COMP 516
Research Methods in Computer Science

Dominik Wojtczak

Department of Computer Science
University of Liverpool

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Lecture 1: Introduction and Overview

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Aims

1. To provide a deep and systematic understanding of the nature and conduct of Computer Science research
2. To enable students to undertake independent research
3. To enhance existing transferable key skills
4. To develop high-order transferable key skills
5. To remind students of the Legal, Social, Ethical and Professional (LSEP) issues applicable to the computer industry

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Learning Outcomes (1)

1. Have an understanding of how established techniques of research and enquiry are used to extend, create and interpret knowledge in Computer Science
2. Have a conceptual understanding sufficient to:
   (i) evaluate critically current research and advanced scholarship in Computer Science, and
   (ii) propose possible alternative directions for further work
3. Be able to deal with complex issues at the forefront of the academic discipline of Computer Science in a manner, based on sound judgements, that is both systematic and creative; and
   be able to communicate conclusions clearly to both specialists and non-specialists

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Learning Outcomes (2)

4. Demonstrate self-direction and originality in tackling and solving problems within the domain of Computer Science, and be able to act autonomously in planning and implementing solutions in a professional manner
5. Be able to define and plan a programme of independent research
6. Participate within the professional, legal and ethical framework within which they would be expected to operate as professionals within the IT industry

Learning Outcomes (2)

4. Demonstrate self-direction and originality in tackling and solving problems within the domain of Computer Science, and be able to act autonomously in planning and implementing solutions in a professional manner
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Learning Outcomes (3)

7. Make use of the qualities and transferable skills necessary for employment requiring:
   (i) the exercise of initiative and personal responsibility,
   (ii) decision making in complex and unpredictable situations, and
   (iii) the independent learning ability required for continuing professional development

8. Have the skills set to be able to continue to advance their knowledge and understanding, and to develop new skills to a high level, with respect to continuing professional development as a "self-directed life-long learner" across the discipline of Computer Science

Learning Outcomes (4)

In short, you should learn to

1. understand research and research methods in Computer Science
2. be able to plan, and conduct your own research, taking into account ethical, legal, and professional limitations
3. be able to communicate its results

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This module is preparation for COMP702.

Delivery of the Module (1)

1 Lectures

Monday	14:00	Central Teaching Hub, Lecture Theatre D
Tuesday	13:00	Ashton Lecture Room
Thursday	10:00	EEE, Lecture Room E2

2 Practicals

Friday 11:00 Lab 1, Holt Building

Practical labs start Friday 5 October 2012

3 Seminars

Tuesday 16.00 Departmental research seminar

http://www.csc.liv.ac.uk/research/seminars/

Ashton Lecture Theater (First Floor)

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Delivery of the Module (2)

1. **Office hour**

   Tuesday 14:00-15:00; arrange by e-mail first

   (d.wojtczak@liverpool.ac.uk)

2. **Website**

   http://www2.csc.liv.ac.uk/~dominik/teaching/comp516/

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Recommended Texts

- Christian W. Dawson: Projects in Computing and Information Systems (A Student's Guide). Addison Wesley, 2005.
  Harold Cohen Library, Class No 518.561.D27

  Earlier edition:
  Christian W. Dawson: The essence of computing projects (A student's guide). Prentice Hall, 2000.
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- Justin Zobel: Writing for Computer Science. Springer, 2004.
  Harold Cohen Library, Class No 378.962.Z81

Assessment

- Presentation & short bibliography on an agreed subject (15%)
  - subject to be agreed by Friday 19 October 2012
  - slides and bibliography due by 17:00 Friday 2 November 2012
- Class test on project planning (15%)
- Class test on professional, legal, and ethical issues (15%)
- 3,000 word essay on the agreed subject (55%)
  - work can be started as soon as the subject is agreed
  - to be submitted by 15:30 Monday 10 December 2012

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Pass mark is 50% (standard for MSc modules)

Teaching and Learning Strategy

- Lectures and tutorials/labs only make up a small part of the module
- In total you are expected to commit 150 hours to the module, that is, 12.5 hours per week over 12 weeks
  (more hours per week than for any other module)
- Of those the timetabled activities only make up 4 hours per week
- In addition you should spend 2 hours per week on reflection, consideration of lecture material and background reading
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What Is ‘Research’?

Research (Dictionary)

Noun

1. Scholarly or scientific investigation or inquiry.
2. Close, careful study.

Verb

1. To study (something) thoroughly so as to present in a detailed, accurate manner.
   (Example: researching the effects of acid rain.)

Note the difference between the definition of the noun and of the verb.

What Is ‘Research’?

Study (Dictionary)

Noun

1. The pursuit of knowledge, as by reading, observation, or research.
2. Attentive scrutiny.

Verb

1. To apply one’s mind purposefully to the acquisition of knowledge or understanding of (a subject).
2. To inquire into; investigate.
3. To examine closely; scrutinise.

What Is ‘Research’?

Research (`http://en.wikipedia.org/wiki/Research` from 4th October 2005)

- an active, diligent, and systematic process of inquiry in order to discover, interpret or revise facts, events, behaviours, or theories, or to make practical applications with the help of such facts, laws, or theories.
- a collection of information about a particular subject.
- derives from the Middle French and the literal meaning is “investigate thoroughly”.

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Research into `http://en.wikipedia.org/wiki/Research`

- more than 250 edits in the last year
- the article has completely changed since 2011, not to mention 2005
- one would expect the etymology of the word to remain the same
  - 2005: Middle French and the literal meaning is “investigate thoroughly”
  - 2012: Middle French ”recherche”, which means ”to go about seeking”
  - 2012: the term itself being derived from the Old French term ”recerchier” a compound word from ”re-” + ”cerchier”, or ”sercher”, meaning ’search’.
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- good for quickly learning about something, but not for referencing
- in 2007, Ryan Jordan, 24 at that time, who described himself as a tenured professor of religion was the main managing editor of many religion related Wikipedia entries, while in fact was using books such as “Catholicism for Dummies”

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Homework: Read the new Wikipedia article about research:
`http://en.wikipedia.org/wiki/Research`.
Compare it with the article from October 2005 and October 2011