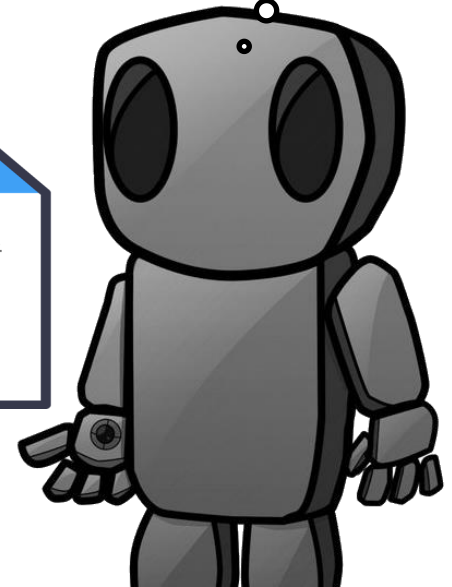
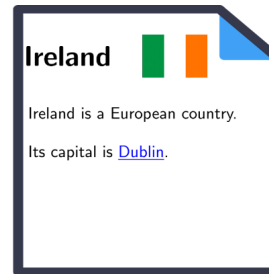


Google

ireland 

Google Search

I'm Feeling Lucky



ireland

ogyselw

WHAT MACHINES CANNOT DO: COMBINE SOURCES

`http://ex.org/0gyselw`

`http://ex.cl/Wdcsól`

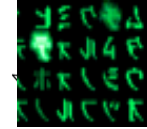
Ogyselw



Ogyselw oz e Ydguryel budlfgi.

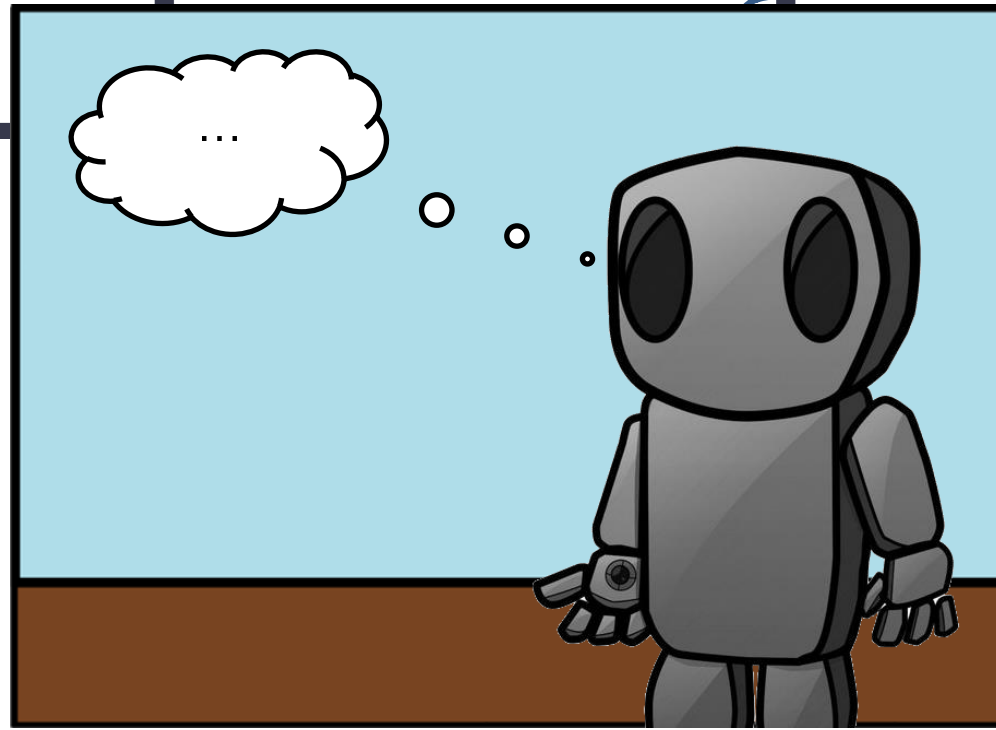
Ofz berofes oz [Wdcsol.](#)

Wdcsól



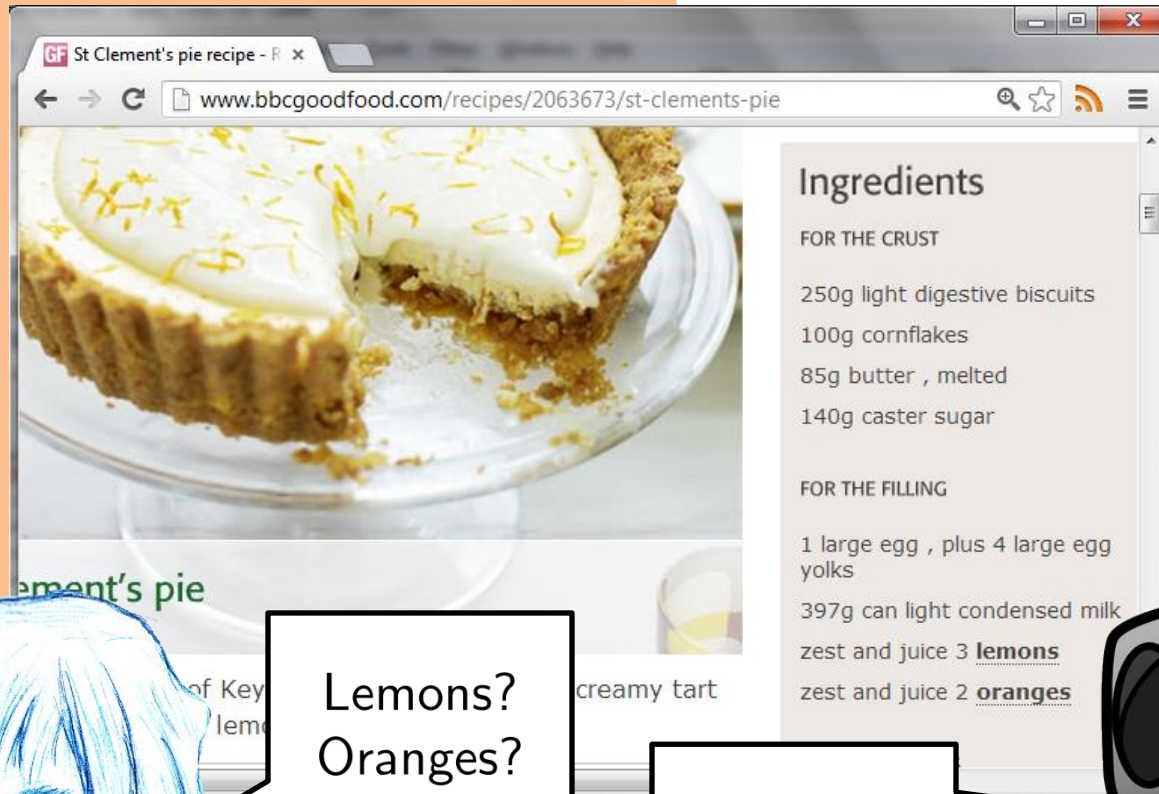
Wdcsól yz se berofes wy [Ogselwe.](#)

Zd rucseboúl yz dl mossúl.




TOWARDS A SEMANTIC WEB

LET'S LOOK AT THIS RECIPE ...




The screenshot shows a web browser window with the URL www.bbcgoodfood.com/recipes/2063673/st-clements-pie. The page features a large image of a St Clement's pie on a glass stand. To the right of the image is an 'Ingredients' section divided into two parts: 'FOR THE CRUST' and 'FOR THE FILLING'. The crust ingredients are 250g light digestive biscuits, 100g cornflakes, 85g butter (melted), and 140g caster sugar. The filling ingredients are 1 large egg plus 4 large egg yolks, 397g can light condensed milk, zest and juice of 3 lemons, and zest and juice of 2 oranges.

Section	Ingredient	Quantity
FOR THE CRUST	light digestive biscuits	250g
	cornflakes	100g
	butter, melted	85g
	caster sugar	140g
FOR THE FILLING	large egg, plus 4 large egg yolks	1
	can light condensed milk	397g
	zest and juice	3 lemons
	zest and juice	2 oranges

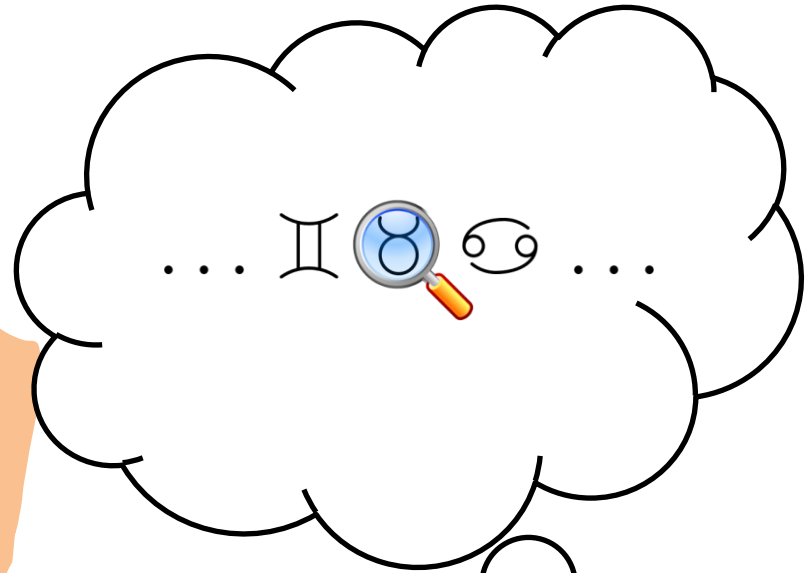


Lemons?
Oranges?
Citrus!!

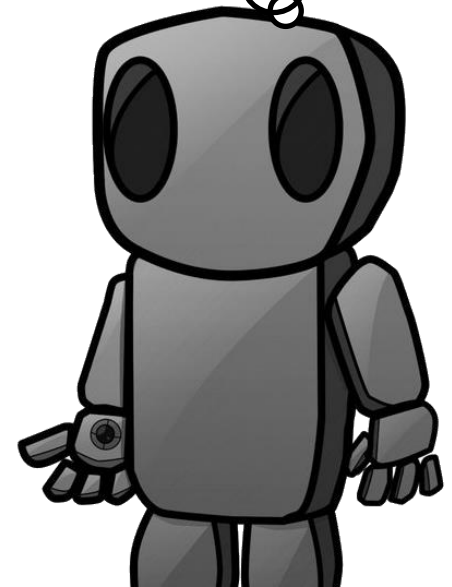


♊?
♋?
♌?

CAN MACHINES BE TAUGHT TO "UNDERSTAND"?



Lemon



EDSGER W. DIJKSTRA

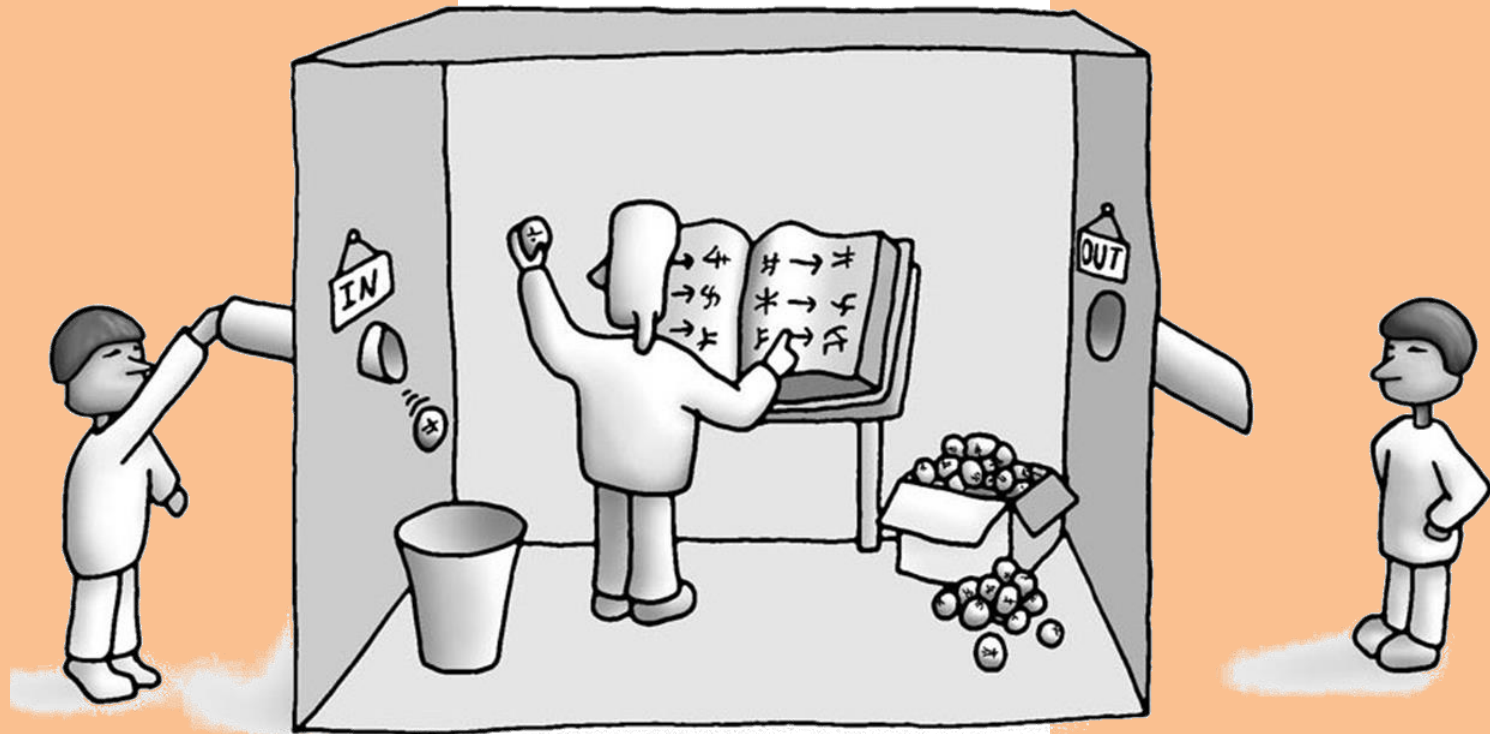


The question of whether computers
can think is like the question of
whether submarines can swim.

Edsger W. Dijkstra

SEARLE'S CHINESE ROOM

SEARLE'S CHINESE ROOM ...



SEARLE'S CHINESE ROOM (NATURAL LANGUAGE)

<http://ex.org/Ogyselw>

<http://ex.org/Wdcsol>

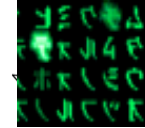
Ogyselw



Ogyselw oz e Ydguryel budlfgi.

Ofz berofes oz [Wdcsol](#).

Wdcsol



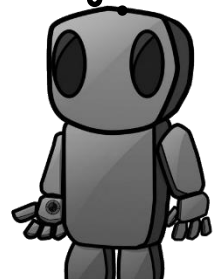
Wdcsol oz fhy berofes up [Ogyselw](#).

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 ...

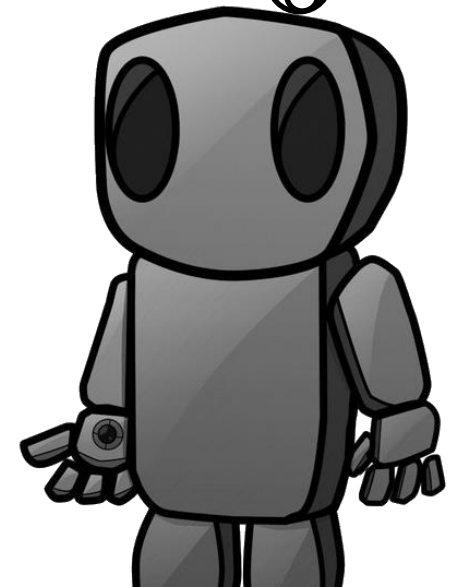


Ireland

IE

Irlanda

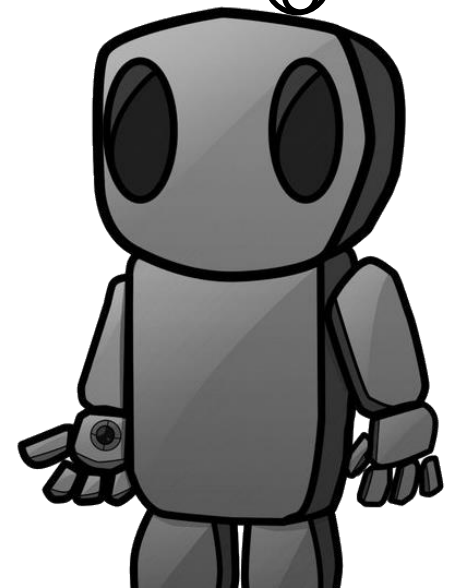
Rep. of Ireland



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.

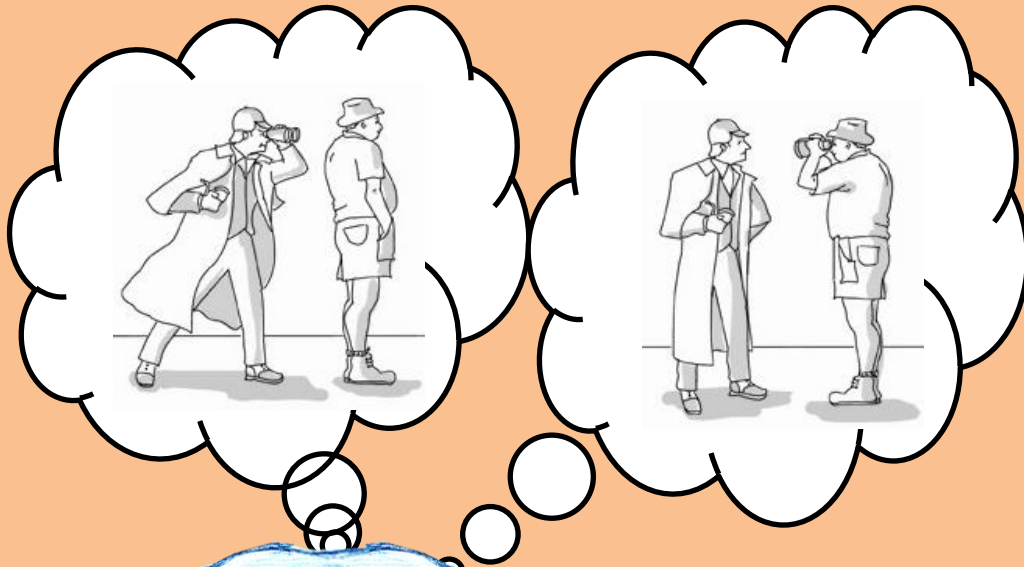
[Dublin] Its population is one million.

La población de Dublín es un millón.



MULTIPLE MEANINGS FOR THE SAME SAYING ...

Sherlock saw the man using binoculars.

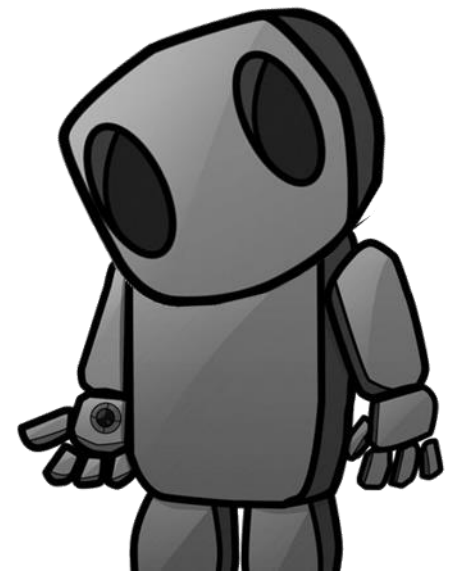


NOT SAYING WHAT IS MEANT ...

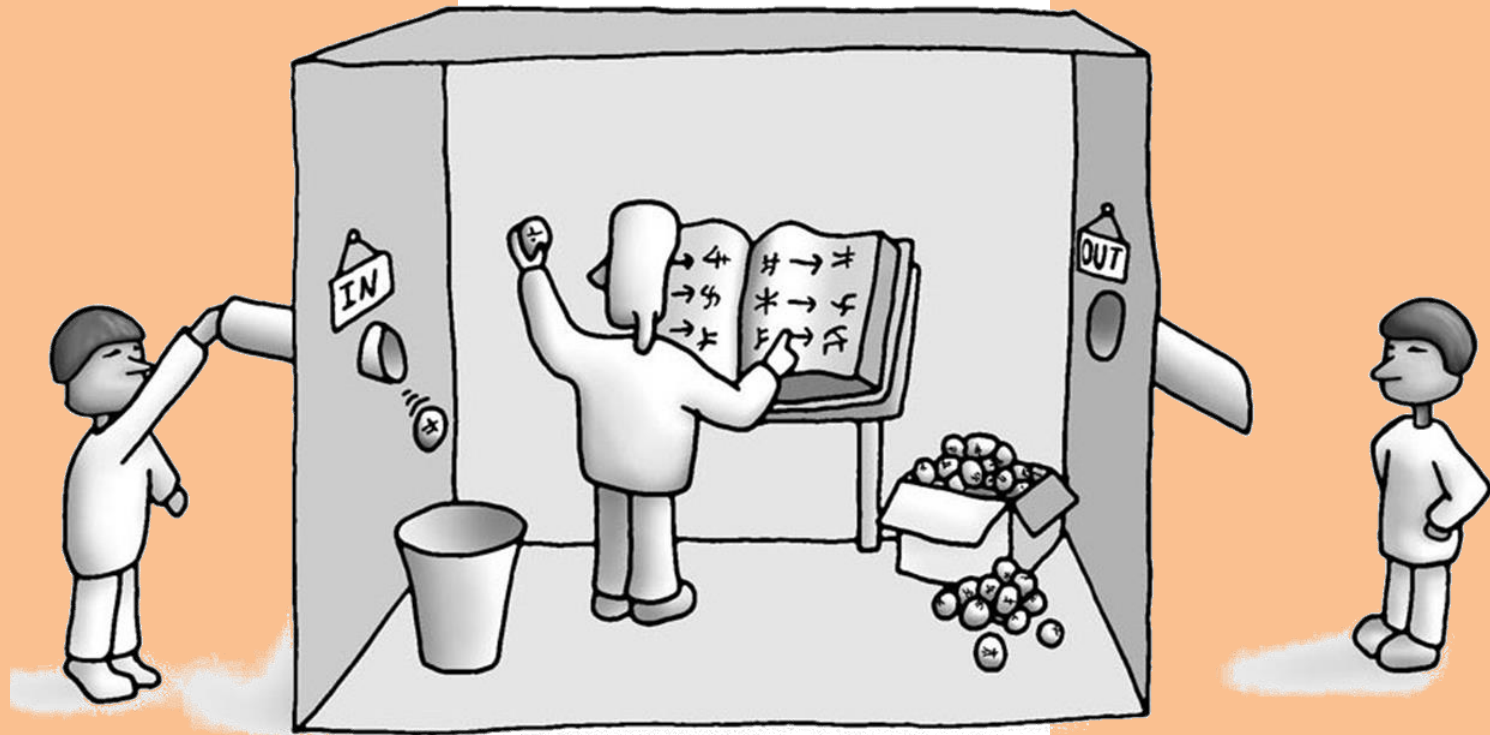
Fred está arriba la pelota.



THE SEMANTIC GAP



WHAT IF WE COULD "STRUCTURE" EVERYTHING ...



ONE SYMBOL, ONE MEANING ...



Ireland

IE

Irlanda

Rep. of Ireland



Ⓟ

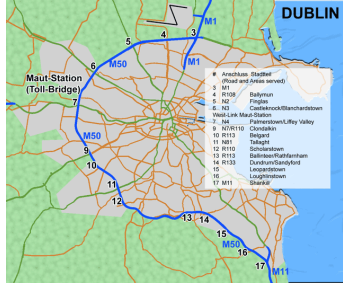
♂

☾

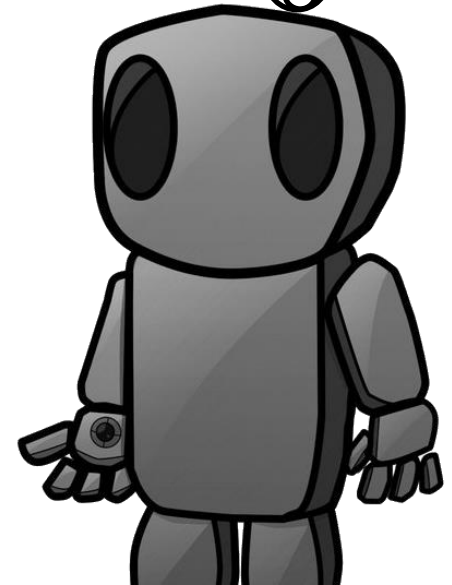
₣



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.

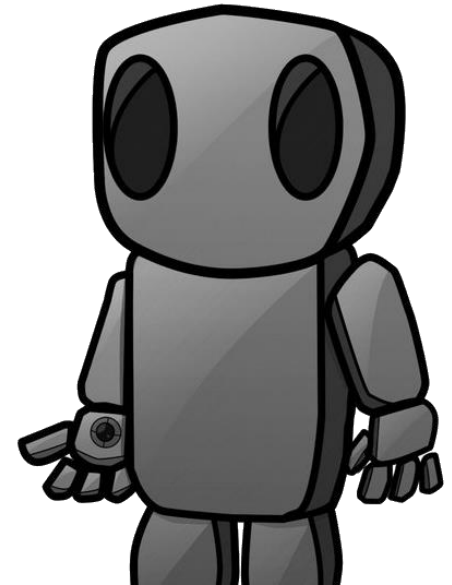
One million people live in Dublin.

[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>

<http://ex.org/Wdcsol>

Ogyselw



Ogyselw oz e Ydguryel budlfgi.

Ofz berofes oz [Wdcsol](#).

Wdcsol



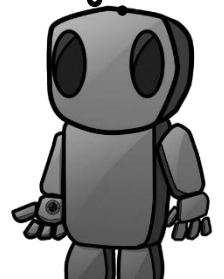
Wdcsol oz fhy berofes up [Ogyselw](#).

Ofz rurdsefoul oz uly mossoul.

INPUT: “Nhef oz fhy rurdsefoul up fhy berofes up Ogyselw?”

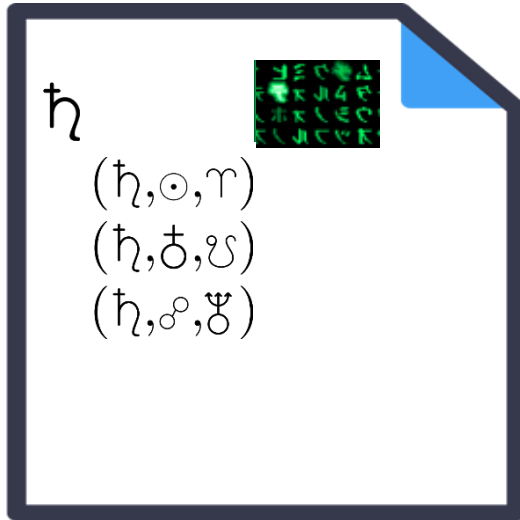
... what should the output be?

OUTPUT: “uly mossoul”

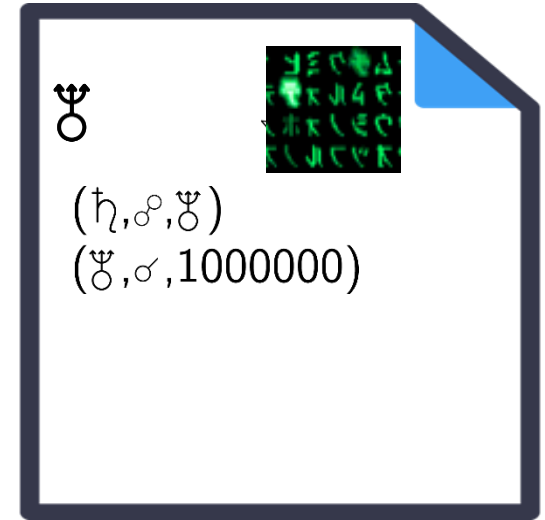


SEARLE'S CHINESE ROOM (SYMBOLIC)

<http://ex.org/h>



<http://ex.org/y>



INPUT: “(h, s, x), (x, s, y)?”


... what should the output be?

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




SEARLE'S CHINESE ROOM (SYMBOLIC)

<http://ex.org/Ireland>

Ireland 

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

<http://ex.org/Dublin>

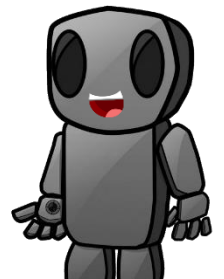
Dublin 

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

INPUT: “(Ireland,capital, x), (x ,population, y)?”

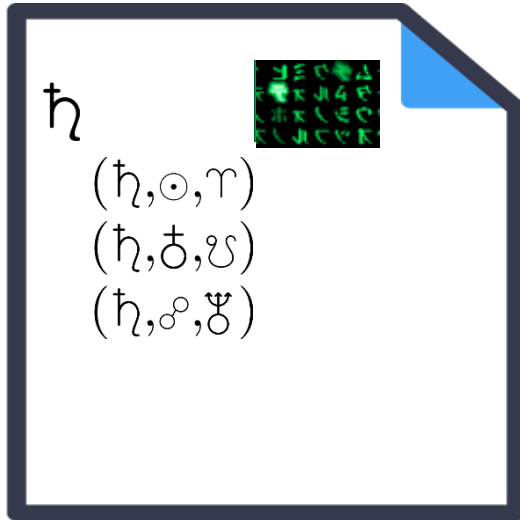
... what should the output be?

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

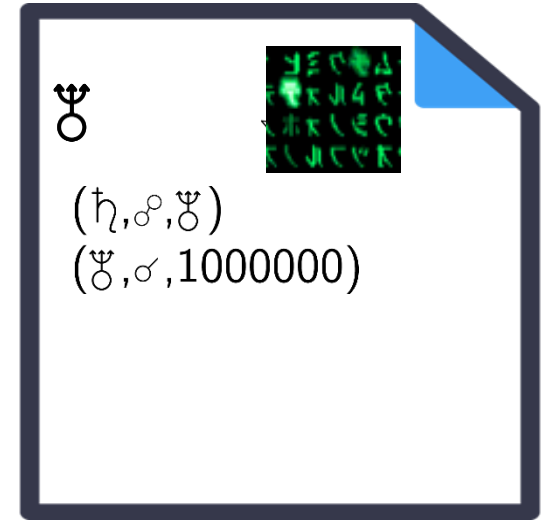


SEARLE'S CHINESE ROOM II

<http://ex.org/h>



<http://ex.org/y>



INPUT: “(x, o, y)?”


... what should the output be?

OUTPUT: $\{(x \mapsto h, y \mapsto r)\}$




SEARLE'S CHINESE ROOM II

<http://ex.org/Ireland>

Ireland 

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

<http://ex.org/Dublin>

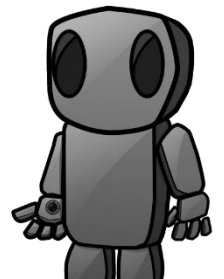
Dublin 

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

INPUT: “(x ,partOf, y)?”

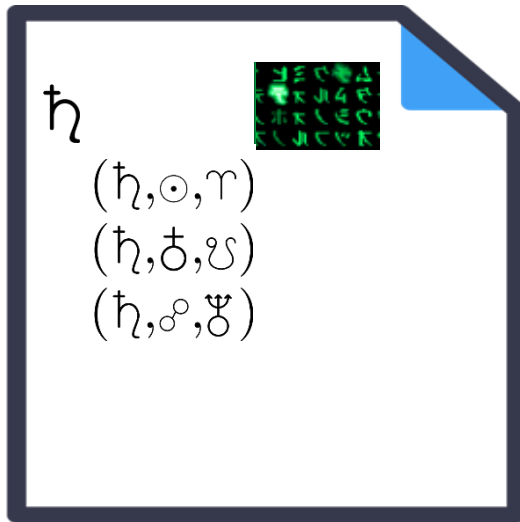
... what should the output be?

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

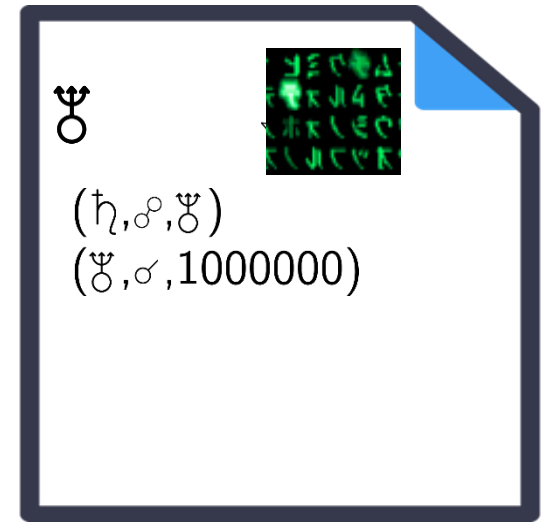


SEARLE'S CHINESE ROOM II

<http://ex.org/h>



<http://ex.org/♂>



RULE: “(b, ♂, a) → (a, ⊙, b)”

INPUT: “(x, ⊙, y)?”

... what should the output be?

OUTPUT: $\{(x \mapsto h, y \mapsto ㄥ), (x \mapsto ♂, y \mapsto h)\}$




SEARLE'S CHINESE ROOM II

<http://ex.org/Ireland>

Ireland 

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

<http://ex.org/Dublin>

Dublin 

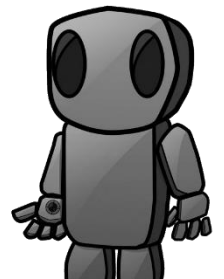
(Ireland,capital,Dublin)
(Dublin,population,1000000)

RULE: “(b,capital,a) → (a,partOf,b)”

INPUT: “(x,partOf,y)?”

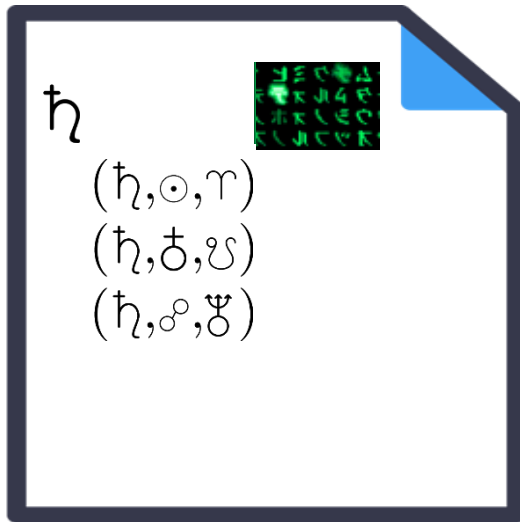
... what should the output be?

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

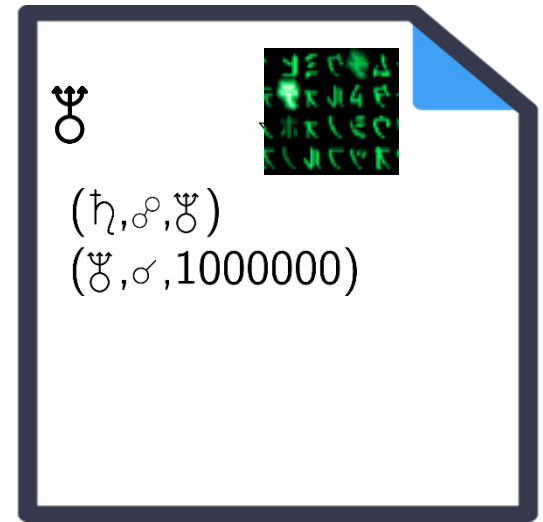


SEARLE'S CHINESE ROOM II

<http://ex.org/h>



<http://ex.org/y>

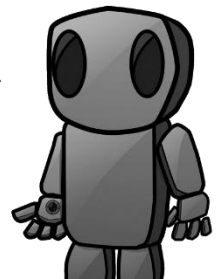


RULES: “(b, s, a) → (a, o, b)”
“(a, o, b), (b, o, c) → (a, o, c)”

INPUT: “(x, o, y)?”


... what should the output be?

OUTPUT: $\{(x \mapsto h, y \mapsto r), (x \mapsto y, y \mapsto h), (x \mapsto y, y \mapsto r)\}$




SEARLE'S CHINESE ROOM II

<http://ex.org/Ireland>

Ireland 

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

<http://ex.org/Dublin>

Dublin 

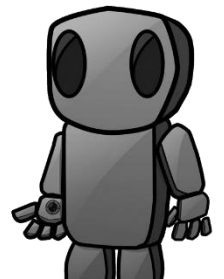
(Ireland,capital,Dublin)
(Dublin,population,1000000)

RULES: $“(b, \text{capital}, a) \rightarrow (a, \text{partOf}, b)”$
 $“(a, \text{partOf}, b), (b, \text{partOf}, c) \rightarrow (a, \text{partOf}, c)”$

INPUT: $“(x, \text{partOf}, y)”$

... what should the output be?

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



SEMANTIC WEB: DATA, LOGIC, QUERY

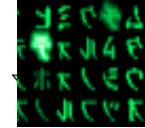
DATA:

Ireland



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

Dublin



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

LOGIC: $“(b, \text{capital}, a) \rightarrow (a, \text{partOf}, b)”$
 $“(a, \text{partOf}, b), (b, \text{partOf}, c) \rightarrow (a, \text{partOf}, c)”$

QUERY: $“(x, \text{partOf}, y)”$

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 ...



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- [Community portal](#)
- [Project chat](#)
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- [Recent changes](#)
- [Random item](#)
- [Query Service](#)
- [Nearby](#)
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[Discussion](#)

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- [Community portal](#)
- [Project chat](#)
- [Create a new item](#)
- [Recent changes](#)
- [Random item](#)
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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

Nationalmannschaft²

2007	Chile U-20	
2006–	Chile	76 (25)

PROBLEM 2: COMPLEX LISTS OF THINGS

MANUALLY EDITED BY USERS



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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.*

Top goalscorers [\[edit\]](#)

As of September 1, 2016

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

#	Name	International Career	Caps	Goals	#	Name	International Career	Goals	Caps
1.	Claudio Bravo	2004 –	106	0	1.	Marcelo Salas	1994–2007	37	70
2.	Alexis Sánchez	2006 –	102	34	2.	Iván Zamorano	1987–2001	34	69
3.	Gary Medel	2007 –	96	7		Alexis Sánchez	2006 –	34	102
4.	Gonzalo Jara	2006 –	95	3	(list)				
						Eduardo			

ALEXIS SCORES A GOAL ...



Now an army of human editors has to manually update a bunch of articles: different languages, lists, ...

SOLUTION: WIKIDATA



- [Main page](#)
- [Community portal](#)
- [Project chat](#)
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- [Recent changes](#)
- [Random item](#)
- [Query Service](#)
- [Nearby](#)
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- [Donate](#)

[Main Page](#)

[Discussion](#)

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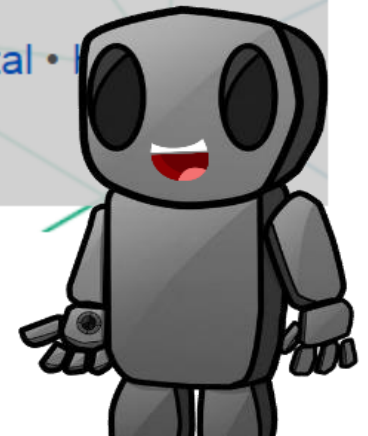
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Alexis Alejandro Sánchez Sánchez (Q180553)

Chilean footballer

[edit](#)

Chiqui

[► In more languages](#)

Statements

sex or gender	male ► 1 reference	edit
		+ add

member of sports team	Cobreloa ► 1 reference	edit
	Udinese Calcio ► 1 reference	edit
	Arsenal F.C ► 1 reference	edit
	Club Atlético River Plate	edit


- [Main page](#)
- [Community portal](#)
- [Project chat](#)
- [Create a new item](#)
- [Item by title](#)
- [Recent changes](#)
- [Random item](#)
- [Nearby](#)
- [Help](#)
- [Donate](#)

- Print/export
- [Create a book](#)
 - [Download as PDF](#)
 - [Printable version](#)

- Tools
- [What links here](#)
 - [Related changes](#)
 - [Special pages](#)
 - [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 Sánchez | Alexis Sanchez | Alexis Sanches

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Declaraciones

sexo	<div> masculino  editar</div> <div>► 1 referencia</div> <div>+ añadir</div>
miembro del equipo deportivo	<div> Club de Deportes Cobreloa  editar</div> <div>► 1 referencia</div>
	<div> Udinese Calcio  editar</div> <div>► 1 referencia</div>
	<div> Arsenal Football Club  editar</div> <div>► 1 referencia</div>

- [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](#)
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Alexis Sánchez (Q180553)

chilenischer Fußballspieler

[✎ bearbeiten](#)

[Alexis Alejandro Sánchez Sánchez](#) | [Alexis Sanchez](#) | [Alexis Alejandro Sanchez Sanchez](#)

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Aussagen

Geschlecht	<input type="checkbox"/> <input type="checkbox"/> männlich ✎ bearbeiten
	▶ 1 Fundstelle
+ hinzufügen	

Mitglied von Sportmannschaft oder -verein	<input type="checkbox"/> <input type="checkbox"/> CD Cobreloa ✎ bearbeiten
	▶ 1 Fundstelle
	<input type="checkbox"/> <input type="checkbox"/> Udinese Calcio ✎ bearbeiten
	▶ 1 Fundstelle
	<input type="checkbox"/> <input type="checkbox"/> FC Arsenal ✎ bearbeiten
	▶ 1 Fundstelle
	<input type="checkbox"/> <input type="checkbox"/> CA River Plate ✎ bearbeiten

- [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](#)



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История



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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](#)
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- [Создать книгу](#)
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- [Ссылки сюда](#)
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- [Спецстраницы](#)
- [Постоянная ссылка](#)
- [Сведения о странице](#)
- [URI концепта](#)
- [Цитировать страницу](#)



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

- അച്ചടിയ്ക്കുക/കയറ്റുമതി ചെയ്യുക
- പുസ്തകം സൃഷ്ടിക്കുക
- PDF ആയി ഡൗൺലോഡ് ചെയ്യുക
- അച്ചടിയറുപം

- ഉപകരണങ്ങൾ
- ഈ താളിലേക്കുള്ള കണ്ണികൾ
- അനുബന്ധ മാറ്റങ്ങൾ
- പ്രത്യേക താളുകൾ
- സ്ഥിരംകണ്ണി
- താരിഖ്

അലക്സിസ് സാഞ്ചസ് (Q180553)

വിവരണമൊന്നും നിർവചിച്ചിട്ടില്ല ✎ തിരുത്തുക
 അപരനാമങ്ങളൊന്നും കണ്ടെത്താനായില്ല.

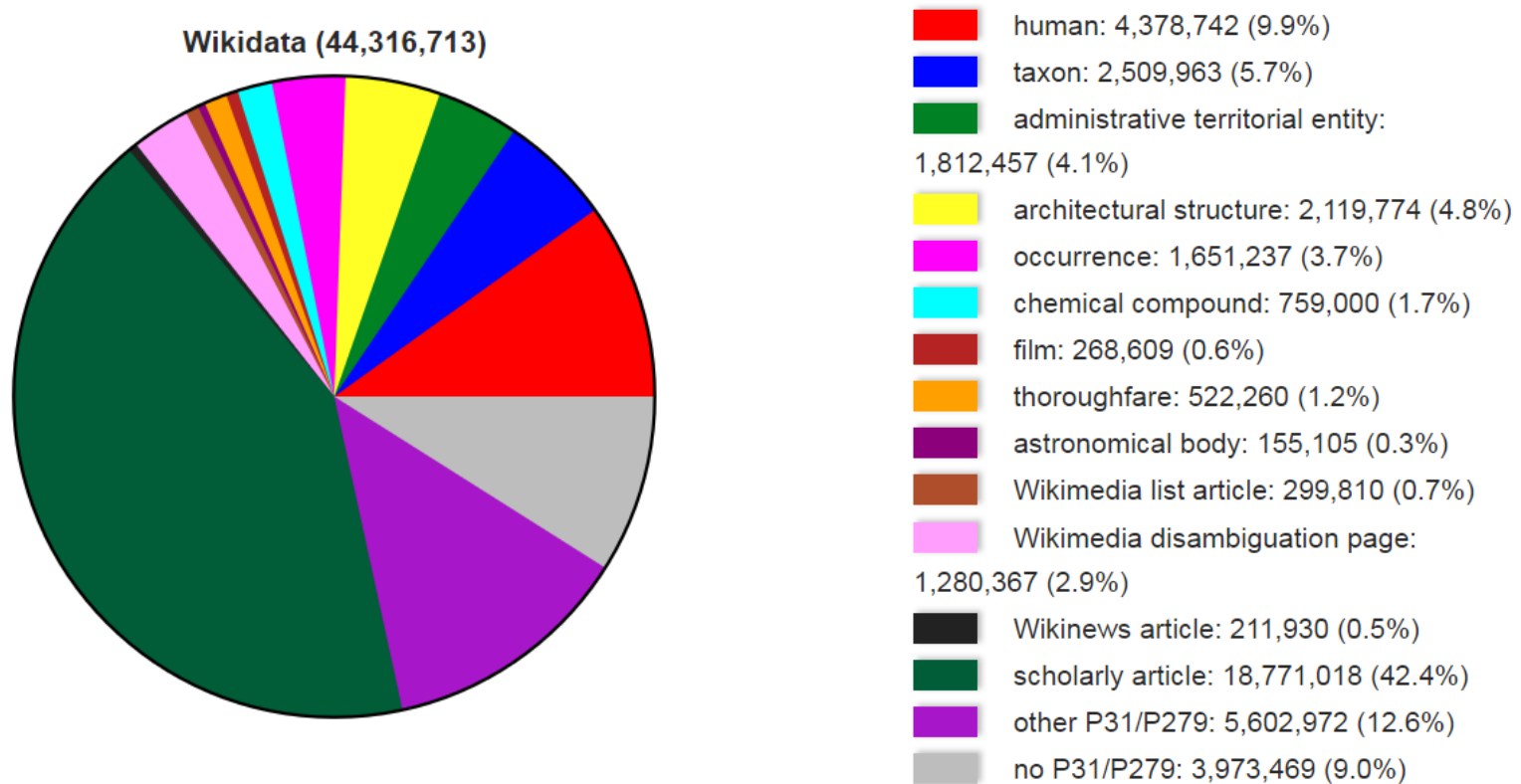
▶ കൂടുതൽ ഭാഷകളിൽ

Statements

ലിംഗം	<ul style="list-style-type: none"> പുരുഷൻ ▶ 1 സ്രോതസ്സ് 	✎ തിരുത്തുക
+ ചേർക്കുക		

member of sports team <i>ഇംഗ്ലീഷ്</i>	<ul style="list-style-type: none"> Cobreloa <i>ഇംഗ്ലീഷ്</i> ▶ 1 സ്രോതസ്സ് 	✎ തിരുത്തുക
	<ul style="list-style-type: none"> Udinese Calcio <i>ഇംഗ്ലീഷ്</i> ▶ 1 സ്രോതസ്സ് 	✎ തിരുത്തുക
	<ul style="list-style-type: none"> ആഴ്സണൽ എഫ്.സി. ▶ 1 സ്രോതസ്സ് 	✎ തിരുത്തുക
	<ul style="list-style-type: none"> Club Atlético River Plate <i>ഇംഗ്ലീഷ്</i> 	✎ തിരുത്തുക

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[Current events](#)
[Random article](#)
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[Interaction](#)

[Help](#)
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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 / ﻿23.00583°S 67.75917°W﻿ / -23.00583; -67.75917 ✎
Organization	<div><input type="text" value="Edit this at Wikidata"/> Observatory Max Planck Institute for Radio Astronomy Onsala Space Observatory ✎</div>
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

- Main page
- Contents
- Featured content
- Current events



- Main page
- Community portal
- Project chat
- Create a new item
- Recent changes
- Random item
- Query Service
- Nearby
- Help
- Donate

- Tools
- What links here
- Related changes
- Special pages

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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

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Atacama Pathfinder Experiment (Q753076) EX

radio telescope at

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Statements

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

Atacama Pathfinder Experiment



The APEX telescope

Observatory	Llano de Chajnantor Observatory edit
Location(s)	Atacama Desert, Chile edit
Coordinates	23°00′21″S 67°45′33″W﻿ / ﻿23.00583°S 67.75917°W﻿ / -23.00583; -67.75917 edit
Organization	<input type="text" value="Edit this at Wikidata"/> Observatory Max Planck Institute for Radio Astronomy Oonsala Space Observatory edit
Altitude	5,100 m (16,700 ft) edit
Wavelength	0.2, 1.5 mm (1.50, 0.20 THz)
First light	2004 edit
Telescope style	Cassegrain reflector Cosmic microwave background experiment Radio telescope edit



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
Maftai 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

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
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%33>

Wikidata Query Service Examples Prefixes Tools Help English

```
1 PREFIX wd: <http://www.wikidata.org/entity/>
2 PREFIX wdt: <http://www.wikidata.org/prop/direct/>
3 PREFIX p: <http://www.wikidata.org/prop/>
4 PREFIX ps: <http://www.wikidata.org/prop/statement/>
5 PREFIX pq: <http://www.wikidata.org/prop/qualifier/>
6 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
7
8 SELECT DISTINCT ?laureateName ?awardYear ?warName ?warYear
9 WHERE {
10  ?laureate p:P166 ?award .           # Winner of some prize
11  ?award ps:P166 wd:Q37922 .         # Prize is Nobel Pr. in Lit.
12  ?award pq:P585 ?awardDate .       # Get the date of the award
13  BIND(YEAR(?awardDate) as ?awardYear) # Get the year of the award
14  ?laureate wdt:P607 ?war .         # Find war(s) laureate was in
15  ?war rdfs:label ?warName .       # Get name(s) of war(s)
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
```

Find award received Nobel Prize in Literature

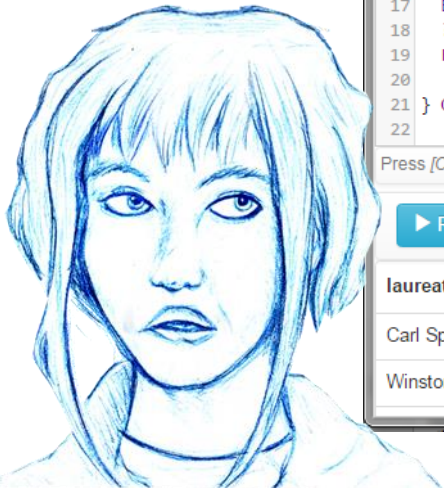
Show

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

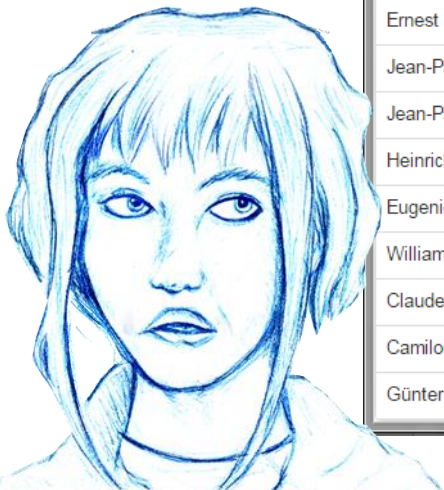
<https://query.wikidata.org/#PREFIX%20wd%3A%20%3Chttp%3A%2F%2Fwww.wikidata.org%2Fentity%2F%3>

```
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
    && 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

12 Results in 1589 ms

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

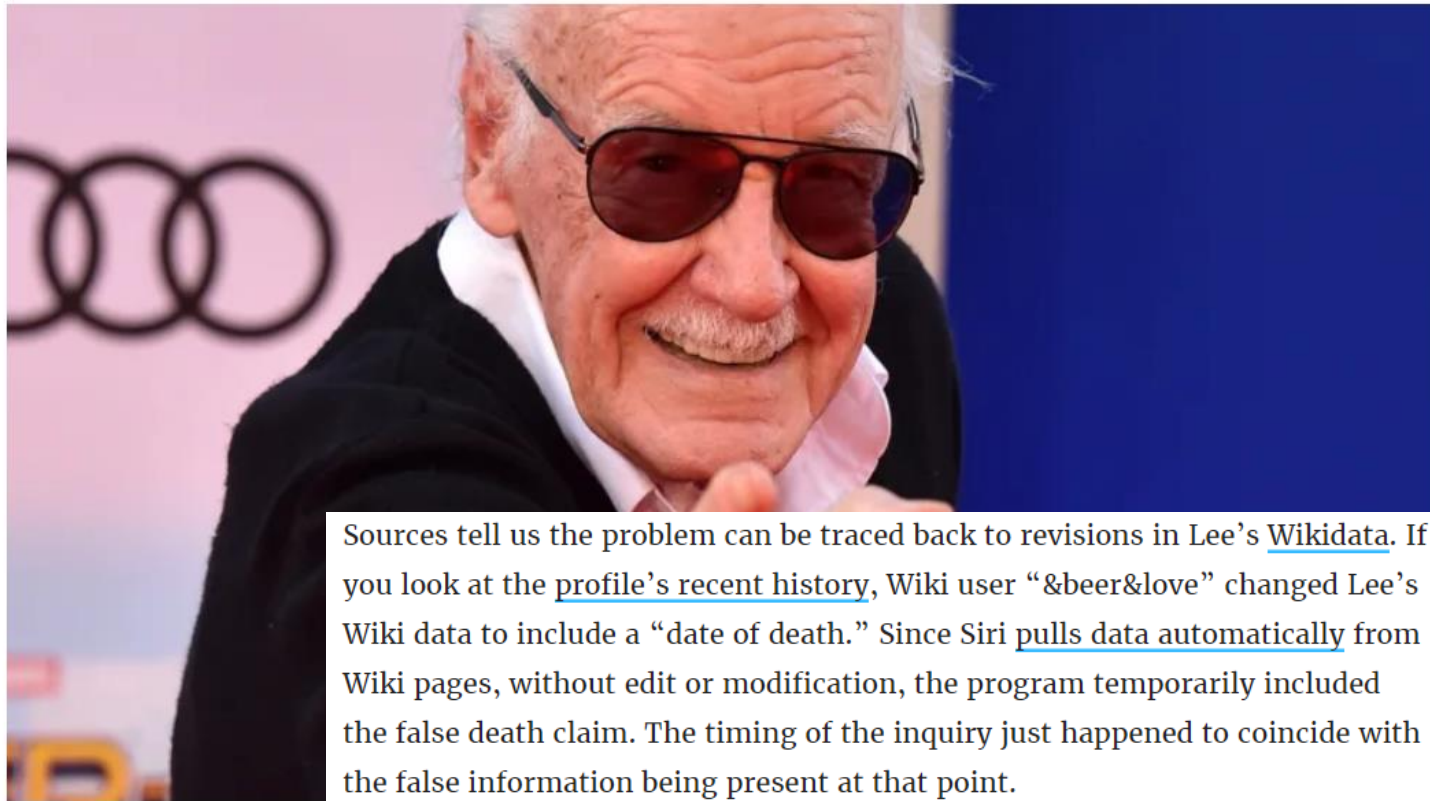
7/03/18 2:45pm • Filed to: STAN LEE ▾



17.4K

45

5



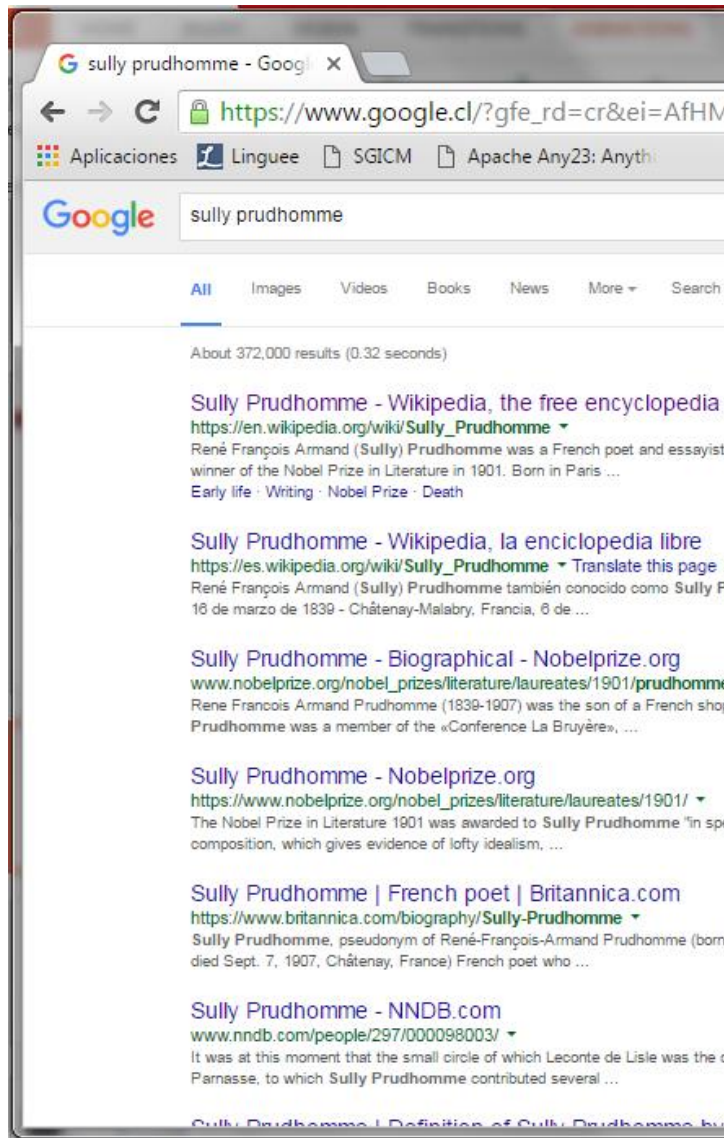
Sources tell us the problem can be traced back to revisions in Lee's [Wikidata](#). If you look at the [profile's recent history](#), Wiki user “&beer&love” changed Lee's Wiki data to include a “date of death.” Since Siri [pulls data automatically](#) from Wiki pages, without edit or modification, the 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 INFO-BOX



sully prudhomme - Google

https://www.google.cl/?gfe_rd=cr&ei=AfHM

Aplicaciones Linguee SGICM Apache Any23: Anyth

Google sully prudhomme

All Images Videos Books News More Search

About 372,000 results (0.32 seconds)

Sully Prudhomme - Wikipedia, the free encyclopedia
https://en.wikipedia.org/wiki/Sully_Prudhomme
René François Armand (Sully) Prudhomme was a French poet and essayist. winner of the Nobel Prize in Literature in 1901. Born in Paris ...
Early life · Writing · Nobel Prize · Death

Sully Prudhomme - Wikipedia, la enciclopedia libre
https://es.wikipedia.org/wiki/Sully_Prudhomme Translate this page
René François Armand (Sully) Prudhomme también conocido como Sully P
16 de marzo de 1839 - Châtenay-Malabry, Francia, 6 de ...

Sully Prudhomme - Biographical - Nobelprize.org
www.nobelprize.org/nobel_prizes/literature/laureates/1901/prudhomme
Rene Francois Armand Prudhomme (1839-1907) was the son of a French shop
Prudhomme was a member of the «Conférence La Bruyère», ...

Sully Prudhomme - Nobelprize.org
https://www.nobelprize.org/nobel_prizes/literature/laureates/1901/
The Nobel Prize in Literature 1901 was awarded to Sully Prudhomme "in spe
composition, which gives evidence of lofty idealism, ...

Sully Prudhomme | French poet | Britannica.com
<https://www.britannica.com/biography/Sully-Prudhomme>
Sully Prudhomme, pseudonym of René-François-Armand Prudhomme (born
died Sept. 7, 1907, Châtenay, France) French poet who ...

Sully Prudhomme - NNDB.com
www.nndb.com/people/297/000098003/
It was at this moment that the small circle of which Leconte de Lisle was the
Parnasse, to which Sully Prudhomme contributed several ...

Sully Prudhomme | Definition of Sully Prudhomme by



Sully Prudhomme

Poet

René François Armand Prudhomme was a French poet and essayist. He was the first ever winner of the Nobel Prize in Literature in 1901.
[Wikipedia](#)

Born: March 16, 1839, Paris, France

Died: September 6, 1907, Châtenay-Malabry, France

Books: [Les vaines tendresses](#)

Awards: [Nobel Prize in Literature](#)

People also search for

[View 10+ more](#)



Leconte de Lisle



Theodor Mommsen



Frédéric Mistral



Paul Verlaine



Gabriel Fauré

GOOGLE'S SEMANTIC SEARCH

The image shows a browser window with a Google search for "wife of william golding". The search results page displays the Google logo, the search query, and navigation options like "All", "Images", "Videos", "News", "More", and "Search tools". Below the navigation, it indicates "About 388,000 results (0.50 seconds)". The main result is a knowledge panel for "William Golding / Spouse", featuring the name "Ann Brookfield" in large text and "m. 1939–1993" below it. A "Feedback" link is visible at the bottom right of the panel. Below the knowledge panel, there is a "People also ask" section with the question "Who is William Golding?" and a dropdown arrow.

wife of william golding - C x

https://www.google.cl/?gfe_rd=cr&ei=AfHMV9-YCMqnxgT356mQDw&gws_rd=ssl#q=wife+of+william+g

Aplicaciones Linguee SGICM Apache Any23: Anyth Otros marcadores

Google wife of william golding

All Images Videos News More Search tools

About 388,000 results (0.50 seconds)

William Golding / Spouse

Ann Brookfield
m. 1939–1993

Feedback

People also ask

Who is William Golding?

USING SEMANTIC WEB KNOWLEDGE-BASES

From Freebase to Wikidata: The Great Migration

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Wikimedia, Berlin, Germany
lydia@pintscher.de

ABSTRACT

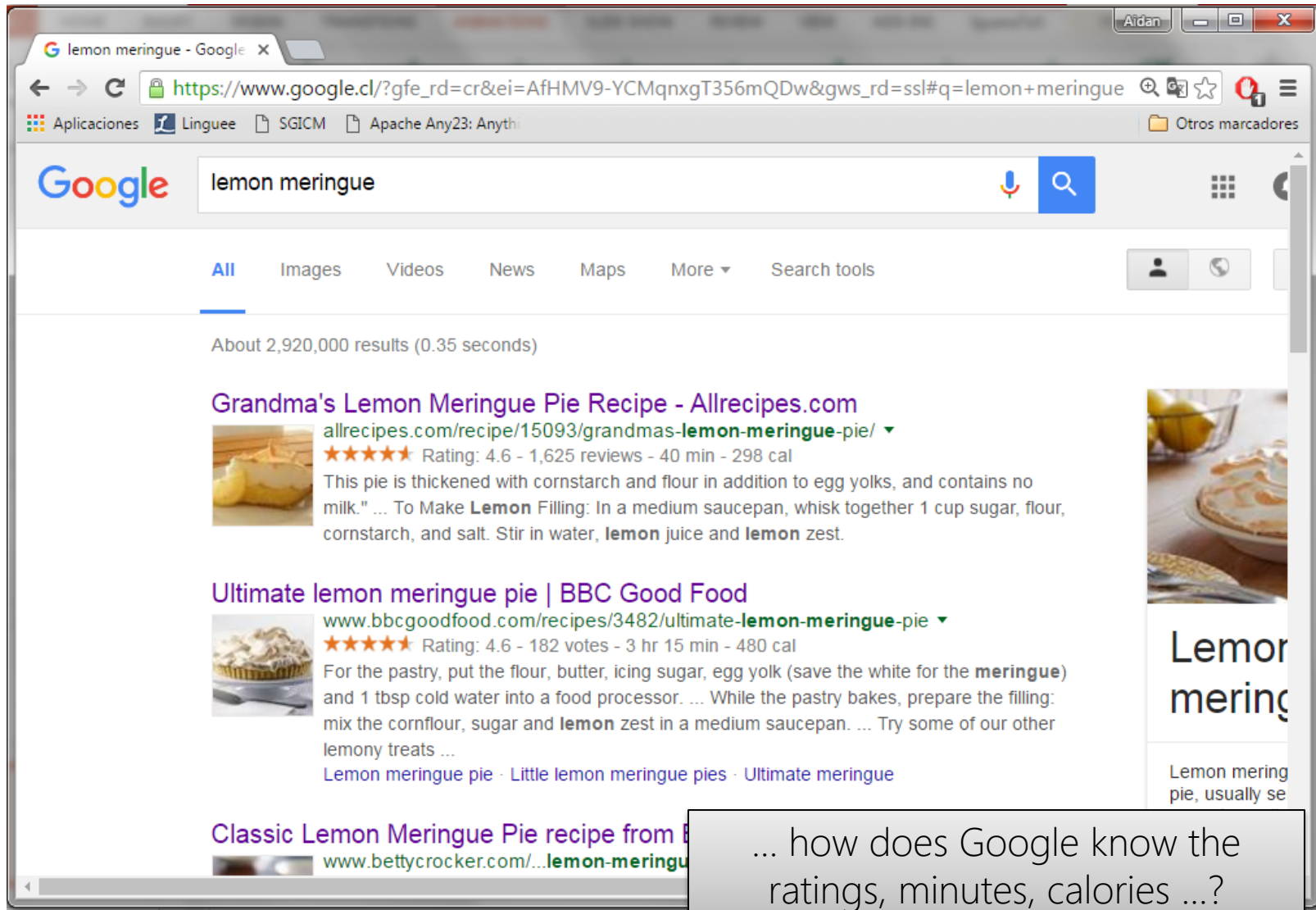
Collaborative knowledge bases that make their data freely available in a machine-readable form are central for the data strategy of many projects and organizations. The two major collaborative knowledge bases are Wikimedia's Wikidata and Google's Freebase. Due to the success of Wikidata, Google decided 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 ...



The screenshot shows a Google search for "lemon meringue" in a browser window. The search results are displayed in a clean, organized layout. The first result is "Grandma's Lemon Meringue Pie Recipe - Allrecipes.com", which includes a small image of the pie, a star rating of 4.6, 1,625 reviews, a 40-minute preparation time, and 298 calories. The second result is "Ultimate lemon meringue pie | BBC Good Food", also featuring a small image, a 4.6 rating, 182 votes, a 3-hour 15-minute preparation time, and 480 calories. The third result is "Classic Lemon Meringue Pie recipe from Betty Crocker". A callout box at the bottom right of the screenshot asks, "... how does Google know the ratings, minutes, calories ...?".

lemon meringue - Google X

https://www.google.cl/?gfe_rd=cr&ei=AfHVMV9-YCMqnxgT356mQDw&gws_rd=ssl#q=lemon+meringue

Google lemon meringue

All Images Videos News Maps More Search tools

About 2,920,000 results (0.35 seconds)

Grandma's Lemon Meringue Pie Recipe - Allrecipes.com
allrecipes.com/recipe/15093/grandmas-lemon-meringue-pie/ ▾
★★★★★ Rating: 4.6 - 1,625 reviews - 40 min - 298 cal
This pie is thickened with cornstarch and flour in addition to egg yolks, and contains no milk." ... To Make **Lemon** Filling: In a medium saucepan, whisk together 1 cup sugar, flour, cornstarch, and salt. Stir in water, **lemon** juice and **lemon** zest.

Ultimate lemon meringue pie | BBC Good Food
www.bbcgoodfood.com/recipes/3482/ultimate-lemon-meringue-pie ▾
★★★★★ Rating: 4.6 - 182 votes - 3 hr 15 min - 480 cal
For the pastry, put the flour, butter, icing sugar, egg yolk (save the white for the **meringue**) and 1 tsp cold water into a food processor. ... While the pastry bakes, prepare the filling: mix the cornflour, sugar and **lemon** zest in a medium saucepan. ... Try some of our other lemony treats ...
Lemon meringue pie · Little lemon meringue pies · Ultimate meringue

Classic Lemon Meringue Pie recipe from Betty Crocker
www.bettycrocker.com/...lemon-meringue

... how does Google know the ratings, minutes, calories ...?

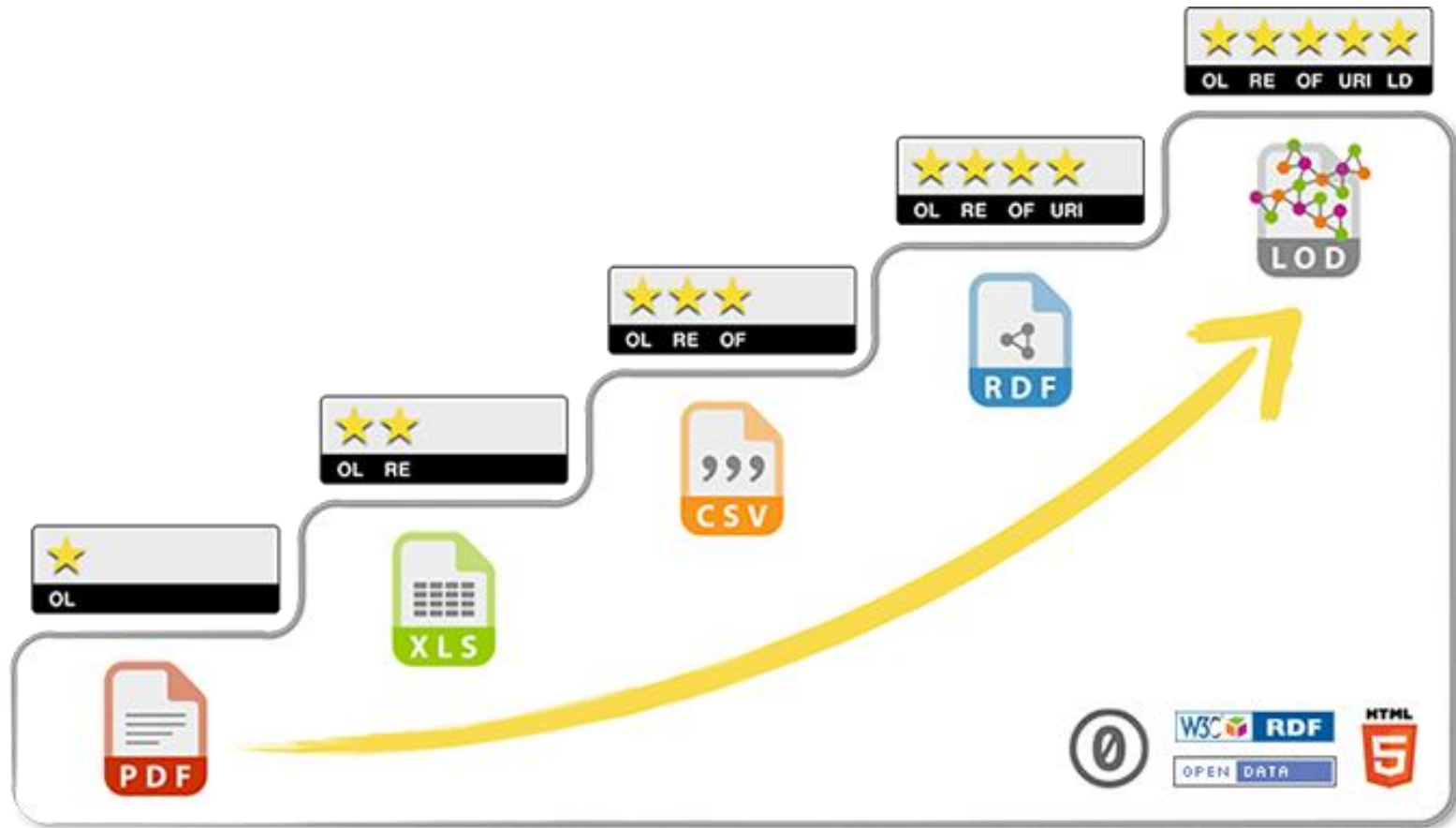
PUBLISHERS ADD STRUCTURED DATA!

```
<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

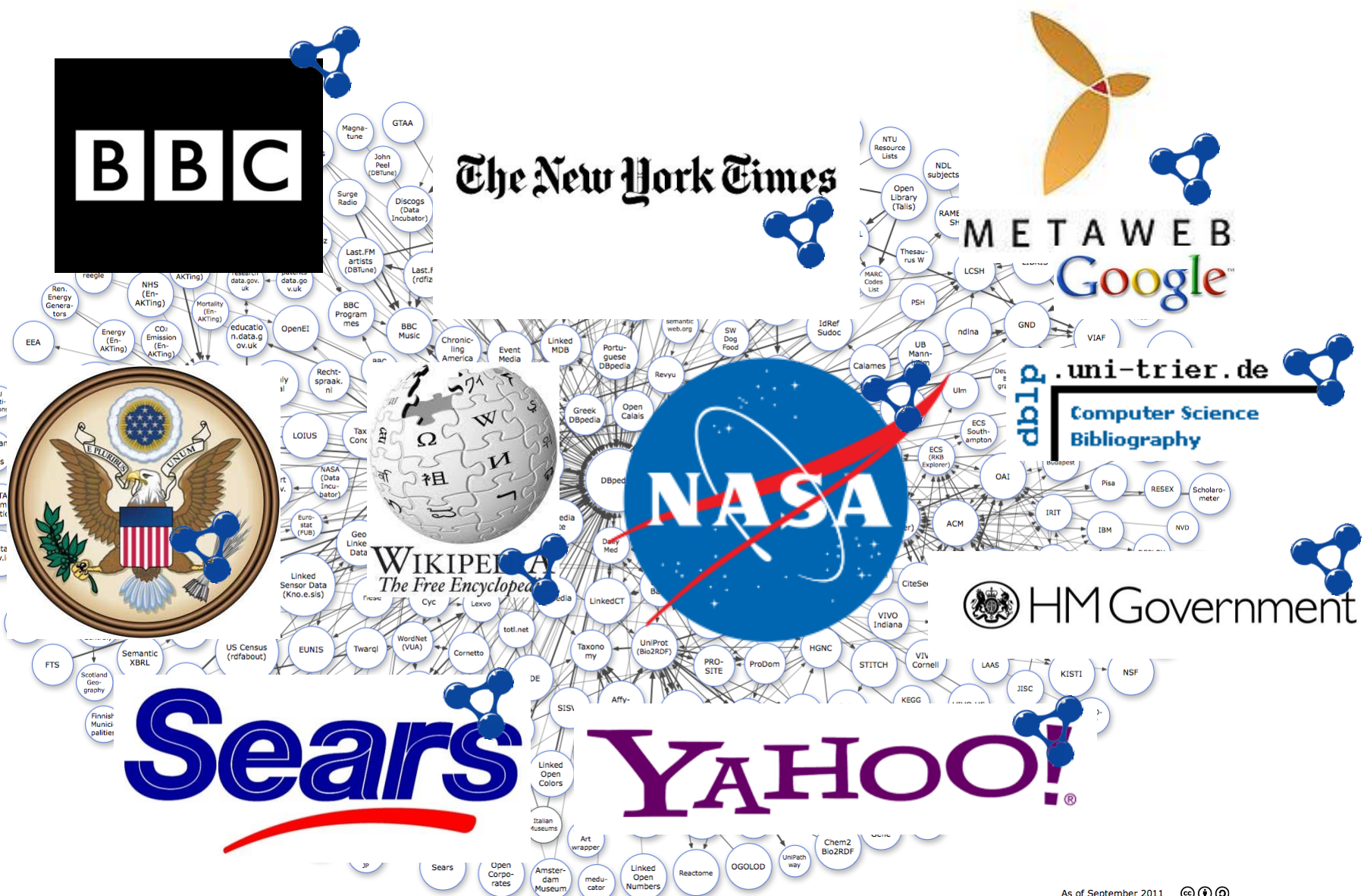
STANDARDS FOR OPEN DATA: LINKED OPEN DATA

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)

STRUCTURE OF THE COURSE

- Each week:
 - Class on Monday (learn concepts)
 - Lab on Wednesday (see concepts in practice)
- Marking structure:
 - 50% labs
 - 30% two controls
 - 15% project
 - 5% reading group

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?

