Introduction to Semantic Web (Linked Data) and Semantic Wikis

Partly taken from:

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Wikis are great

- Enable new scale of human collaboration

- Everyone can read
- Everyone can write
- Everyone gets aggregated
- Everyone is accountable for everything

- But some things are better left to machines…

[edit](#)

```
wow. I can change the web.
let's write an encycolpedia!
```

Semantic
Wikis are great

+ computer

- Enable new scale of human collaboration

- Everyone can read
- Everyone can write
- Everyone gets aggregated
- Everyone is accountable for everything

- But how are semantic wikis different?

edit

edit

edit

Country

capital

City
Population =
745,514
Area = 39 km^2

mayor

edit

edit

Birthdate =
1 April 1946
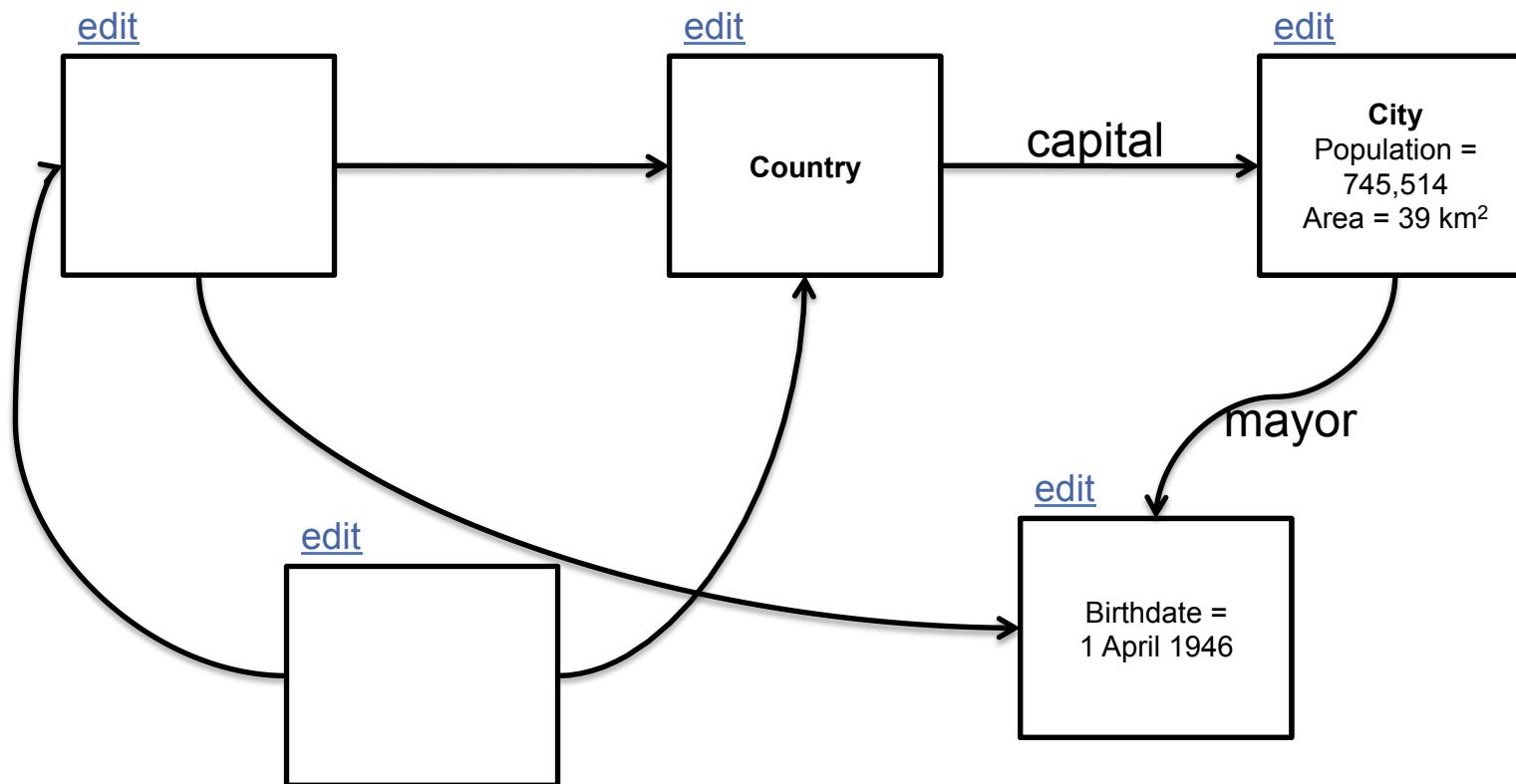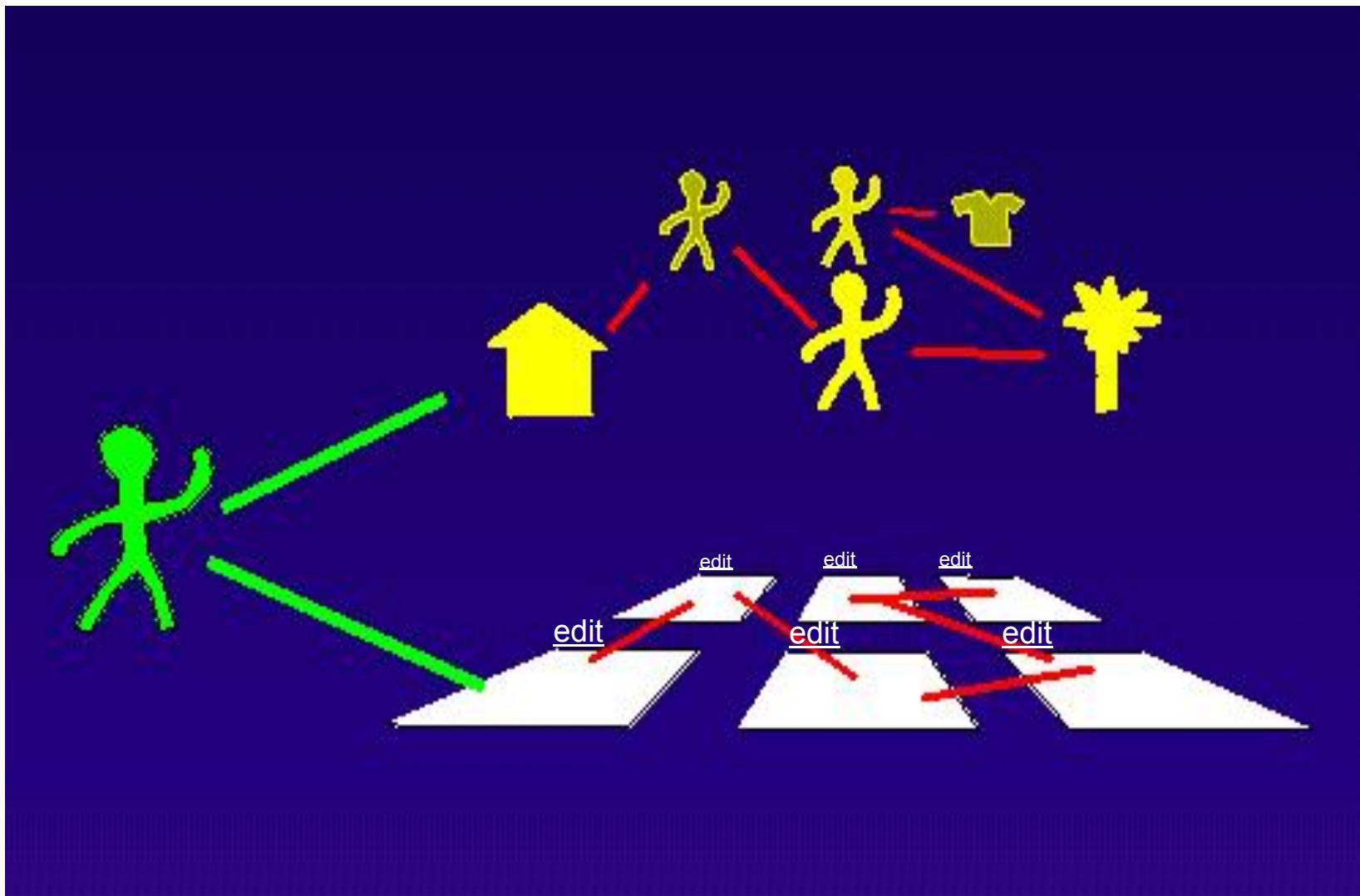
May 27 1994, Tim Berners-Lee, Keynote at WWW1

What humans are good at

- Understanding
- "Why"
- Tacit knowledge
- Stories
- Following hunches
- Checking external refs

What machines are good at

- Executing
- Facts and figures
- Explicit knowledge
- Keeping track and logs
- Analyzing big style
- Calling web services

Universal Access to All Knowledge

What Wikipedia knows

- Wikipedia has articles about…
    - … all cities
    - … their populations
    - … their mayors

  So can I ask for a list of the world's ten largest cities with a female mayor?

Search

From Wikipedia, the free encyclopedia

You searched for **What are the ten largest cities with a female mayor?** [Index]

For more information about searching Wikipedia, see Wikipedia:Searching.

| What are the ten largest cities with a female mayor? | MediaWiki search ▼ | Search |

There is no page titled "What are the ten largest cities with a female mayor?".

Results 1-20 of 345

1 2 3 4 5 6 7 8 9 10 11 Next »

- Manhattan
  Relevance: 100.0% - -

- Chicago
  Relevance: 99.5% - -

- Washington, D.C.
  Relevance: 97.7% - -

- St. Louis, Missouri
  Relevance: 97.6% - -

WIKIPEDIA'S ANSWER: LISTS

22.06.2010   Semantic MediaWiki   Institut AIFB

List of countries by GDP (nominal)

From Wikipedia, the free encyclopedia

This article includes a **list of countries of the world** sorted by their **gross domestic product** (GDP), the value of all final goods and services produced within a nation in a given year. The GDP dollar estimates presented here are calculated at market or government official exchange rates.

The table below includes data for the year 2005 for all 181 members of the International Monetary Fund, for which information is available. **Data are in millions of current United States dollars.**

It should be noted these figures do not include Somalia, Cuba, North Korea, Iraq, and several small states in Europe (Andorra, Monaco, San Marino, Liechtenstein, Vatican City, Greenland) and the Pacific (Palau, Marshall Islands, Micronesia, Nauru and Tuvalu).

Countries by nominal GDP.
Source: IMF (2005)
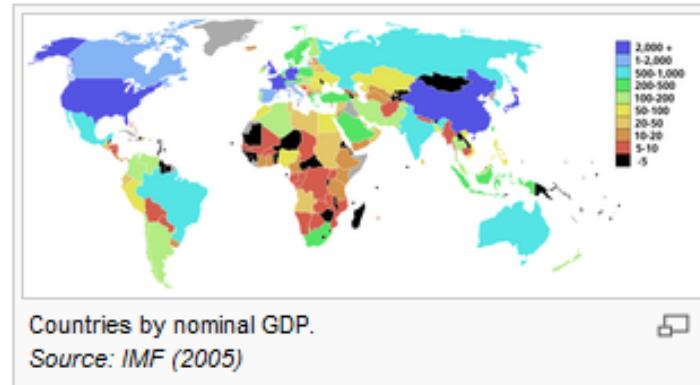
Rank	Country	GDP (millions of USD)
—	*World*	44,454,843
—	*European Union*	13,502,800
1	United States	12,455,825
2	Japan	4,567,441
3	Germany	2,791,737
4	People's Republic of China [2]	2,234,133
5	United Kingdom	2,229,472
6	France	2,126,719
7	Italy	1,765,537

List of countries by GDP (nominal) per capita

From Wikipedia, the free encyclopedia

This article includes a **list of countries of the world** sorted by their **Gross Domestic Product (nominal) per capita**, the value of all final goods and services produced within a nation in a given year, divided by the average population for the same year.

The figures presented here do not take into account differences in the cost of living in different countries, and the results can vary greatly from one year to another based on fluctuations in the exchange rates of the country's currency. Such fluctuations may change a country's ranking a great deal from one year to the next, even though they often make little or no difference to the standard of living of its population. Therefore these figures should be used with caution.

Map of countries by GDP (nominal) per capita. *Source: IMF (2005)*

Comparisons of national wealth are also frequently made on the basis of purchasing power parity (PPP), to adjust for differences in the cost of living in different countries (*See* List of countries by GDP (PPP) per capita). PPP largely removes the exchange rate problem, but has its own drawbacks. It does not reflect the value of economic output in international trade, and it also requires more estimation than GDP per capita. On the whole PPP per capita figures are more narrowly spread than GDP per capita figures.

Great care should be taken when using either set of figures to compare the wealth of two countries. Often people who wish to promote or denigrate a country will use the figure that suits their case best and ignore the other one, which may be substantially different, but a valid comparison of two economies should take both rankings into account, as well as utilising other economic data to put an economy in context.

The table below includes data for the year 2005 for all 180 members of the International Monetary Fund, for which information is available. Data are in United States dollars.

Rank	Country	GDP per capita
1	Luxembourg	80,288
2	Norway	64,193
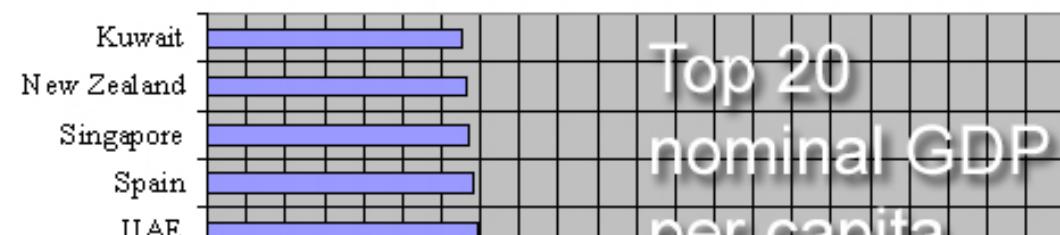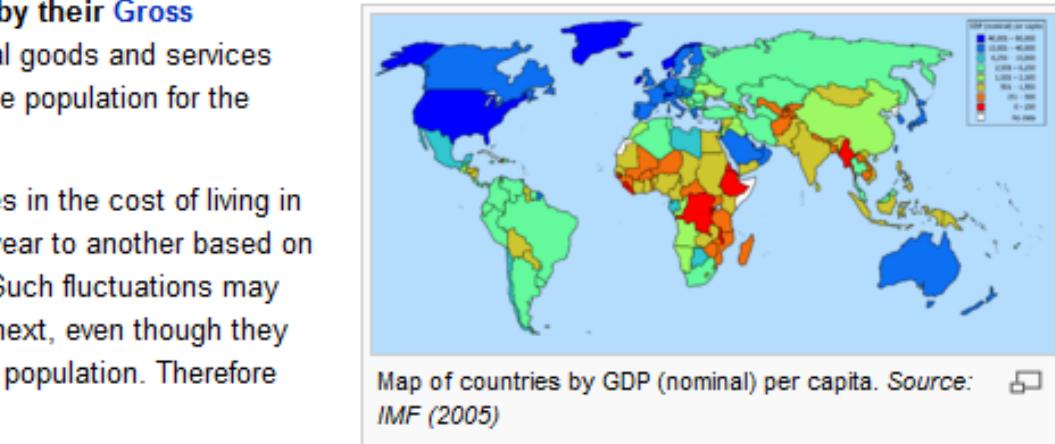
List of countries by GDP (PPP)

From Wikipedia, the free encyclopedia

There are three **lists of countries of the world sorted by their gross domestic product (GDP)** (the value of all final goods and services produced within a nation in a given year). The GDP dollar estimates given on this page are derived from Purchasing Power Parity (PPP) calculations. Using a PPP basis is arguably more useful when comparing differences in living standards because PPP takes into account the relative cost of living and the inflation rates of the countries, rather than using just exchange rates which may distort the real differences in income. The Market Exchange Rate (MER) GDP is more useful for understanding the international economic purchasing power and the total value of tradeable goods and services of different countries.
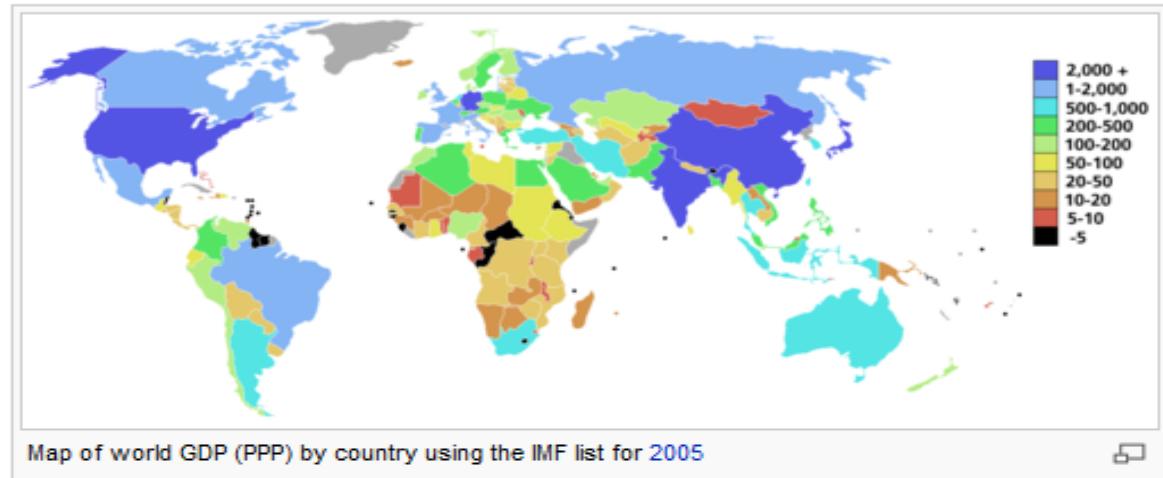
Map of world GDP (PPP) by country using the IMF list for 2005

- The first table includes data for the year 2005 for all 180 members of the International Monetary Fund, excluding East Timor for which information is not available, and the unranked entities: world and European Union. Data is in millions of international dollars and is calculated by the International Monetary Fund.

- The second table shows 162 national entities as well as figures for the European Union and the World. This list was compiled by the World Bank. Data is for the year 2005, with figures in millions of international dollars.

- The third table is a tabulation of the CIA World Factbook data update of April 2006, according to the data provided by the CIA. Figures are estimates in millions of international dollars, for various years ranging from 1993 to 2005 (most figures are however for the year 2005).

List by the International Monetary Fund

Rank	Country	GDP (PPP) $m
—	World	61,027,505
—	European Union	12,427,413
1	United States	12,277,583

List by the World Bank

Rank	Country	GDP (PPP) $m
—	World	61,006,604
—	European Union	12,626,921
1	United States	12,409,465

List by the CIA World Factbook

Rank	Country	GDP (PPP) $m
—	World	60,630,000
1	United States	12,310,000
—	European Union	12,180,000

List of countries by GDP (PPP) per capita

From Wikipedia, the free encyclopedia

This article includes a **list of countries of the world** sorted by their **gross domestic product** (GDP) at **purchasing power parity** (PPP) **per capita**, the value of all final goods and services produced within a nation in a given year divided by the average population for the same year.

GDP dollar estimates here are derived from purchasing power parity (PPP) calculations. Such calculations are prepared by various organisations, including the International Monetary Fund, the University of Pennsylvania, and the World Bank. As estimates and assumptions have to be made, the results produced by different organisations for the same country tend to differ, sometimes substantially. PPP per capita figures are estimates rather than hard facts, and should be used with caution.

Map of countries by GDP (PPP) per capita, based on the 2005 IMF data.

Comparisons of national wealth are also frequently made on the basis of nominal GDP, which does not reflect differences in the cost of living in different countries. (*See* List of countries by GDP (nominal) per capita.) The advantages of using nominal GDP figures include that less estimation is required, and that they more accurately reflect the participation of the inhabitants of a country in the global economy. On the whole PPP per capita figures are more narrowly spread than GDP per capita figures.

Great care should be taken when using either set of figures to compare the wealth of two countries. Often people who wish to promote or denigrate a country will use the figure that suits their case best and ignore the other one, which may be substantially different, but a valid comparison of two economies should take both rankings into account, as well as utilising other economic data to put their economies into context.

The table below includes data for the year 2005 for all 181 members of the International Monetary Fund, for which information is available. Data are in International dollars. The table excludes Bermuda which is one of the British overseas territories. Bermuda has the highest GDP PPP in the world at $69,900 (2004 est.) according to the CIA Worldfact book.

Rank	Country	GDP (PPP) $ per capita
1	Luxembourg	69,800
2	Norway	42,364
3	United States	41,399

| article | discussion | edit this page | history |

List of asteroids named after people

From Wikipedia, the free encyclopedia

This is a **list of asteroids named after people**, both real and fictional.

Contents [show]

Science [edit]

Mathematicians [edit]

- 1858 Lobachevskij (Nikolai Lobachevsky)
- 1859 Kovalevskaya (Sofia Kovalevskaya)
- 1888 Zu Chong-Zhi (Zu Chongzhi)
- 1996 Adams (John Couch Adams)
- 1997 Leverrier (Urbain Jean Joseph Le Verrier)
- 2002 Euler (Leonhard Euler)
- 2010 Chebyshev (Pafnuti Chebyshev)
- 2587 Gardner (Martin Gardner)
- 4354 Euclides (Euclid)
- 4628 Laplace (Pierre-Simon Laplace)
- 6765 Fibonacci (Leonardo Fibonacci of Pisa)
- 6143 Pythagoras (Pythagoras)
- 12493 Minkowski (Hermann Minkowski)
- 27500 Mandelbrot (Benoît Mandelbrot)
- 29552 Chern (Shiing-Shen Chern)

Physicists [edit]

- 1069 Planck (Max Planck)
- 1979 Sakharov (Andrei Sakharov)
- 2001 Einstein (Albert Einstein)
- 2352 Kurchatov (Igor Kurchatov)
- 3905 Doppler (Christian Doppler)

innhaldsside   diskusjon   endre   historikk

Asteroidar namnsette etter menneske

Frå Wikipedia – det frie oppslagsverket

Dette er **ei liste over asteroidar** namngjevne etter kjende menneske.

Innhaldsliste [vis]

Vitskap [endre]

Fysikarar [endre]

- 1979 Sakharov (Andrej Sakharov)
- 2001 Einstein (Albert Einstein, matematikar og fysikar)
- 2002 Euler (Leonhard Euler, matematikar og fysikar)
- 2352 Kurchatov (Igor Vasiljevitsj Kurtsjatov)
- 3905 Doppler (Christian Doppler)
- 3949 Mach (Ernst Mach)
- 4065 Meinel (Aden Meinel)
- 4716 Urey (Harold Urey)
- 5668 Foucault (Léon Foucault)
- 7495 Feynman (Richard Feynman)
- 7672 Hawking (Stephen Hawking)
- 8000 Isaac Newton (Isaac Newton)
- 8103 Fermi (Enrico Fermi)
- 13092 Schrödinger (Erwin Schrödinger)
- 13149 Heisenberg (Werner Heisenberg)
- 37582 Faraday (Michael Faraday)

Astronomar [endre]

- 366 Vincentina (Vincenzo Cerulli)
- 676 Melitta (Philibert Jacques Melotte)
- 729 Watsonia (James Craig Watson)
- 768 Struveana (Otto Wilhelm von Struve, Friedrich Georg Wilhelm Struve og Karl Hermann Struve)
- 819 Barnardiana (Edward Emerson Barnard)

navigering

- Hovudside
- Brukarportal
- Samfunnshuset
- Siste endringar
- Tilfeldig side
- Hjelp
- Gåver

søk

[Vis] [Søk]

verktøy

- Lenkjer hit
- Relaterte endringar
- Last opp fil
- Spesialsider
- Utskriftsversjon
- Permanent link
- Siter denne artikkelen

på andre språk

- English
- 한국어
- Português

Lista de asteróides com nomes de pessoas

Origem: Wikipédia, a enciclopédia livre.

Esta é uma **Lista de asteróides** com nomes de pessoas:

Índice [mostrar]

Ciência [editar]

Físicos [editar]

- 1979 Sakharov (Andrei Sakharov)
- 2001 Einstein (Albert Einstein, matemático e físico)
- 2002 Euler (Leonhard Euler, matemático e físico)
- 2352 Kurchatov (Igor Kurchatov)
- 3905 Doppler (Christian Doppler)
- 3949 Mach (Ernst Mach)
- 4065 Meinel (Aden Meinel)
- 5668 Foucault (Léon Foucault)
- 7000 Curie (Maria Skłodowska-Curie)
- 7495 Feynman (Richard Feynman)
- 7672 Hawking (Stephen Hawking)
- 8000 Isaac Newton (Isaac Newton)
- 8103 Fermi (Enrico Fermi)
- 13092 Schrödinger (Erwin Schrödinger)
- 13149 Heisenberg (Werner Heisenberg)
- 37582 Faraday (Michael Faraday)
- 10979 FRiStephenson (Professor F. Richard Stephenson)

Astrónomos [editar]

- 366 Vincentina (Vincenzo Cerulli)
- 676 Melitta (Philibert Jacques Melotte)
- 729 Watsonia (James Craig Watson)
- 768 Struveana (Otto Wilhelm von Struve, Friedrich Georg Wilhelm Struve e Karl Hermann Struve)
- 819 Barnardiana (Edward Emerson Barnard)

사람의 이름을 딴 소행성 목록

위키백과 – 우리 모두의 백과사전.

목차 [보이기]

과학 [편집]

수학자 [편집]

- 1858 Lobachevskij (니콜라이 이바노비치 로바체프스키)
- 1859 Kovalevskaya (Sofia Kovalevskaya)
- 1888 주충지 (주충지)
- 1996 애덤스 (존 카우치 애덤스)
- 1997 르베리에 (Urbain Jean Joseph Le Verrier)
- 2010 체비쇼프 (파프누티 체비쇼프)
- 4354 유클리드 (유클리드)
- 4628 라플라스 (피에르-시몽 라플라스)
- 6765 피보나치 (레오나르도 피보나치)
- 6143 피타고라스 (피타고라스)
- 12493 민코프스키 (헤르만 민코프스키)
- 29552 Chern (Shiing-Shen Chern)

물리학자 [편집]

- 1069 플랑크 (막스 플랑크)
- 1979 Sakharov (Andrei Sakharov)
- 2001 아인슈타인 (알베르트 아인슈타인)
- 2002 오일러 (레온하르트 오일러)
- 2352 Kurchatov (Igor Kurchatov)
- 3905 도플러 (크리스티안 도플러)
- 3949 마흐 (에른스트 마흐)
- 4065 Meinel (Aden Meinel)

위키백과
우리 모두의 백과사전

19

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List of problems solved by MacGyver

From Wikipedia, the free encyclopedia

This is a **list of problems that have been solved by the fictional character MacGyver** from the television series of the same name. (This list is not yet comprehensive.) MacGyver employs his resourcefulness and his knowledge of chemistry, physics,[1] technology, and outdoorsmanship to resolve what are often life or death crises. He spontaneously creates inventions from simple items to solve these problems. These inventions became synonymous with the character and were called MacGyverisms by fans.[2] MacGyverisms became a distinct motif of the series. MacGyver was unlike secret agents in other television series and films because he carried only a Swiss Army knife and duct tape, instead of relying on high-tech weapons and tools.[1]

The show's writers, which included Lee David Zlotoff and Dave Ketchum, based MacGyver's inventions on items they found on location, concepts from scientific advisors John Koivula and Jim Green, and real events.[1] The show also offered a monetary prize to people who sent good ideas into the show. A young fan of the series suggested that MacGyver could patch up a vehicle's radiator by cracking an egg into the radiator. The episode "Bushmaster" was constructed around this trick, and the fan was rewarded. Although staff were appointed to read every letter sent in, few usable ideas were obtained in this way.[2]

Children watching the series imitated MacGyver and tried to replicate the simple devices he created in the show. The creative team behind MacGyver made a point of leaving out crucial elements of the inventions so that children would not be harmed.[1]

Short summaries of all the episodes are in List of MacGyver episodes.

Season 1   [edit]

Pilot (1x01)   [edit]

MacGyver defuses a highly advanced nuclear warhead using a paper clip to short circuit the timing device.

MacGyver places a stick through the trigger of an AK-47 and hangs it from a tree with some string. He then attaches a paper match

Contents [hide]

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Kategorie:Liste

Die Listenkategorien sind Metakategorien und dienen lediglich zur Verwaltung der Listen, nicht zur thematischen Feinsortierung. Zur genaueren Zuordnung sind die Listen wie Artikel in die entsprechenden thematischen Hauptka
einzutragen.

Achtung: Jede Liste gehört in genau **eine** Listenkategorie.

Für die thematische Sortierung lassen sich Listen über das CatScan-Tool 🔗 nach Themenkategorien suchen.

Des Weiteren:

Bitte die Listen nicht unter "L", sondern mit Hilfe einer Pipe unter dem jeweiligen Stichwort einordnen, zum Beispiel eine "Liste bekannter Philosophen" mit

- [[Kategorie:Liste|Philosophen]]

Ist eine Liste unterteilt in mehrere Unterlisten (z. B. Liste der Seen in Deutschland in Unterlisten nach Anfangsbuchstabe), so kommt nur die Hauptliste in eine "Kategorie:Liste (Thema)", alle Unterlisten dagegen in die Kategorie:T

Zu Listen allgemein siehe auch Wikipedia:Listen.

Inhaltsverzeichnis: * 0 1 2 3 4 5 6 7 8 9 A B C D E F G H I J K L M N O P Q R S Sch T U V W X Y Z

(vorherige 200) (nächste 200)

Unterkategorien

Es werden 32 von insgesamt 32 Unterkategorien in dieser Kategorie angezeigt:
In Klammern die Anzahl der enthaltenen Kategorien (K), Seiten (S), Dateien (D)

- [+] Teilliste (2284 S)

A
- [+] Liste (Abkürzungen) (33 S)
- [–] Liste (Auszeichnung) (2 K, 93 S)
  - [+] Liste (Nobelpreisträger) (18 S)
  - [+] Liste (Verdienstordensträger) (24 S)

B
- [–] Liste (Bauwerk) (9 K, 100 S)
  - [–] Liste (Bahnhöfe) (1 K, 57 S)
    - [–] Bahnhof in Deutschland (17 K, 4 S)
      - [+] Hauptbahnhof in Deutschland (87 S)
      - [+] Bahnhof (Baden-Württemberg) (46 S)
      - [+] Bahnhof (Bayern) (2 K, 36 S)
      - [+] Bahnhof in Berlin (2 K, 31 S)
      - [+] Bahnhof (Brandenburg) (14 S)
      - [+] Bahnhof (Bremen) (3 S)
      - [+] Bahnhof in Hamburg (2 K, 13 S)
      - [+] Bahnhof (Hessen) (2 K, 36 S)
      - [+] Bahnhof (Mecklenburg-Vorpommern) (6 S)
      - [+] Bahnhof (Niedersachsen) (31 S)
      - [+] Bahnhof (Nordrhein-Westfalen) (6 K, 85 S)
      - [+] Bahnhof (Rheinland-Pfalz) (21 S)

G (Fortsetzung)
- [–] Liste (Geschichte) (1 K, 46 S)
  - [+] Zeittafel (14 K, 57 S)
- [+] Liste (Gesellschaft) (22 S)

K
- [–] Liste (Kultur) (4 K, 57 S)
  - [+] Liste (Museum) (63 S)
  - [–] Liste (Musik) (4 K, 229 S)
    - [+] Diskografie (26 S)
    - [+] Liste (Instrumentalisten) (26 S)
    - [+] Liste (Komponisten) (54 S)
    - [+] Werkverzeichnis (Musik) (26 S)
  - [+] Liste (Nationale historische Stätten und Kulturgüter unter staatlichem Schutz) (32 S)
 - [+] Liste (Theater) (17 S)
- [+] Liste (Kunst) (41 S)

L
- [+] Liste (Literatur) (233 S)

M
- [+] Liste (Medien) (104 S)
- [+] Liste (Militär) (190 S)
- [+] Liste (Musik) (4 K, 230 S)

R
- [+] Liste (Recht) (56 S)
- [–] Liste (Religion) (9 K, 14 S)
  - [+] Liste (Bibel) (8 S)
  - [+] Liste (Buddhismus) (5 S)
  - [–] Liste (Christentum) (6 K, 25 S)
    - [+] Liste (Altorientalische Kirchen) (8 S)
    - [–] Liste (Katholizismus) (2 K, 20 S)
      - [+] Liste der Kardinalskreierungen (70 S)
      - [–] Personenliste (Katholizismus) (1 K, 63 S)
        - [–] Liste (Römisch-katholischer Bischof) (14 K, 103 S)
          - [+] Liste (Römisch-katholischer Bischof in Belgien) (9 S)
          - [+] Liste (Römisch-katholischer Bischof in Deutschland) (
          - [+] Liste (Römisch-katholischer Bischof in Frankreich) (13
          - [+] Liste (Römisch-katholischer Bischof in Irland) (17 S)
          - [+] Liste (Römisch-katholischer Bischof in Italien) (173 S
          - [+] Liste (Römisch-katholischer Bischof in Kroatien) (14 S
          - [+] Liste (Römisch-katholischer Bischof in den Niederland
          - [+] Liste (Römisch-katholischer Bischof in Polen) (16 S)
          - [+] Liste (Römisch-katholischer Bischof in Portugal) (15 S
          - [+] Liste (Römisch-katholischer Bischof in Schottland) (12
          - [+] Liste (Römisch-katholischer Bischof in der Schweiz) (
          - [+] Liste (Römisch-katholischer Bischof in Spanien) (54 S
          - [+] Liste (Römisch-katholischer Bischof in Tschechien) (7

Kategorie:Liste (Bürgermeister)

Seiten in der Kategorie „Liste (Bürgermeister)"

Es werden 86 von insgesamt 86 Seiten in dieser Kategorie angezeigt:

A

- Liste der Oberbürgermeister und Oberstadtdirektoren von Aachen
- Liste der Bürgermeister von Albstadt
- Altonaer Bürgermeister
- Liste der Oberbürgermeister Augsburgs
- Liste der Bürgermeister Aurichs

B

- Liste der Bürgermeister und Oberbürgermeister von Bamberg
- Liste der Stadtpräsidenten von Bern
- Liste der Bürgermeister von Bogotá
- Liste der Oberbürgermeister und Oberstadtdirektoren von Bonn
- Liste der Bürgermeister der Stadt Boston
- Liste der Stadtoberhäupter von Braunschweig
- Liste der Bremer Bürgermeister
- Liste der Stadtoberhäupter von Bremerhaven

C

- Liste der Oberbürgermeister der Stadt Chemnitz
- Liste der Bürgermeister von Chicago

D

- Liste der Danziger Bürgermeister
- Liste der Bürgermeister von Dautphetal
- Liste der Bürgermeister von Detmold
- Liste der Bürgermeister der Stadt Dorsten
- Liste der Oberbürgermeister von Dresden

E

G

- Liste der Bürgermeister von Gmunden
- Liste der Grazer Bürgermeister
- Liste der Bürgermeister von Greifswald
- Liste der Bürgermeister von Grimmen
- Liste der Bürgermeister von Görlitz

H

- Liste der Oberbürgermeister von Halle
- Hamburger Bürgermeister
- Liste der Bürgermeister von Hamm
- Liste der Stadtoberhäupter von Hannover
- Liste der Bürgermeister und Oberbürgermeister von Hildesheim

I

- Liste der Oberbürgermeister von Ingolstadt

K

- Liste der Bürgermeister der Stadt Kattowitz
- Liste der Oberbürgermeister der Stadt Köln

L

- Liste der Stadtpräsidenten von Lausanne
- Liste der Bürgermeister der Stadt Leipzig
- Liste der Lengfelder Bürgermeister
- Liste der Bürgermeister der Stadt Lima
- Liste der Bürgermeister von Linz
- Liste der Bürgermeister der Stadt Luxemburg
- Liste der Bürgermeister von Bukarest
- Liste der Bürgermeister von Göttingen
- Liste der Bürgermeister von Pittsburgh
- Liste der Bürgermeister von Straubenhardt

M (Fortsetzung)

- Liste der Stadtoberhäupter von Marburg
- Liste der Bürgermeister von Moskau
- Münchner Bürgermeister

N

- Liste der Bürgermeister der Neustadt Hildesheim
- Liste der Bürgermeister der Stadt New York
- Liste der Oberbürgermeister der Stadt Nürnberg

P

- Liste der Bürgermeister der Stadt Peking
- Liste der Bürgermeister von Plauen
- Liste der Bürgermeister von Potštát

R

- Liste der Oberbürgermeister von Radebeul
- Liste der Oberbürgermeister von Regensburg
- Liste der Bürgermeister von Reykjavík
- Liste der Rostocker Bürgermeister
- Liste der Bürgermeister von Roubaix

S

- Liste der Bürgermeister der Stadt Salzburg
- Liste der Bürgermeister von Schöneiche bei Berlin
- Liste der Schweriner Bürgermeister
- Liste der Bürgermeister der Stadt Shanghai
- Liste der Bürgermeister und Oberbürgermeister von Stralsund
- Liste der Bürgermeister der Stadt Swakopmund
- Liste der Bürgermeister der Stadt São Paulo

V

- Liste der Bürgermeister von Vancouver

COMPUTERS ARE STUPID

What humans see

article | discussion | edit this page | history

Karlsruhe

From Wikipedia, the free encyclopedia

Coordinates: 49°1'0"N 8°24'0"E

For other uses, see Karlsruhe (disambiguation).

Karlsruhe (IPA: [ˈkaʁlsʁuːə]; population 285,812 in 2006) is a city in the south west of Germany, in the Bundesland Baden-Württemberg, located near the French-German border.

Founded in 1715 as Karlsruhe Palace, the surrounding town became the seat of two of the highest courts in Germany, the Federal Constitutional Court of Germany whose decisions have the force of a law, and the Federal Court of Justice of Germany, the highest court of appeals in matters of civil law and criminal law. It therefore considers itself the home of justice in Germany, a role taken over from Leipzig after 1933.

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Contents [hide]

1 History
2 Geography
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   3.1 Internet activities
4 Transport
5 Jewish Community
   5.1 Karlsruhe and the Holocaust
6 Historical population
7 Military
8 Famous people
9 Institutions
10 Twinning
11 Local attractions

Karlsruhe

The town centre of the city of Karlsruhe (Germany) photographed from an aeroplane. It is easy to recognize the historic layout of the town: The streets head away from the palace like the rays of the sun.

Coat of arms	Location

Administration

Country	Germany
State	Baden-Württemberg
Admin. region	Karlsruhe
District	Urban district
City subdivisions	27 quarters
Lord Mayor	Heinz Fenrich (CDU)

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What humans see

Karlsruhe

- ... **has a population** of 285,812
- ... **is located** in Germany
- ... **was founded** in 1715
- ... **has mayor** Heinz Fenrich

What computers see

ვიკიპედია
თავისუფალი ენციკლოპედია

| სტატია | განხილვა | რედაქტირება | ისტორია |

კარლსრუე

ნავიგაცია

- მთავარი გვერდი
- თემატური ძიება
- რჩეული სტატიები
- ნებისმიერი გვერდი
- ახალი გვერდები

ძიება

| სტატია | ძიება |

მონაწილეობა

- შესავალი
- ინფორმაცია
- ბოლო ცვლილებები
- დახმარება
- ფორუმი
- შეჭირულობები

კარლსრუე (Karlsruhe), ქალაქი გერმანიაში, მდინარე რაინის მახლობლად (უკავშირდება არხით), ბადენ-ვიურტემბერგის მხარეში. 285,812 ათ. მცხოვრები (2006). დიდი სატრანსპორტო კვანძი, სამდინარო ნავსადგური. გერმანიის სამხრეთ-დასავლეთ ნაწილის საწვავის განმანაწილებელი ცენტრი (ნავთობი კარლსრუეში მიდის მარსელიდან წყლის გზითა და ნავთობსადენით). ნავთობსახდელი ქარხანა, სატრანსპორტო და ელექტრო მანქანათმშენებლობა,

კარლსრუე
Karlsruhe

მდებარეობა	
ქვეყანა	გერმანია
რეგიონი	ბადენ-ვიურტემბე
ზოგადი ინფორმაცია	
ფართობი	173.46 კმ²

What computers see

Karlsruhe

- … 285,812
- … Germany
- … 1715
- … Heinz Fenrich

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COMPUTERS DON'T MAKE CONNECTIONS

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COMPUTERS NEED OUR HELP

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Ontology

- A heavily overloaded term
- with several different meanings
- in different disciplines:

  ✓ Philosophy
  ✓ Linguistics
  ✓ Computer Science)

Ontology - Philosophy

- Ontology deals with the nature and organisation of reality (Aristotele)

- Tries to answer the questions:
 - What characterizes being?
  - What is being?

Ontology - Linguistics

- a concept, is the mediator that relates the symbol to its object

"Semiotic triangle"
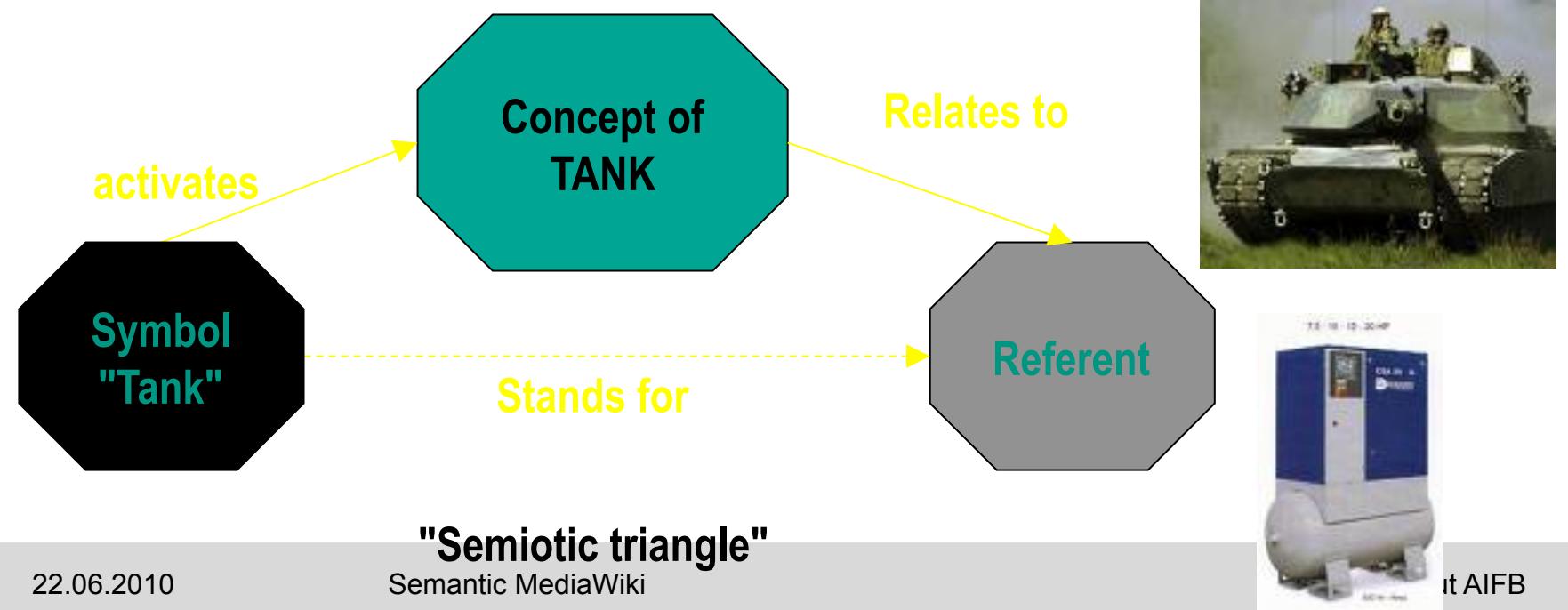
Ontology - Computer Science
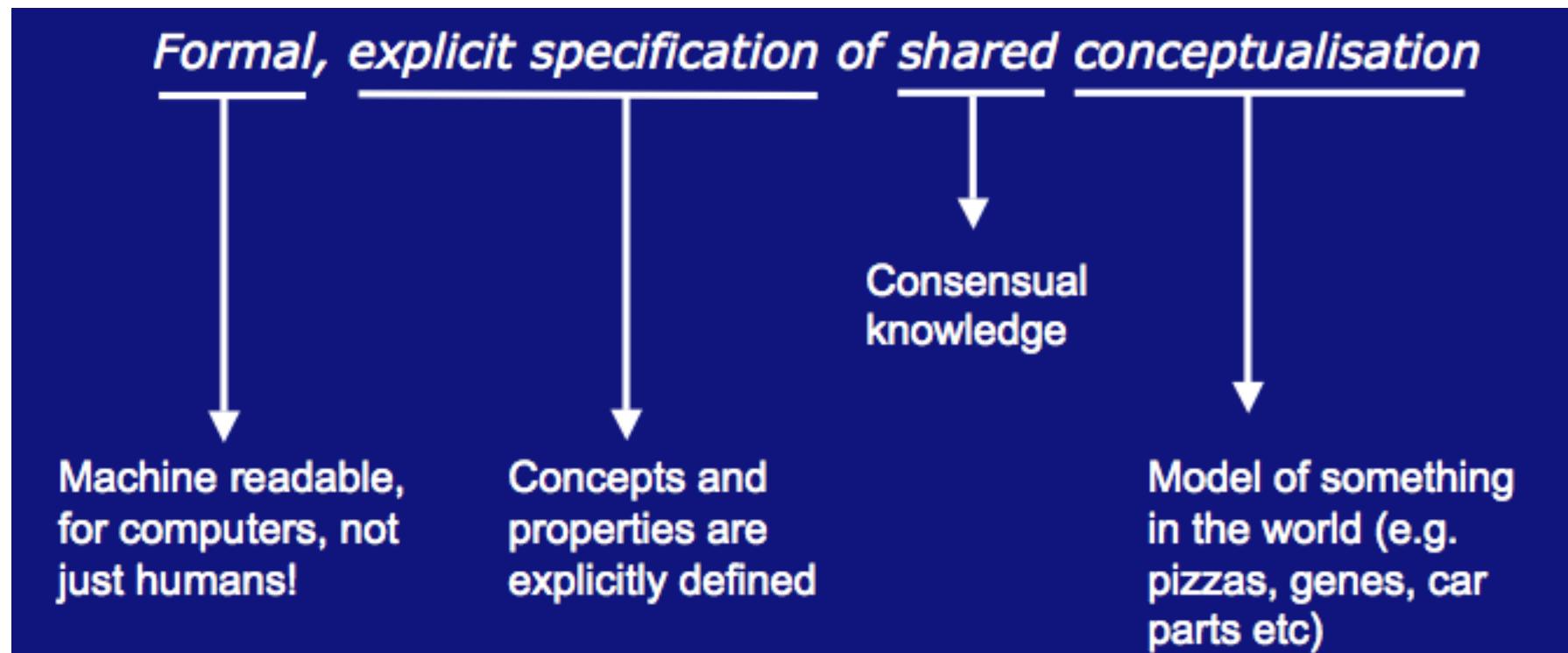
Formal, explicit specification of shared conceptualisation

- Machine readable, for computers, not just humans!
- Concepts and properties are explicitly defined
- Consensual knowledge
- Model of something in the world (e.g. pizzas, genes, car parts etc)

Rudi Studer(98)

A Semantic continuum

Shared human consensus	Text descriptions	Semantics hardwired; used at runtime	Semantics processed and used at runtime
Implicit	Informal (explicit)	Formal (for humans)	Formal (for machines)
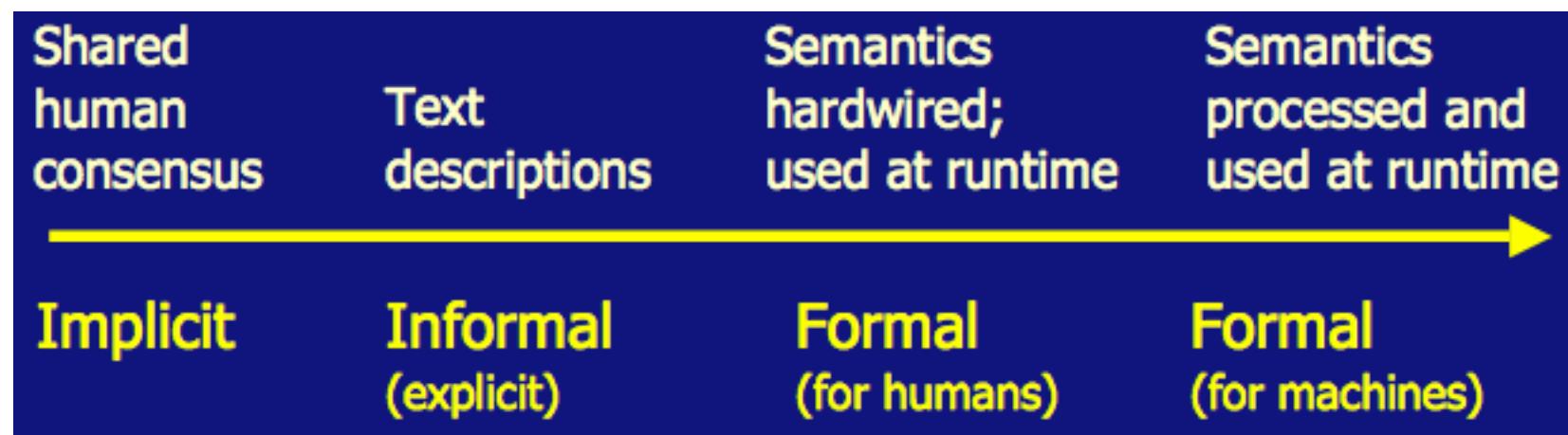
- Further to the right:
- · Less ambiguity
- · Better inter-operation
- · More robust
- · More difficult

Basic terms

- **Individuals**
  - objects in the domain of interest

- **Properties**
  - binary relations on individuals

- **Classes**
  - (concepts) sets that contain individuals
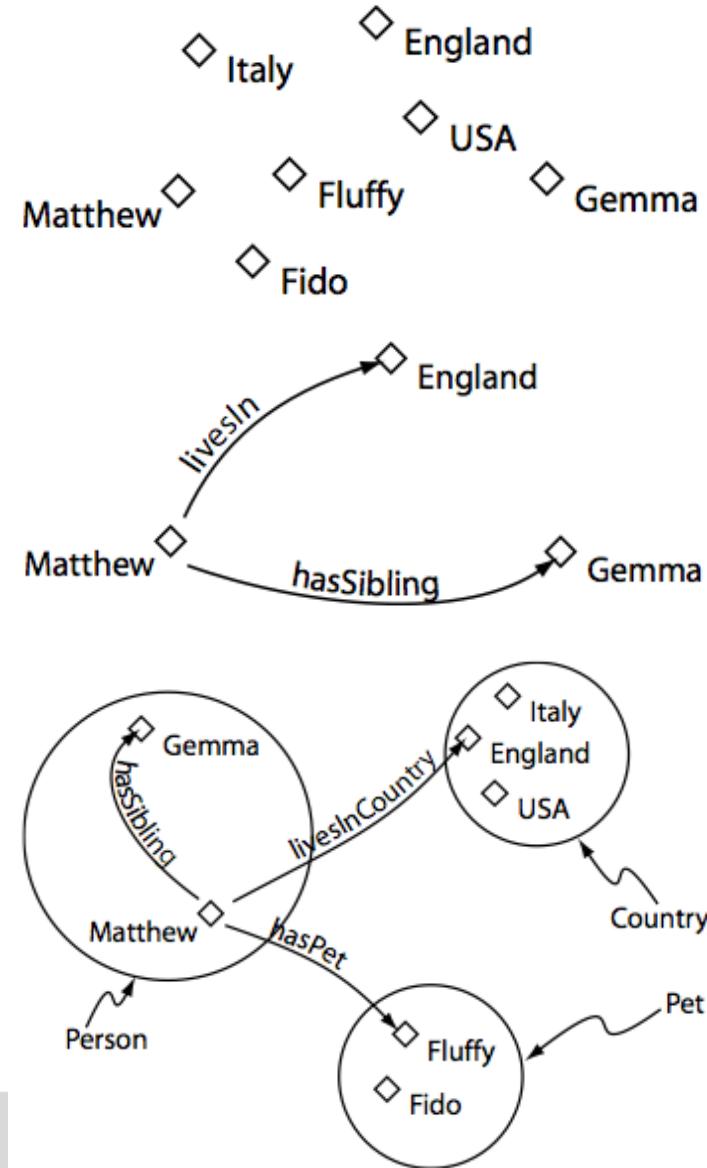
Structure of an Ontology

- Ontologies typically have two distinct components:
- Names for important concepts in the domain
  - Elephant is a concept whose members are a kind of animal
  - Herbivore is a concept whose members are exactly those animals who eat only plants or parts of plants
  - Adult_Elephant is a concept whose members are exactly those elephants whose age is greater than 20 years
- Background knowledge/constraints on the domain
  - Adult_Elephants weigh at least 2,000 kg
  - All Elephants are either African_Elephants or Indian_Elephants
  - No individual can be both a Herbivore and a Carnivore

Ontology Languages

- There are a wide variety of languages for "Explicit Specification"
  - Graphical Notations
    - Semantic Networks
    - Topic Maps
    - UML
    - RDF
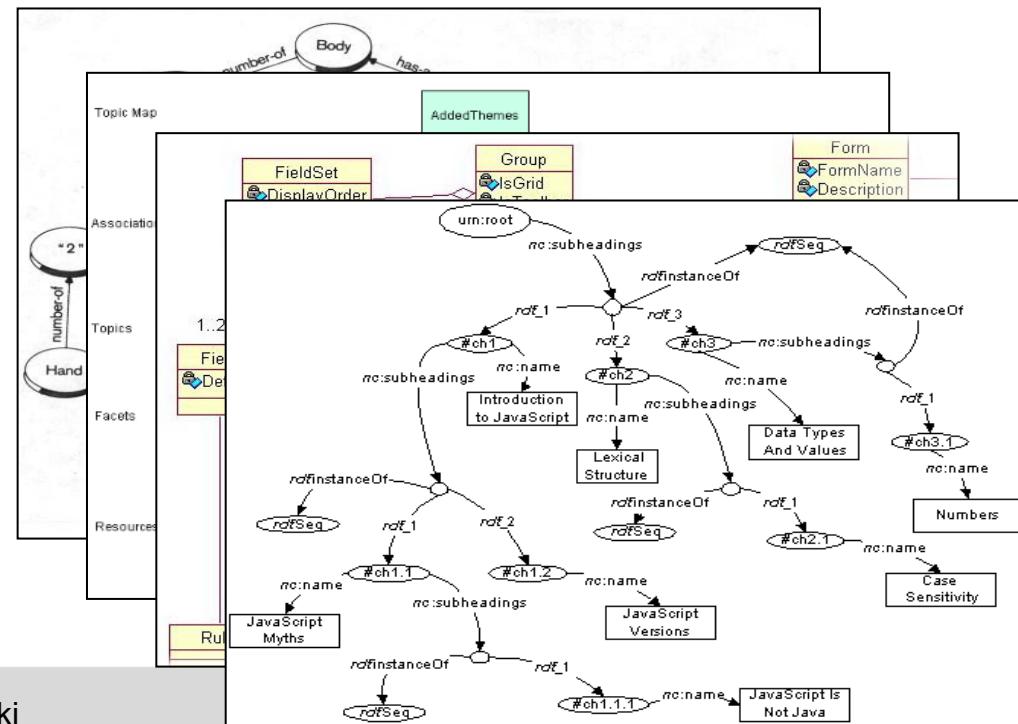
Ontology Languages

- There are a wide variety of languages for "Explicit Specification"
  - Graphical Notations
    - Semantic Networks
    - Topic Maps
    - UML
    - RDF
  - Logic Based
    - Description Logics
    - Rules
    - First Order Logic
    - Conceptual Graphs

Every gardener likes the sun.
$(Ax)\ gardener(x) \Rightarrow likes(x, Sun)$
You can fool some of the people all of the time.
$(Ex)(At)\ (person(x) \wedge time(t)) \Rightarrow can\text{-}fool(x,t)$
You can fool all of the people some of the time.
$(Ax)(Et)\ (person(x) \wedge time(t) \Rightarrow can\text{-}fool(x,t)$
All purple mushrooms are poisonous.
$(Ax)\ (mushroom(x) \wedge purple(x)) \Rightarrow poisonous(x)$
No purple mushroom is poisonous.
$\sim(Ex)\ purple(x) \wedge mushroom(x) \wedge poisonous(x)$
$(Ax)\ (mushroom(x) \wedge purple(x)) \Rightarrow \sim poisonous(x)$
There are exactly two purple mushrooms.
$(Ex)(Ey)\ mushroom(x) \wedge purple(x) \wedge mushroom(y) \wedge purple(y) \wedge \sim(x=y) \wedge (Az)$
$(mushroom(z) \wedge purple(z)) \Rightarrow ((x=z) \vee (y=z))$
Clinton is not tall.
$\sim tall(Clinton)$

Requirements for Ontology Languages

- Ontology languages allow users to write explicit, formal conceptualizations of domain models
- The main requirements are:
  - a well-defined syntax
  - efficient reasoning support
  - a formal semantics
  - sufficient expressive power
  - convenience of expression

Power and Efficient Reasoning Support

- The richer the language is, the more inefficient the reasoning support becomes
- Sometimes it crosses the border of *noncomputability*
- We need a compromise:
  - A language supported by reasonably efficient reasoners
  - A language that can express large classes of ontologies and knowledge.

Linked data basic notions

- see

- http://linkeddatabook.com/editions/1.0/

- https://en.wikipedia.org/wiki/RDFa

RDF

- RDF stands for Resource Description Framework
- It is a W3C Recommendation
    - http://www.w3.org/RDF
- RDF is a graphical formalism (+ XML syntax + semantics)
    - for representing metadata
    - for describing the semantics of information in a machine- accessible way
- Provides a simple data model based on triples.

The RDF Data Model

- Statements are <subject, predicate, object> triples:
  - `<Sean,hasColleague,Ian>`
- Can be represented as a graph:

hasColleague

Sean ——→ Ian

- Statements describe properties of resources
- A resource is any object that can be pointed to by a URI:
  - The generic set of all names/addresses that are short strings that refer to resources
  - a document, a picture, a paragraph on the Web, http://www.cs.man.ac.uk/index.html, a book in the library, a real person (?), isbn://0141184280
- Properties themselves are also resources (URIs)

Linking Statements

- The subject of one statement can be the object of another
- Such collections of statements form a directed, labeled graph

- Note that the object of a triple can also be a "literal" (a string)
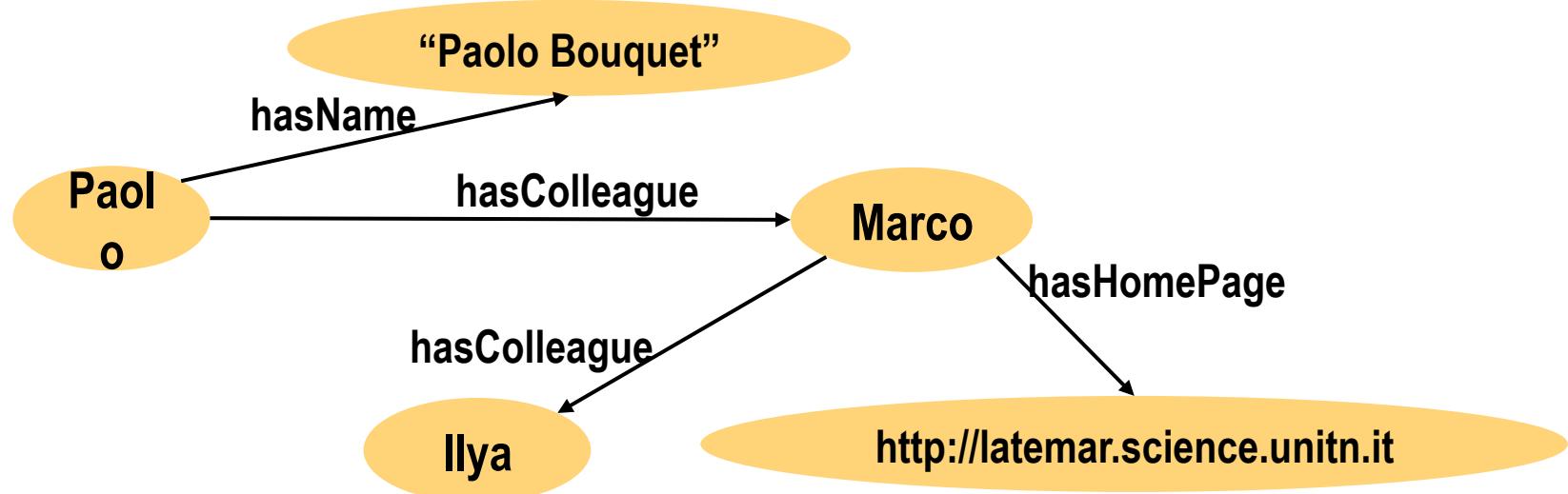
RDF Syntax

- RDF has an XML syntax that has a specific meaning:
- Every `Description` element describes a resource
- Every attribute or nested element inside a `Description` is a `property` of that `Resource`
- We can refer to resources by URIs

```
<Description about="some.uri/person/paolo_bouquet">
  <hasColleague resource="some.uri/person/marco_ronchetti"/>
  <hasName rdf:datatype="&xsd;string">Paolo Bouquet</hasName>
</Description>
<Description about="some.uri/person/marco_ronchetti">
  <o:hasHomePage>http://latemar.science.unitn.it</o:hasHomePage>
</Description>
<Description about="some.uri/person/fausto_giunchiglia">
  <o:hasColleague resource="some.uri/person/fausto_giunchiglia"/>
</Description>
```

What does RDF give us?

- A mechanism for **annotating** data and resources.
- Single (simple) data model.
- Syntactic consistency between names (URIs).
- Low level **integration** of data.

RDF(S): RDF Schema

- RDF gives a formalism for meta data annotation, and a way to write it down in XML, but it does not give any special meaning to vocabulary such as subClassOf or type

    - Interpretation is an arbitrary binary relation

- RDF Schema extends RDF with a schema vocabulary that allows you to define basic vocabulary terms and the relations between those terms

    - Class, type, subClassOf,
    - Property, subPropertyOf, range, domain
    - it gives "extra meaning" to particular RDF predicates and resources
    - this "extra meaning", or semantics, specifies how a term should be interpreted

RDF(S) Examples

- RDF Schema terms (just a few examples):
  - Class; Property
  - type; subClassOf
  - range; domain
- These terms are the RDF Schema building blocks (constructors) used to create vocabularies:
  - `<Person,type,Class>`
  - `<hasColleague,type,Property>`
  - `<Professor,subClassOf,Person>`
  - `<Carole,type,Professor>`
  - `<hasColleague,range,Person>`
  - `<hasColleague,domain,Person>`

RDF/RDF(S) "Liberality"

- No distinction between classes and instances (individuals)

  `<Species,type,Class>`

  `<Lion,type,Species>`

  `<Leo,type,Lion>`

- Properties can themselves have properties

  `<hasDaughter,subPropertyOf,hasChild>`

  `<hasDaughter,type,familyProperty>`

- No distinction between language constructors and ontology vocabulary, so constructors can be applied to themselves/ each other

  `<type,range,Class>`

  `<Property,type,Class>`

  `<type,subPropertyOf,subClassOf>`

What does RDF(S) give us?

- Ability to use simple schema/vocabularies when describing our resources.

- **Consistent** vocabulary use and **sharing**.

- Simple **inference**

Problems with RDF(S)

- RDF(S) is too weak to describe resources in sufficient detail
  - No localised range and domain constraints
    - Can't say that the range of hasChild is Person when applied to Persons and Elephant when applied to Elephants
  - No existence/cardinality constraints
    - Can't say that all *instances* of Person have a mother that is also a Person, or that Persons have exactly 2 parents
  - No transitive, inverse or symmetrical properties
    - Can't say that isPartOf is a transitive property, that hasPart is the inverse of isPartOf or that touches is symmetrical
- Difficult to provide reasoning support
  - No "native" reasoners for non-standard semantics
  - May be possible to reason via FO axiomatisation

Solution

- Extend RDF(S) with a language that has the following desirable features identified for Web Ontology Language
    - Extends existing Web standards
        - Such as XML, RDF, RDFS
    - Easy to understand and use
        - Should be based on familiar KR idioms
    - Of "adequate" expressive power
    - Formally specified
        - Possible to provide automated reasoning support
- That language is OWL.

Is RDF(S) enough?

OWL

RDF(S)

RDF

XML

Annotation

Integration

Inference
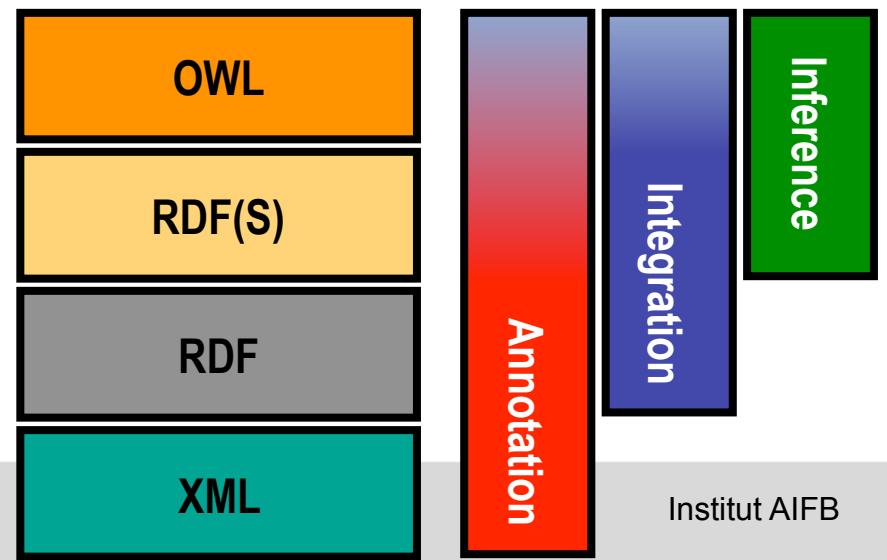
Reasoning About Knowledge in Ontology Languages

- Class membership
  - If x is an instance of a class C, and C is a subclass of D, then we can infer that x is an instance of D

- Equivalence of classes
  - If class A is equivalent to class B, and class B is equivalent to class C, then A is equivalent to C, too

Reasoning About Knowledge in Ontology Languages (2)

- ## Consistency
  - X instance of classes A and B, but A and B are disjoint
  - This is an indication of an error in the ontology

- ## Classification
  - Certain property-value pairs are a sufficient condition for membership in a class A; if an individual x satisfies such conditions, we can conclude that x must be an instance of A

Uses for Reasoning

- Reasoning support is important for
  - checking the consistency of the ontology and the knowledge
  - checking for unintended relationships between classes
  - automatically classifying instances in classes
- Checks like the preceding ones are valuable for
  - designing large ontologies, where multiple authors are involved
  - integrating and sharing ontologies from various sources

Part 2

=> Go To QWWQ

=> Come back here for introduction to Semantic Wikis

Context: Social Web, Semantic Web, and Semantic Wikis

Increasing Data Interconnection (vertical axis)

Increasing Social Interconnection (horizontal axis)

Upper-left quadrant:
- Expert Systems
- Software Agents
- Schema Integration
- Ontologies
- Linked Data
- Semantic Desktops
- Thesauri

Upper-right quadrant:
- Freebase
- Facebook OpenGraph
- Semantic Wikis
- Evri
- Twine/T2
- Prediction Markets

Lower-left quadrant:
- PIMs
- Databases
- Search Engines
- Content Portals
- Web sites
- File servers

Lower-right quadrant:
- Ning
- FaceBook
- Amazon Reviews
- Wikipedia
- Blogs
- Twitter

Based on a diagram by Nova Spivak, Radar Networks

Institut AIFB

A Range of Semantic Wiki Platforms

- **KiWi** – Knowledge in a Wiki

- **Knoodl** – Semantic Collaboration tool and application platform

- **Freebase** - Collaborative platform for almanac data by Metaweb

- **OntoWiki**

- **PhpWiki**

- **Semantic MediaWiki** - an extension to MediaWiki that turns it into a semantic wiki (and SMW extensions)

- **TikiWiki** - CMS/Groupware integrates Semantic links as a core feature

- **Wikidsmart** - adds semantics to Confluence (from zAgile)
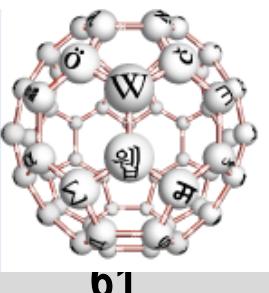
```
Karlsruhe is a city in
[[Country::Germany]].
```

Subject	Predicate	Object
Karlsruhe	Country	Germany
Karlsruhe	Mayor	Heinz Fenrich
Heinz Fenrich	Gender	Male

62

```
{{#ask:
    [[Category:City]]
    [[located in::
        Baden-Württtermberg]]
  | format=barchart
  | ?population
}}
```


Semantic MediaWiki
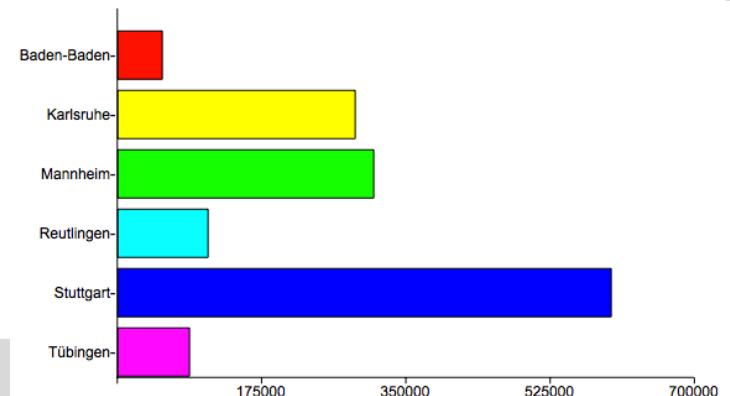
External data reuse

Export formats
- RDF/XML
- SPARQL
- RDFa
- CSV
- JSON
- iCal
- vCard
- Bibtex

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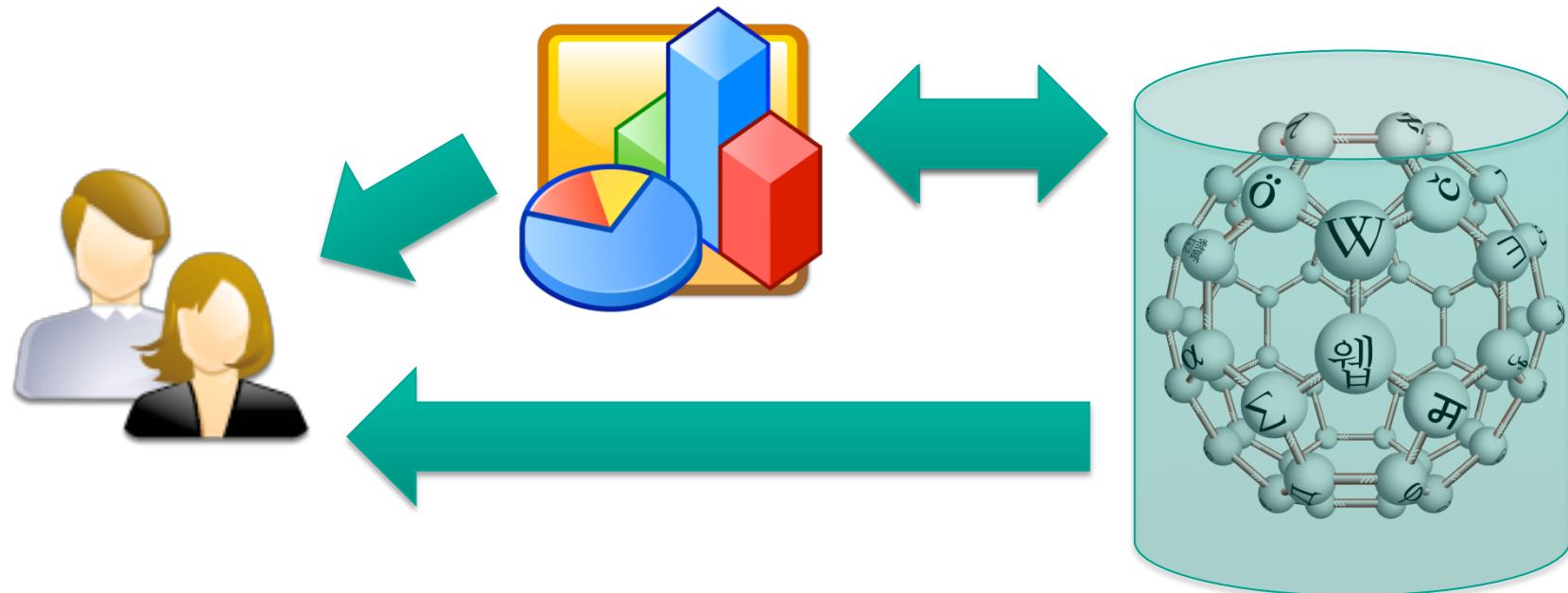
External data reuse

- ## Computer understands wiki content
  - ### Knowledge based applications
- ## A number of export formats
  - ### RDF/XML, SPARQL, RDFa, CSV, JSON, iCal, vCard, Bibtex, ...
- ## RDF APIs in programming languages
  - ### Java, JavaScript, C/C++, Python, Ruby, Haskell, .Net, PHP, Common Lisp, Prolog, …
- ## Standards based
  - ### URIs, XML, RDF, OWL, SPARQL, …

Test wiki

- Go to http://sandbox.semantic-mediawiki.org/wiki/ Main_Page
- Click on log in and then on "Create an account"

Editing the wiki

- Go to your own page (page with your name)

- Click on "edit"

- Try to add or change text

- You can cancel anytime, preview (just for you), or save the changes so that everyone can see them

article   discussion   edit   history   protect   de

Editing Denny Vrandecic

B I Ab A √n —

Denny is working at the [[Affiliation::AIFB]].
[[Nationality::Croatia]], but lives in [[locate
while now.

Please note that all contributions to Aassw2007 may be edited
contributors. If you don't want your writing to be edited mercile
You are also promising us that you wrote this yourself, or copie
resource (see Project:Copyrights for details). DO NOT SUBM
PERMISSION!

Summary:

☐ This is a minor edit ☐ Watch this page

Save page   **Show preview**   **Show changes**   Cancel

Overview of semantic markup

- To add a page P to category C type [[Category:C]] on page P

- To make a typed link of type R from page P1 to page P2 type [[R::P2]] on page P1

- To state the value V of an attribute A on page P type [[A::V]] on page P

- Example:

Editing Busan

B I Ab A √n W —
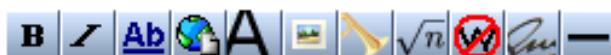
```
Busan is a city in [[located in::Korea]]
with a population of [[population::3,635,389]].

[[Category:City]]
```

Data values and types

- Attributes like [[birthdate::February 27 1978]] or [[population:: 3,635,389]] must know the *type* of the value
- This is done by adding [[has type::T]] on the page of the attribute
- Available, predefined types:

  - Page
  - String
  - Number
  - Boolean
  - Date
  - Text
  - Code
  - Temperature

  - Telephone number
  - Record
  - URL
  - Email
  - Annotation URI
  - Geographic coordinate (S Maps)
  - Enumeration
  - Custom units

Add your own information

- Now add information about yourself
- For example: nationality, affiliation, age, birthday, hair color, likes…

- Save or preview to see if and how the information has been understood
- Blue links mean there is a page about it
- Red link means there is no page about it
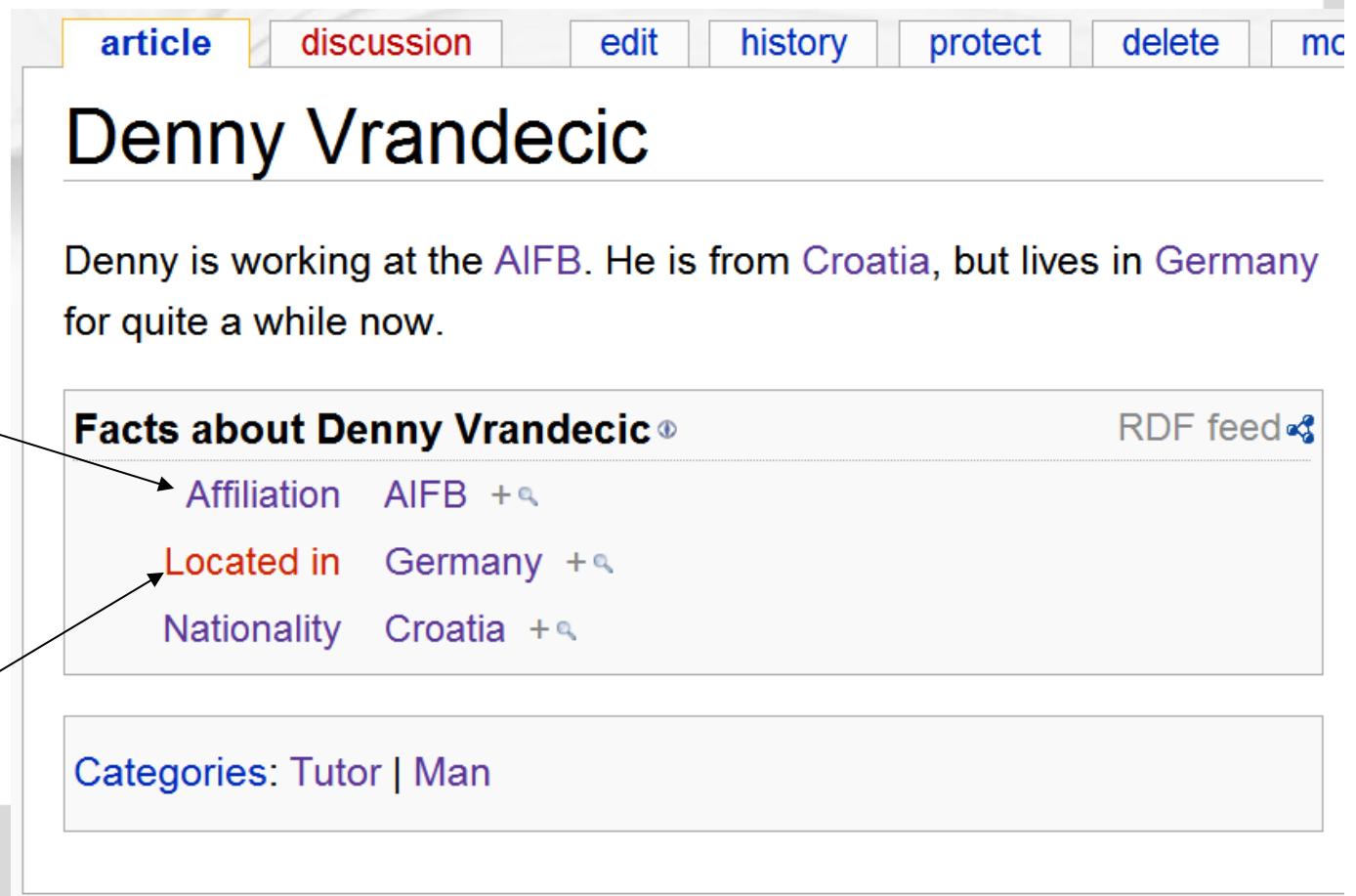
| article | discussion | edit | history | protect | delete | mo |

Denny Vrandecic

Denny is working at the AIFB. He is from Croatia, but lives in Germany for quite a while now.

Facts about Denny Vrandecic ⊕   RDF feed ⌁

Affiliation   AIFB +🔍

Located in   Germany +🔍

Nationality   Croatia +🔍

Categories: Tutor | Man

71 22.06.2010

Collaborative ontology engineering

- There are pages describing categories and properties
- Informal description
  - Can be discussed
  - Can be edited

- Extensional descript.
  - List of all instances
  - But: only direct ones

- Supercategories

category	discussion	edit	history	protect	delete

Category:Tutor

A tutor is a person that gives a course, talk, tutorial, or similar at the

Articles in category "Tutor"

There are 2 articles in this category.

D

- Denny Vrandecic

P

- Peter Haase

Category: Person

Social aspects

- Task: come up with a vocabulary and the relation between the vocabularies for the whole group, using the wiki
    - How to decide which properties and categories are important?
    - How to define the properties or categories?
    - How to ensure high quality data? What does it mean?
    - How to control the wiki knowledge base and its growth?
- Browse the wiki to see the results and connections

Querying the knowledge

- Go to Special:Ask
- Enter a query
- Queries look like this:
  - Conditions on a category: [[Category:X]]
  - Conditions on a property: [[R::X]]
  - Property conditions can be ranges, [[R::>X]], [[R::<X]]
  - Property conditions: any value [[R::+]]
  - Print statements: ?R
- Examples follow
- See also online docs

special

Search by entering a query into the search field below. Further informatio

semantic search.

```
[[Category:Tutor]]
[[affiliation::*]]
```

Sort by column [   ] [Ascending ▾]

Find results

Previous	**Results 1– 2**	Next	(**20** | 50 | 100

⊠	⊠ **Affiliation**
Denny Vrandecic	AIFB
Peter Haase	AIFB

Previous	**Results 1– 2**	Next	(**20** | 50 | 100

Query examples

- [[population::>1,000,000]] anything with a population of over a Million

- [[located in::Korea]] anything that is located in Korea

- [[affiliation::+]] anything that has any stated affiliation

- [[Category:Tutor]] all tutors

- [[Category:Tutor||Student]] all tutors or students (logical or)

- [[Category:Tutor]] [[Category:Student]] everyone who is both

Querying and social aspects

- Querying can only be done on aligned vocabularies
  - If half of the people use "affiliation" and the other half "works for" you cannot query the knowledge easily
- Inside SMW, information integration usually happens with social tools, not with technology
- Gardening tools can help with aligning vocabularies, but not replace them
  - Tools that allow you to rename a property throughout the wiki
  - Or to join two different names

Querying the wiki

```
{{#ask:
 [[Category:City]]
 [[Mayor.Gender::Female]]
| sort=Population
}}
```

Querying the wiki

```
{{#ask:
 [[Category:Country]]
 [[Continent::North America]]
|?Population
}}
```

Result rendering

page | discussion | edit | history | delete | move | protect | watch | refresh

North America

The North American continent is one of the 7 continents of the earth. It contains United States of America and Canada.

Countries

⋈	⋈ Population
Canada	33,312,000
Mexico	106,682,500
United States of America	304,541,000

Facts about North America ⓘ

Has political entity	United States of America + 🔍 , and Canada + 🔍
Located in	Earth + 🔍 , and America + 🔍

Category: Continent

Querying the wiki

```
{{#ask:
 [[Category:Country]]
 [[Continent::North America]]
|?Population
|format=piechart
}}
```

Pie chart

North America

The North American continent is one of the 7 continents of the earth. It contains United States of America and Canada.

Countries
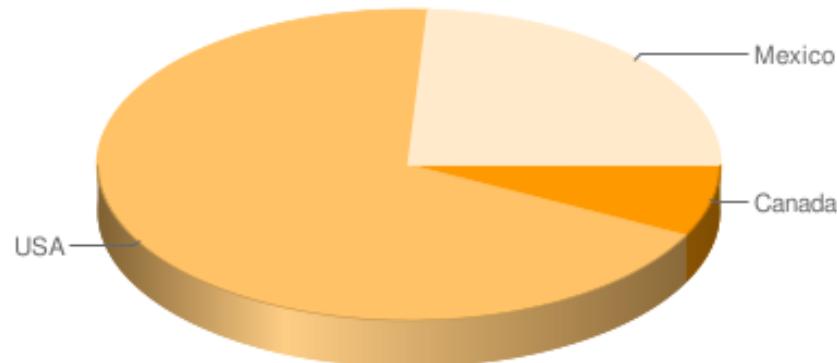
Facts about North America ⓘ

Has political entity	United States of America + 🔍, and Canada + 🔍
Located in	Earth + 🔍, and America + 🔍

Category: Continent

Querying the wiki

```
{{#ask:
 [[Category:Country]]
 [[Continent::North America]]
|?Population
|format=barchart
}}
```

Bar chart

North America

The North American continent is one of the 7 continents of the earth. It contains United States of America and Canada.

Countries

Facts about North America ⓘ

Has political entity	United States of America + 🔍, and Canada + 🔍
Located in	Earth + 🔍, and America + 🔍

Category: Continent