

# **COMP 516**

## **Research Methods in Computer Science**

**Dominik Wojtczak**

**Department of Computer Science  
University of Liverpool**

# **COMP 516**

## **Research Methods in Computer Science**

### **Lecture 5: Literature searches**

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# Academic English Classes

- for all international students and staff members
- Monday 1st October - Friday 14th December 2012
- no need to register for these classes (but take your student card)
- e.g. every Monday 13.00- 14.00 **Grammar & Vocabulary** in MATH-105 and repeated Tuesday 12.00-13.00 in GHOLT-H223
- many more classes: **Academic Writing, Academic Reading, Academic Speaking & Pronunciation, Academic Listening, Britain Today**

[http://www.liv.ac.uk/english-language-centre/academic\\_english\\_classes\\_for\\_all\\_international\\_students\\_and\\_staff/](http://www.liv.ac.uk/english-language-centre/academic_english_classes_for_all_international_students_and_staff/)

or click “Useful resources for COMP516” at

<https://cgi.csc.liv.ac.uk/~dominik/teaching/comp516>

# Academic English classes for International MSc Students

- discipline-specific language classes
- all overseas students are expected to enroll on this module
- Monday 8th October - Friday 14th December 2012
- Classes for CS: Monday 15:00-16:00 in ELEC-204 (E4),  
first class: Monday 8 October 2012
- Scientific English: Wed 15:00-17:00 in MATH-103,  
first class: Wed 10 October 2012

[http://www.liv.ac.uk/english-language-centre/academic\\_english\\_classes\\_for\\_international\\_tps/](http://www.liv.ac.uk/english-language-centre/academic_english_classes_for_international_tps/)

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# Clarification about the Essay (1)

- the presentation/essay for COMP516 is not related to your final MSc project (COMP702)
- MSc project is almost always picked from a list (available at the end of semester 2)
- it is sometimes possible to propose a new MSc project, but that requires finding a suitable supervisor

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## Clarification about the Essay (2)

- the topic for your COMP516 essay can be anything that interests you and is related to CS
- alternatively, pick some topic listed at the COMP516 webpage
- you will submit the topic of your essay online via a form
- in a unlikely event that this topic is not suitable I will ask you to pick a new one
- another possibility is to pick as your essay topic an MSc project was not picked last year
- <https://cgi.csc.liv.ac.uk/~comp702/> and use your CS login/password (not MWS) ....
- however, once picked one should confirm that the project will still be available this year

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# Barclays Lectures: Insights into IT

- a series of 8 lectures by Barclays representatives
- the poster is just outside
- every Wednesday at 1pm in Ashton Lecture Theatre, starting this week (3 October 2012)
- IT related topics: security, cloud computing etc.
- directly related to the material in COMP516, e.g. project management, risk assessment
- would help you to make the connection between theory and practice

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# Searching for Literature

- What are you trying to find out?
  - ~> Try to specify exactly what you need to know
- What type of information do you want to find?
  - ~> An answer to a specific question?
  - ~> An overview of a subject area?
  - ~> A specific document?
- Why do you need this information?
  - ~> Literature survey: Information needs to be comprehensive
  - ~> Short essay: Limited number of sources is sufficient
- How quickly do you need the information?
  - ~> Immediately: Internet
  - ~> In a day: Library
  - ~> In a week: Inter Library Loans

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Consider the following tasks:

- 1 Obtain a paper copy of the following article:

*P. McBurney, S. Parsons and M. Wooldridge (2002):  
Desiderata for agent argumentation protocols.  
In: C. Castelfranchi and W. L. Johnson (Editors):  
Proceedings of the First International Joint Conference on  
Autonomous Agents and Multi-Agent Systems (AAMAS  
2002), pp. 402–409, Bologna, Italy. July 2002. New York,  
USA: ACM Press.*

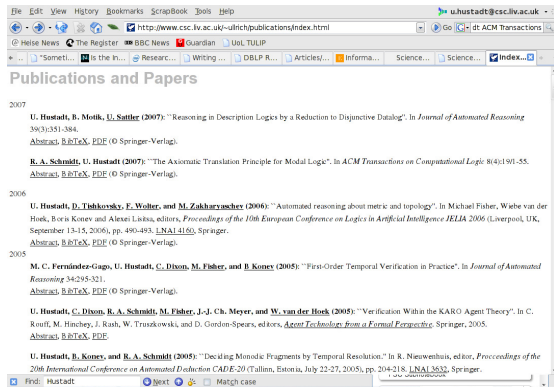
- 2 Find out which other publications refer to the article above.

How would you accomplish these tasks?

# Where to Search: Sources

## Sources for literature on the internet:

### ■ Freely available collections (personal/institutional)



### ■ Publishers' websites/databases

### ■ Literature databases

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The screenshot shows a web browser window displaying a SpringerLink article. The browser's address bar shows the URL: <http://www.springerlink.com/content/0g40629w4773rn8/?p=d051b67059b643c3>. The page title is "Reasoning in Description Logics by a Reduction to Disjunctive Datalog". The authors listed are Ulrich Hustadt, Boris Motik, and Ulrike Sattler. The article is from the "Journal of Automated Reasoning", published by Springer Netherlands. A prominent orange banner in the center of the page reads "Read for FREE: the #1 cited article of 2005 from UCV". Below the banner, the authors' affiliations are listed: (1) Department of Computer Science, University of Liverpool, Liverpool, UK and (2) Department of Computer Science, University of Manchester, Manchester, UK. The article's abstract discusses applications of description logics and the development of a reasoning algorithm. The keywords are "Description logics · Disjunctive datalog · Data complexity". The page also includes a sidebar with navigation options like "Add to marked items", "Add to shopping cart", and "Add to saved items".

SpringerLink

Journal Article

Reasoning in Description Logics by a Reduction to Disjunctive Datalog

Journal of Automated Reasoning

Publisher: Springer Netherlands

ISSN: 0168-7433 (Print) 1573-0670 (Online)

Volume 25, Number 2 / October, 2007

Pages: 251-304

Subject collection: Computer Science

Printed: July 27, 2007

**Read for FREE: the #1 cited article of 2005 from UCV**

Ulrich Hustadt<sup>1</sup>, Boris Motik<sup>2</sup> and Ulrike Sattler<sup>2</sup>

(1) Department of Computer Science, University of Liverpool, Liverpool, UK  
(2) Department of Computer Science, University of Manchester, Manchester, UK

Received: 1 May 2006 Accepted: 1 February 2007 Published online: 27 July 2007

**Abstract** As applications of description logics proliferate, efficient reasoning with knowledge bases containing many assertions becomes ever more important. For such cases, we developed a novel reasoning algorithm that reduces a *SHIQ* knowledge base to a disjunctive datalog program while preserving the set of ground consequences. Queries can then be answered in the resulting program while reusing existing and practically proven optimization techniques of deductive databases, such as join-order optimizations or magic sets. Moreover, we use our algorithm to derive precise data complexity bounds: we show that *SHIQ* is data complete for NP, and we identify an expressive fragment of *SHIQ* with polynomial data complexity.

**Keywords** Description logics · Disjunctive datalog · Data complexity

- Literature databases

# Where to Search: Sources

## Sources for literature on the internet:

- Freely available collections (personal/institutional)
- Publishers' websites/databases
- Literature databases

The screenshot shows a web browser window with the address bar displaying <http://www.scopus.com.ezproxy.liv.ac.uk/scopus/results/results.uri?sort=plf-f&sr>. The browser's address bar also shows the user's email address: [u.hustadt@csc.liv.ac.uk](mailto:u.hustadt@csc.liv.ac.uk). The search results are displayed in a table with the following columns: Document (sort by relevance), Author(s), Date, Source Title, and Cited By. The results are sorted by relevance, and the first six results are shown. Each result includes a checkbox for selection, a link to the abstract, and links to the full text or PDF. The search results are as follows:

Document (sort by relevance)	Author(s)	Date	Source Title	Cited By
1. Reasoning in description logics by a reduction to disjunctive datalog <a href="#">Abstract</a> <a href="#">Refs</a> <a href="#">Full Text</a> <a href="#">Show Abstract</a>	Hustadt, U., Motik, B., Sattler, U.	2007	Journal of Automated Reasoning 39 (3), pp. 351-384	0
2. The axiomatic translation principle for modal logic <a href="#">Abstract</a> <a href="#">Refs</a> <a href="#">Full Text</a> <a href="#">Show Abstract</a>	Schmidt, R.A., Hustadt, U.	2007	ACM Transactions on Computational Logic 8 (4), art. no. 1276921	0
3. Automated reasoning about metric and topology <a href="#">Abstract</a> <a href="#">Refs</a> <a href="#">Full Text</a> <a href="#">Show Abstract</a>	Hustadt, U., Tashkovsky, D., Wolter, F., Zakharyashev, M.	2006	Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics) 4160 LNAI, pp. 490-493	0
4. Deciding monodie fragments by temporal resolution <a href="#">Abstract</a> <a href="#">Refs</a> <a href="#">Full Text</a> <a href="#">Show Abstract</a>	Hustadt, U., Konev, B., Schmidt, R.A.	2005	Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics) 3632 LNAI, pp. 204-218	1
5. A decomposition rule for decision procedures by resolution-based calculi <a href="#">Abstract</a> <a href="#">Refs</a> <a href="#">Full Text</a> <a href="#">Show Abstract</a>	Hustadt, U., Motik, B., Sattler, U.	2005	Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics) 3452 LNAI, pp. 21-39	0
6. Mechanising first-order temporal resolution <a href="#">Abstract</a> <a href="#">Refs</a> <a href="#">Full Text</a> <a href="#">Show Abstract</a>	Konev, B., Degtyarev, A., Dixon, C., Fisher, M., Hustadt, U.	2005	Information and Computation 199 (1-2), pp. 55-86	8



# Where to Search: Interrelationship of Sources

- 1 Authors submit paper to conference/journal for **peer review**
- 2 If accepted, the paper is **revised** by the authors and submitted to conference/journal editor
- 3 The paper is **processed** to bring it into the publisher's format (typesetting/layout)
- 4 The paper is then
  - included in the **publisher's database**,
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  - possibly published in printed form  
(not necessarily in that order)
- 5 **Literature databases**
  - collect the bibliographic information from several publishers
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  - link back to publisher for full-text of papers

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Our library has subscriptions to many publishers' databases:

ACM Digital Library	Full-text of all <a href="#">ACM</a> journals and conference proceedings <a href="http://portal.acm.org.ezproxy.liv.ac.uk/dl.cfm">http://portal.acm.org.ezproxy.liv.ac.uk/dl.cfm</a>
IEEE Xplore	Full-text of <a href="#">IEEE</a> journals, conference proceedings, and books <a href="http://ieeexplore.ieee.org.ezproxy.liv.ac.uk/">http://ieeexplore.ieee.org.ezproxy.liv.ac.uk/</a>
ScienceDirect	Full-text of <a href="#">Elsevier</a> journals <a href="http://www.sciencedirect.com.ezproxy.liv.ac.uk">http://www.sciencedirect.com.ezproxy.liv.ac.uk</a>
SpringerLink	Full-text of <a href="#">Springer</a> journals, conference proceedings, and books <a href="http://www.springerlink.com.ezproxy.liv.ac.uk/">http://www.springerlink.com.ezproxy.liv.ac.uk/</a>
Wiley InterScience	Full-text of <a href="#">Wiley</a> journals and books <a href="http://www.interscience.wiley.com.ezproxy.liv.ac.uk/">http://www.interscience.wiley.com.ezproxy.liv.ac.uk/</a>

Access to full-text requires authentication by MWS login and password

# Databases and Search Engines: Literature Databases

The University Library has subscriptions to many literature databases:

Scopus	Covers 14,000 journals and proceedings series; incl. ACM, Elsevier, IEEE, Springer <a href="http://www.scopus.com/">http://www.scopus.com/</a>
Web of Knowledge	Covers 22,000 journals and 192,000 proceedings; incl. ACM, Elsevier, IEEE, Springer <a href="http://isiknowledge.com/">http://isiknowledge.com/</a>
DISCOVER (UoL)	Meta search engine for ACM Digital Library, IEEE Explore, etc but also Scopus, Web of Science and Google Scholar <a href="http://www.liv.ac.uk/library/e-library/eds.html">www.liv.ac.uk/library/e-library/eds.html</a>

Adding `.ezproxy.liv.ac.uk` to the server name again allows access from outside the campus using your MWS login and password for authentication

# Databases and Search Engines: Web Search Engines

Freely available (scholarly) web search engines include:

Citeseer	Digital library of 750k freely available papers in computer and information science <a href="http://citeseer.ist.psu.edu/">http://citeseer.ist.psu.edu/</a>
Google	General internet search engine <a href="http://www.google.co.uk">http://www.google.co.uk</a>
Google Scholar	Searches scholarly literature on the web. <a href="http://scholar.google.com">http://scholar.google.com</a>
Scirus	Searches journals (ScienceDirect) and web resources <a href="http://www.scirus.com/">http://www.scirus.com/</a>
Windows Live Search Academic	Academic search engine - search academic journals and content for article titles, author names, article abstracts, and conference proceedings. <a href="http://academic.live.com/">http://academic.live.com/</a>



# Databases and Search Engines: Comparison

- All these databases and search engines, and many more, are accessible from one central point:

`http://atoz.ebsco.com.ezproxy.liv.ac.uk/Customization/Tab/11404?tabId=8591`

- The library's own catalogue is available at

`http://library.liv.ac.uk/`

- There is an important difference to remember:

**Library catalogue:** Allows to search **for** a journal, but not **for** journal articles

**Publishers' and literature databases:** Allow to search **for** journal articles, but not **in** the full-text journal articles

**Web search engines:** Allow to search **in** the full-text of journal articles, but have difficulties with their structure

# Databases and Search Engines: Comparison

- **Literature databases** cover a vast number of journals and conferences, but they
  - do not cover all journals and conference
  - do not cover textbook, handbooks, collections of articles in book form
  - do not cover workshops and similar scientific meetings
  - do not cover technical reports and pre-prints
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  - typically also return a lot of irrelevant material to a query
  - leave it to the user to distinguish high quality from low quality material

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- **Literature databases** cover a vast number of journals and conferences, but they
  - do not cover all journals and conference
  - do not cover textbook, handbooks, collections of articles in book form
  - do not cover workshops and similar scientific meetings
  - do not cover technical reports and pre-prints
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- Search terms might be simple keywords, phrases, or consist of field identifiers, modifiers, operators, and keywords

Examples: induction

“mathematical induction”

induct\*

author = Ambuhl

author like Ambuhl

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- Queries are typically constructed from search terms using boolean operators

Examples: induction AND mathematical

induction OR deduction

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## Queries (2)

- Queries are typically constructed from **search terms** using **boolean operators**
  - **AND** retrieves records where ALL of the search terms are present,  
induction AND mathematical
  - **OR** retrieves records containing either one term OR another  
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- **Mode** of search is very important:
  - narrow: you are looking for exactly one record
    - ↪ use a search term which is as specific as possible  
"cell microprocessor" instead of cell
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- 2 synchronisation between computers
- 3 drag-and-drop publications
- 4 social network, groups organised around different research areas
- 5 recommendations of publications, reviews etc.
- 6 shows the most read papers not just the most cited

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