Portfolio of Teaching Experience: Lars Michael Kristensen

May 18, 2009

COURSES TAUGHT

The number in parentheses following each year gives the number of course participants.

Operating Systems and Networks. 2009 (60). 2nd year undergraduate course, Department of Computer Engineering, Bergen University College. Course duration: 15 weeks. The course covers the fundamental principles of operating systems and TCP/IP networking. The course consists of 4-6 hours of lectures and 2 hours of exercises per week. The exercises are divided in two parts: one that emphasizes operating system concepts and one that provides hands-on experience with operating systems and networks, including JAVA network programming.

Operating Systems. 2005 (67), 2006 (49), 2007 (60). 2nd year undergraduate course, Department of Computer Science, University of Aarhus. Course duration: 7 weeks. The course covers the fundamental principles of operating systems. The course consists of 4 hours of lectures and 4 hours of exercises per week. The weekly exercises are divided in two parts: one that emphasizes operating system concepts and one that provides hands-on experience with operating systems, including C programming. A set of small mandatory projects has been developed for the latter part where the participants make modifications and extensions to the Linux kernel. Course web page (in Danish): `www.daimi.au.dk/~kris/dOpSys/`.

Coloured Petri Nets – Modelling and Validation of Distributed Systems. 2005 (9), 2006 (33), 2007 (27), 2008 (22). Graduate course, Department of Computer Science, University of Aarhus. Duration of the course is 7 or 14 weeks. The course introduces the Coloured Petri Nets (CPN) language and associated analysis methods for modelling, verification, and performance analysis of distributed systems. The first seven weeks is a combination of conventional lectures covering the CPN modelling language and workshops where the participants use the CPN Tools computer tool for practical modelling and validation of relatively simple examples of distributed systems. Participants following the last seven weeks conduct a project applying the modelling language and analysis methods to real-life distributed systems. Course web page: `www.daimi.au.dk/~kris/CPN/`.

Network Protocols and Internetworking. 2004 (23), 2005 (50), 2006 (73), 2007 (30). Graduate course, Department of Computer Science, University of Aarhus. Duration of the course is 7 or 14 weeks. The first seven weeks of the course covers the principles of Internetworking and the Internet Protocol including, addressing, forwarding, routing protocols, and mobile networks. Course participants conduct two smaller projects: one on JAVA network programming and a series of laboratory exercises using the Virtual Internetworking Environment (VINE) that was developed as part of the course. VINE provides a virtual IP laboratory allowing students to get hands-on experience with IPv4 and IPv6 protocol analysis and network configuration. Participants following the last seven weeks conduct a larger project on the design and implementation of communication infrastructure, software, and protocols. Course web page: `www.daimi.au.dk/NPaI/`.

Machine Architecture / Computers and Networks. 2004 (137), 2005 (129), 2006 (121), spring 2007 (96), fall 2007 (110), fall 2008 (130). 1st year undergraduate course, Department of Computer Science, University of Aarhus. Course duration: 7 weeks. The course cover computer organization and architecture including, gates and circuits, micro-architecture, machine code, assembly languages, virtual machines, and integer representation and arithmetic. The course consists of 4 hours of lectures and 4 hours of exercises per week. The weekly exercises are divided into two parts: one that emphasizes computer organisation concepts and one that provides hands-on experience involving assembly language programming, C programming, and JAVA network programming. A set of smaller mandatory projects are used for the latter part. Course web page (in Danish): `www.daimi.au.dk/~kris/dMasArk/`.

Computer Science in Perspective. 2007 (76), 2008 (85). 1st year undergraduate course, Department of Computer Science, University of Aarhus. Course duration: 7 weeks. This course gives a broad introduction to the many aspects of computer science and is given jointly by researchers at the department of computer science and the University of Aarhus. One week was focussed on modelling and validation of concurrent systems and consisted of two lectures and a one-day open learning center.

Advanced Data Network Protocols. 2004 (14). Graduate course, Department of Computer Science, University of Aarhus. Duration of the course was 14 weeks. This is an earlier version of the course Network Protocols and Internetworking described above.

Computer Architecture and Operating Systems. 2002 (80), 2003 (66). 2nd year undergraduate course, Department of Computer Science, University of Aarhus. Duration of the course was 14 weeks. This course is a predecessor of the courses on Machine Architecture and Operating Systems described above.

System Design Techniques. 2001 (app. 40), 2002 (app. 40). Final year course, School of Electrical and Information Engineering, University of South Australia. This course introduced the Petri net formalism for modelling and analysing discrete event systems. The course also covered high-level Petri nets in the form of Coloured Petri Nets. The content of the course is very similar to the course on Coloured Petri Nets described above.

Modelling and Validation of Network Protocols. 1998 (8), 1999 (11). Graduate course, Department of Computer Science, University of Aarhus. This is an earlier version of the course on Coloured Petri Nets – Modelling and Validation of Distributed System described above.

EXAMINATIONS

UNDERGRADUATE COURSES

Operating Systems and Networks. June 2009. Five hour written exam.

Operating Systems. June 2005, August 2005, June 2006, August 2006, June 2007, August 2007. 20-minute oral exam with no advance preparation. Grading according to the 13-scale. The exam had 9 exam questions corresponding to the main topics covered in the course.

Machine Architecture / Computers and Networks. March 2004, March 2005, August 2005, March 2006, August 2006, March 2007, August 2007, January 2008, August 2008, january 2009. 20-minute oral exam with no advance preparation. Grading according to the 13-scale. The exam had 6 exam questions corresponding to the six mandatory practical projects carried out in the course.

Computer Architecture and Operating Systems. January 2003, January 2004. 30-minutes oral exam with 30 minute advance preparation time. The exam had 14 exam questions corresponding to the main topics covered in the course.

GRADUATE COURSES

Coloured Petri Nets – Modelling and Validation of Distributed Systems. June 2005, March 2006, May 2006, June 2006, March 2007, June 2007, June 2008. 20-minute oral exam with no advance preparation for participants following the 7 weeks version, and a 25-minute oral exam based on the project report for participants following the 14 weeks version.

Network Protocols and Internetworking. October 2004, October 2005, January 2006, August 2006, October 2006, January 2007. October 2007, January 2008. 20-minute oral exam with no advance preparation for participants following the 7 weeks version, and a 25-minute oral exam based on the project report for participants following the 14 weeks version.

System Design Techniques. 2001, 2002. 4-hour written exam.

In addition to the above exams: 2 Honour's Thesis exams, 20 Master's Thesis exams, and 1 Ph.D. Qualification exam have been completed. See the list of theses supervised below for details.

THESES SUPERVISED

PH.D THESES

M.T. Hansen. *Efficient Protocols and Middleware for Sensor Networks*. 2008-2009.

P. Fleischer. *Model-Aided Development of Communication Protocols*. 2007-2008.

J. Andersen. *Medical Sensor Network Infrastructures*. In progress.

J. Brøndsted. *Software Architecture and Communication in Mobile Environments*, University of Aarhus, 2004-2008. Jointly supervised with K.M. Hansen.

M. Westergaard. *Model Checking and State Space Methods*. University of Aarhus, 2003-2007. Jointly supervised with K. Jensen.

C. Ouyang. *The Internet Open Trading Protocol*. University of South Australia, 2000-2002. Co-supervised with Prof. Jonathan Billington.

Associate supervisor for Ph.D. students: S. Gordon, L. Liu, B. Han, and A. Singh, University of South Australia, 2000-2002. Main supervisor was Prof. Jonathan Billington.

MASTER'S THESES

K.L. Espensen and M.K. Kjeldsen. *Automatic Code Generation from Process-partitioned Coloured Petri Net Models*. Department of Computer Science, University of Aarhus. January 2009.

R. Dobers. *A Hybrid Publish-Subscribe Middleware interconnecting mobile ad-hoc and wired Networks across the Internet*. Department of Computer Science, University of Aarhus. January 2009.

K. Dorland. *MobiVINE: A Virtual Environment for Developing Location-aware Network Protocols*. Department of Computer Science, University of Aarhus. November 2008.

E. Olafsson and H. Andersen. *Protocols for Structural Health Monitoring*. Department of Computer Science, University of Aarhus. October 2008.

S. Markert. *Internet Connectivity for Mobile Ad-hoc Networks*. Department of Computer Science, University of Aarhus. March 2008.

B. Pedersen. *Modelling and Validation of Autoconfiguration Protocols for Mobile Ad-hoc Networks*. Department of Computer Science, University of Aarhus. August 2007.

R. Thouvenin. *Implementation of the Dynamic MANET On-Demand Routing Protocol on the TinyOS Platform*. Department of Computer Science, University of Aarhus. July 2007.

P. G. Jensen: *Reliable Multicast in Sensor Networks.* Department of Computer Science, University of Aarhus. May 2007.

S. Hansen: *Modelling and Validation of the Dynamic On-Demand Routing (DYMO) Protocol.* Department of Computer Science, University of Aarhus. Februar 2007.

R. Thorup: *Implementation and Evaluation of the Dynamic On-Demand Routing (DYMO) Protocol.*. Department of Computer Science, University of Aarhus. Februar 2007.

J. Cheng: *Evaluation and Optimization of a Heuristic for TCP Acknowledgement Frequency.* Department of Computer Science, University of Aarhus. Januar 2007.

K. B. Nielsen: *Towards a Transition of the DAIMI IP Network to IPv6.* Department of Computer Science, University of Aarhus, September 2006.

P. Fleischer: *Implementation and Evaluation of Header-based Quality of Service for IPv6.* Department of Computer Science, University of Aarhus, August 2006.

C. Ritte: *Implementation and Evaluation of the Optimized Link-State Routing Protocol (OLSR) on the TinyOS platform.* Department of Computer Science, University of Aarhus, July 2006.

B. Hansen, K. S. Krabbe, S. S. Nielsen: *Event Detection, Localization, and Time Synchronization in a ZigBee Sensor Network.* Department of Computer Science, University of Aarhus, June 2006.

G. Zhang: *Modelling and Validation of the Ad-hoc On-demand Distance Vector Protocol using Coloured Petri Nets.* Department of Computer Science, University of Aarhus, March 2006.

M. Skafte: *Geographically-based Services in Cellular Networks.* Department of Computer Science, University of Aarhus, January 2006.

J. Andersen and T. Sørensen: *Design and Evaluation of a Traffic Warning Unit.* Department of Computer Science, University of Aarhus, January 2006.

C. Holst and J. Klitgaard: *Ethernet Audio-Video Streaming with Quality of Service.* Department of Computer Science, University of Aarhus, January 2006.

H. L. Jensen: *MobyM - A Mobile Ad-hoc Network Emulation Environment.* Department of Computer Science, University of Aarhus, January 2005.

K. D. Nielsen: *Evaluation of Broadcast Based Protocol for Data Dissemination in Traffic Warning Networks.* Department of Computer Science, University of Aarhus, June 2004.

B. Bayart and T. Ribes: *Modular State Space Analysis for Coloured Petri Nets.* University of Aarhus, June 2003.

S. Bardin. *PARADOX: Computer-Aided Operational Level Planning.* School of Electrical and Information Engineering, University of South Australia, July 2002.

HONOUR'S THESES

B. Mitchell: *Formal Specification and Analysis of an Operational Planning Process using Coloured Petri Nets.* University of South Australia, 2002.

G. Gallasch and M. Elliot: *Animation Facilities for Defence Systems Modelling.* University of South Australia, 2001. Co-supervised with Prof. Jonathan Billington.

COURSE DEVELOPMENT

Machine Architecture / Computers and Networks.

Operating Systems.

Network Protocols and Internetworking.

Coloured Petri Nets – Modelling and Validation of Distributed Systems.

Advanced Data Network Protocols.

A brief description of each course is provided above under COURSES TAUGHT.

TEXTBOOKS AND TEACHING MATERIAL

K. Jensen and L.M. Kristensen: *Coloured Petri Nets – Modelling and Validation of Concurrent Systems*. In preparation. To be published by Springer-Verlag. Drafts of this book has been used as teaching material in courses on Coloured Petri Nets at University of Aarhus, George Mason University (USA), and Technical University of Eindhoven (The Netherlands).

L.M. Kristensen and C. Storm: *VMware and dOpSys-Linux Guide*. This guide describes the VMware-based environment developed in the Operating Systems course that forms the basis for the practical projects involving modification and extensions to the Linux kernel.

L.M. Kristensen and P. Fleischer: *VINE: A Virtual TCP/IP Internetworking Environment*. This guide describes a virtual networking environment that we developed to be used as a basis for the practical projects and workshops in the Network Protocols and Internetworking course. Available via: `www.daimi.au.dk/~vine/`

L.M. Kristensen and K. Jensen. Teaching Modelling and Validation of Concurrent Systems using Coloured Petri Nets. In Proc. of 2nd Workshop on Teaching Concurency (TeaConc'07), pp. 67-78, 2007.

In addition to the above, slide sets have been developed for use in the courses taught. These slide sets are available from the course web pages (see links given above).

PEDAGOGICAL ACTIVITIES

Completed course on university-level teaching for assistant professors organised by the University of Aarhus. August, 2004.

Completed course on university-level supervision organised by the University of Aarhus. January, 2008.

OTHER TEACHING ACTIVITIES

Teaching assistant in the course on Distributed System, 1996, 1998, 1999. Department of Computer Science, University of Aarhus.

Teaching assistant in the course on Coloured Petri Nets, 1996. Department of Computer Science, University of Aarhus.