



Multi-Agent and Semantic Web Systems: Introduction

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The World Wide Web





- The internet - already there



- The internet - already there
- HTML programmers



- The internet - already there
- HTML programmers
- Core weight of interest



- The internet - already there
- HTML programmers
- Core weight of interest
- Search engines

Why do we need the Semantic Web?



*I have a dream for the Web [in which computers] become capable of analyzing all the data on the Web — the content, links, and transactions between people and computers.
...the day-to-day mechanisms of trade, bureaucracy and our daily lives will be handled by machines talking to machines.*

Tim Berners-Lee (1999) Weaving the Web

- What are you doing on Burns night?
- ⇒ Google “burns”
- ⇒ Wikipedia articles on Robert Burns
- ⇒ Amazon listing of books by Burns
- ⇒ Google Maps to look at birthplace of Burns



[Web](#) [Images](#) [Groups](#) [News](#) [Froogle](#) [more »](#)

burns

Search

Search: the web pages from the UK

Web

[Robert Burns Country: the official Robert Burns site](#)

The Robert Burns works archive, with full text indexed and searchable online.

www.robertburns.org/ - 24k - 10 Jan 2006 - [Cached](#) - [Similar pages](#)

[MedlinePlus: Burns](#)

Burns. ... Overviews; **Burns** (Mayo Foundation for Medical Education and Research) ...

Treatment; **Burns**: Taking Care of **Burns** (American Academy of Family ...

www.nlm.nih.gov/medlineplus/burns.html - 31k - 10 Jan 2006 - [Cached](#) - [Similar pages](#)

www.sciencedirect.com/science/journal/03054179

[Similar pages](#)

[Welcome to Burns Guitars - Burns Guitars](#)

The **Burns** Shadows Custom Edition comes with its own unique hard case finished ... The new

Burns Shadows model has been awarded 5 Stars Guitarist Choice for ...

www.burnsguitars.com/ - 19k - 10 Jan 2006 - [Cached](#) - [Similar pages](#)

Wikipedia article (Scotland :: Culture)



Culture

Main article: Culture of Scotland

See also: Scottish People, Music in Scotland, Scottish literature, Scottish art, Media in Scotland, and Cuisine of Scotland



The National Library of Scotland. 

Scottish music is a significant aspect of the nation's culture, with both traditional and modern influences. A famous traditional Scottish instrument is the [Great Highland Bagpipe](#), a wind instrument consisting of three drones and a melody pipe (called the chanter), which are fed continuously by a reservoir of air in a bag. [Bagpipe bands](#), featuring bagpipes and various types of drums, and showcasing Scottish music styles while creating new ones, have spread throughout the world. The [clàrsach](#) (harp), [fiddle](#) and [accordion](#) are also traditional Scottish instruments, the latter two heavily featured in [Scottish country dance](#) bands. Today, there are many successful Scottish bands and individual artists in varying styles.^[151]

Scottish literature includes text written in [English](#), [Scottish Gaelic](#), [Scots](#), [French](#), and [Latin](#).

The poet and songwriter [Robert Burns](#) wrote in the [Scots language](#), although much of his writing is also in English and in a "light" Scots dialect which is more accessible to a wider audience. Similarly, the writings of [Sir Walter Scott](#) and [Sir Arthur Conan Doyle](#) were internationally successful during the late 19th and early 20th Centuries.^[152] [J. M. Barrie](#) introduced the movement known as the "[Kailyard school](#)" at the end of the 19th century, which brought elements of [fantasy](#) and [folklore](#) back into fashion.^[153] This tradition has been viewed as a major stumbling block for Scottish literature, as it focused on an idealised, pastoral picture of Scottish culture.^[153] Some modern novelists, such as [Irvine Welsh](#) (of [Trainspotting](#) fame), write in a distinctly [Scottish English](#) that reflects the harsher realities of contemporary life.^[154] More recently, author [J.K. Rowling](#) has become one of the most popular authors in the world (and one of the wealthiest) through her [Harry Potter](#) series, which she began writing from a coffee-shop in Edinburgh.

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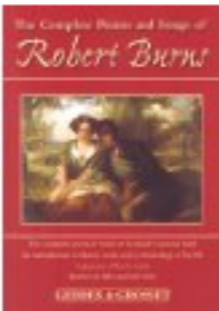
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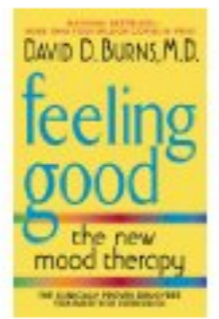
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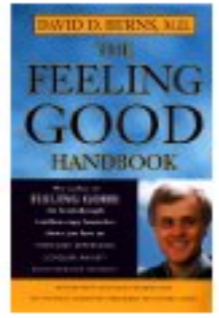
Books > "burns"


Related Searches: [kenny burns](#), [robert burns](#).

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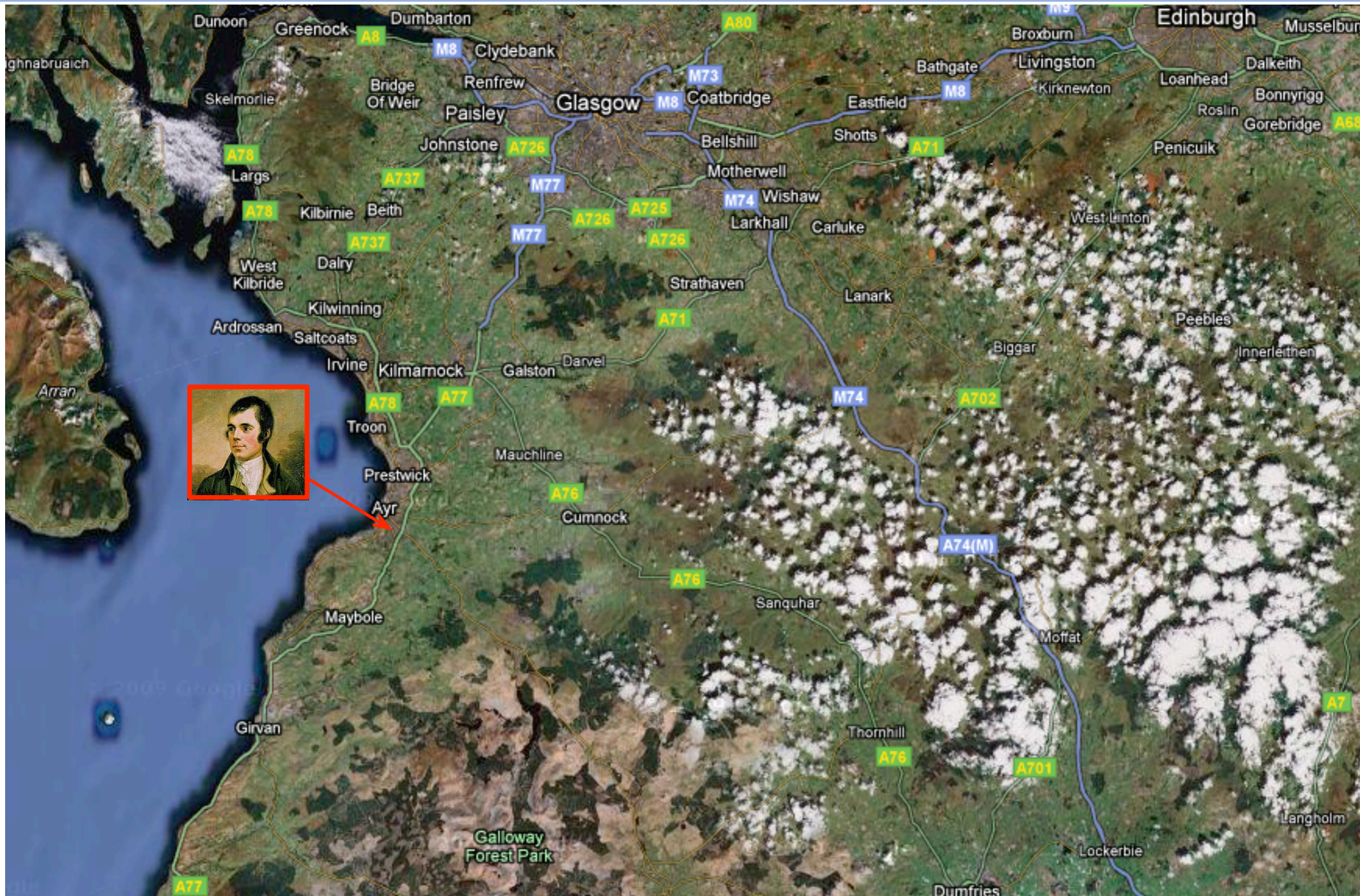
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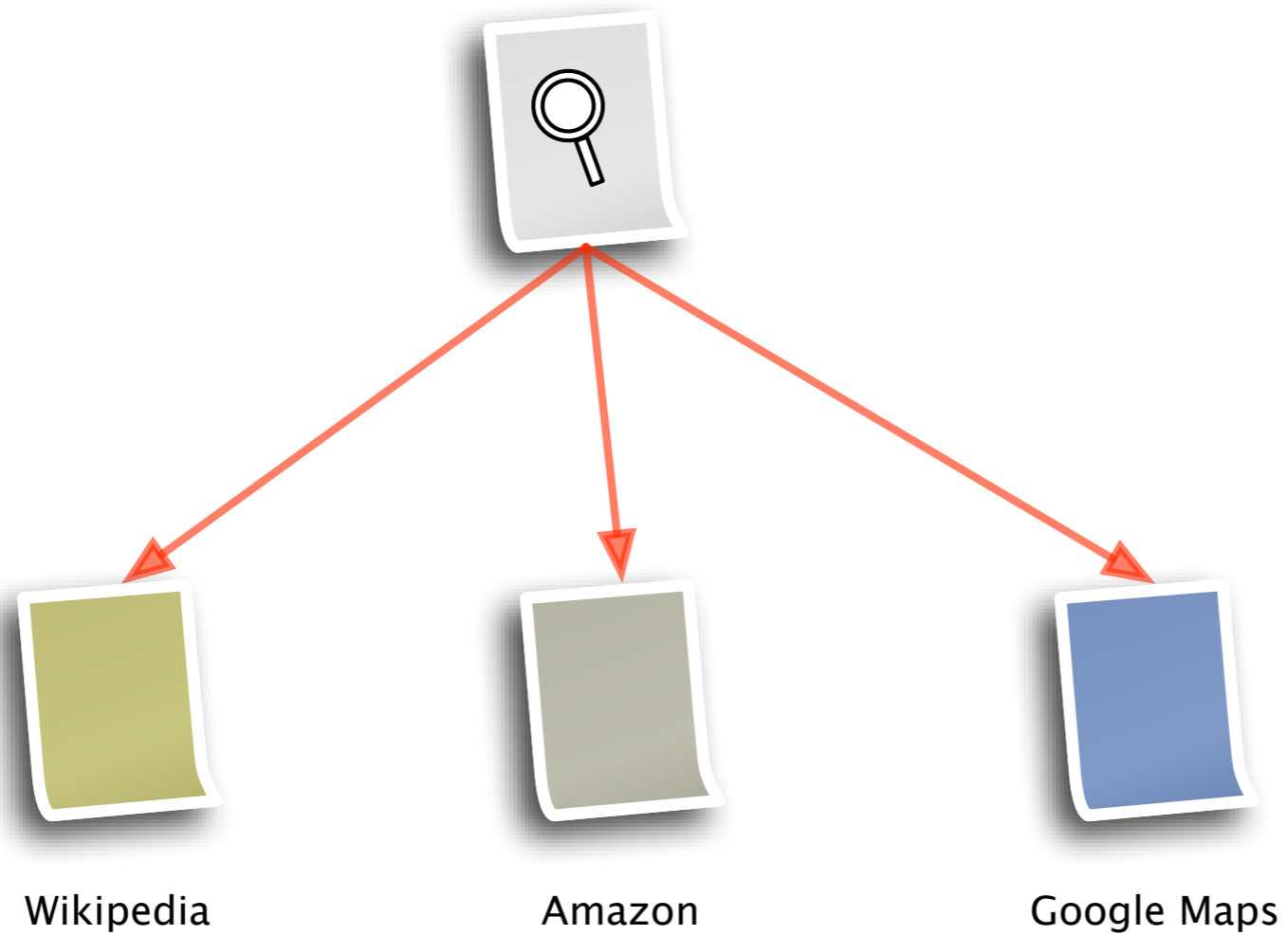
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 Eligible for **FREE** Super Saver Delivery.
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- 

The Collected Poems of Robert Burns (Wordsworth Poetry Library) by Ro

Google Maps



Combining Information



Combining data from one source with a service from another



Wild Swim Map UK | Wild Swimming - outdoors in rivers, lakes and the sea

www.wildswimming.co.uk/wild-swim-map-uk/?multi_region=wild-swim-map-uk

Wild Swim Map UK

Home > Wild Swim Map UK

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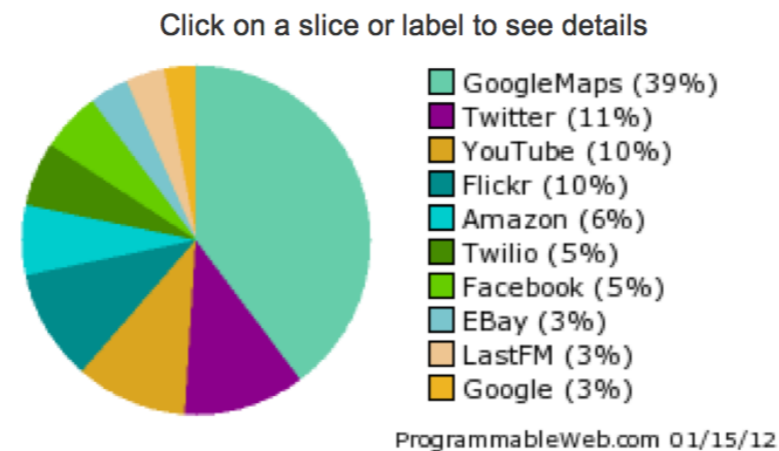
Explore and contribute to the UK wild swimming map. The map has been created from selected places from the Wild Swimming books plus hundreds of additional entries and photos contributed by the wonderful wild swimmers of the UK. Click on the expand button (top left corner of map) to view the wild swim map in full screen mode.

The original wild swimming map was launched as a Google community map in 2007 and has received over a million visits since. We've recently moved over to this new site and are in the process of transferring across all the entries. Use the search boxes on the top right of this page to enter your post code or address, to find places close to you. Use the 'Explore by...' menu to choose wild swim map areas, counties or activity themes to explore by (we're planning to include events, places to camp by water, places to hire boats etc). Click here to add a new swim to the wild swimming map, add a photo or leave a rating, comment or review. Or choose 'Add a Listing' from the menu above, and choose an appropriate category. You can also add information about local events, campaigns and clubs, or recommendations for a lovely campsite or cafe near a swim.

Lee Bay
Lee Bay ★★★★★ 0 reviews
Pinpoint

Local Activities

- A large and growing number of web data sources provide program-accessible interfaces (APIs).
- The web site <http://www.programmableweb.com> currently lists 8311.
- Most popular Web APIs are:



- The interfaces are non-uniform - REST, RPC (e.g., SOAP) and hybrid
- The results are returned in variety of formats - XML, JSON, Atom
- The data schemas tend to be provider-specific
- Militates against the development of portable, generic methods of accessing and using data.

- Invented by Tim Berners-Lee and others. W3C driving organisation.
- Web of machine-readable data
- What are the main aims of the SW?
 - Automated query-answering
 - Automated use of the data (reasoning, planning, acting, etc)



- WWW is a **web of documents**
- SW is a **web of data**
- WWW documents are **human** readable
- SW data is **machine** readable (in theory at least)

Why the Semantic Web?



I don't think [the Semantic Web is] a very good name but we're stuck with it now. The word semantics is used by different groups to mean different things ...I think we could have called it the Data Web. ...it connects all applications together or gives [people] access to data across the company ...

Tim Berners-Lee (2007), Interview in *Business Week*

Syntax / semantics distinction: long history in philosophy of language, linguistics, formal logic

- **Syntax** concerned with arrangement of symbols
- **Semantics** concerned with the relation between symbols strings and the world: what things actually *mean*.

Query answering:

IBM's Watson: beats human competitors at Jeopardy

but

- specifically trained for this task (including looking at decade's worth of past Jeopardy answers)
- sort of cheating (reaction times means it always gets first go!)



Query answering:

Wolfram-alpha: does complex query-answering and solves mathematical problems

but

- hand-curated database - *not* the Semantic Web
- hugely labour-intensive to develop and cannot take advantage of new knowledge

Query answering:

Other systems:

- considerable progress
 - current state-of-the-art is extremely useful
- but*
- the general case is hard!

What can the Semantic Web actually do?



Automated use of data:

works well in constrained circumstances:

for example: Google maps can automatically combine information about maps, speed limits, current road usage, etc., to get estimates of journey time

very hard in unconstrained circumstances:

classic SW example of an automated travel agent still far from achievable

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- Large numbers of users to make their data available:
 - available
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- Good query-answering systems
- The ability to automatically interpret and use data



This Course



This course is about:

- The Semantic Web
- The data representation issues relevant to the Semantic Web and Multi-agent systems



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However, the notion of the Semantic Web as a multi-agent system is important to this course

- Over the course, it will become more apparent what this actually means.
- We will talk about agents enough to understand this, but anyone who wants more information about agents needs to do ABS.



We will cover:

- Fundamentals of knowledge representation:
 - Ontologies and databases
 - Formats: RDF, RDFS, DL and OWL



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- Fundamentals of knowledge representation:
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 - Formats: RDF, RDFS, DL and OWL
- Data querying
- Linked Open Data (LOD)
- Services
- Agents
- The aims and goals of the Semantic Web, and their plausibility.