

**SE4C03: Computer Networks and Computer
Security
Winter 2005
Research Project**

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Revised: 20th February 2005

1 Project summary

Each student will individually do a research project on some network or security technology. The technology can be in networking and security: hardware, software, or theory. The research project consists of two parts:

1. A project proposal.
2. A concise written report on the technology.

The proposal should be exactly one page long (12 pt font, single spaced, 1.5 in left and right margins, 1 in top and bottom margins). It should contain the following information:

1. The course title *SE 4C03 Winter 2005*.
2. The title of the project.
3. The name of the researcher.
4. The date the proposal was last revised.
5. A section titled *Objective* where you mention the technology you would like to investigate. Also, mention whether this technology falls in the hardware, software, or theory categories.
6. A section titled *Approach* which describes how your investigation will be carried out and what written presentation you intend to present later.
7. A section titled *Impact* which states how your proposal fits in with the topics covered in the course and what benefits (you, class, and instructor) are expected to gain from the project.

The proposal is worth 20 points and **must be submitted to Kartik in class on Tuesday, March 15th**. Please note that no late proposals will be accepted.

The written presentation should be not more than 3 pages long (12 pt font, single spaced, 1.5 in left and right margins, 1 in top and bottom margins). This should be a concise report where you describe the technology investigated in your own words. The class is the intended audience; knowledge of the topics covered in the class may be assumed. Moreover, you should clearly and accurately cite your references and all other sources of information. Plagiarism will be treated as academic dishonesty. In addition, your report should include the following:

1. The course title *SE 4C03 Winter 2005*.
2. The title of the project.
3. The name of the researcher.
4. The date of the last revision.
5. References to all your sources of information.

A printed copy of the paper **must be submitted to Kartik in class on Friday, March 25** for preliminary review. I will pass on my comments to you in class on Tuesday, March 29th. A revised copy of the paper in PDF format must be emailed to Kartik (kartik@optlab.mcmaster.ca). These PDF copies will be posted online on the course webpage. The paper is worth 80 points. This includes 20 for command of the subject matter, 20 for the organization of the paper, 20 for the appearance and readability of the paper, and finally 20 for overall effectiveness.

Good reference material

I encourage each one of you to come up with research projects on your own. If you have trouble finding one, you can always drop by my office in ITB 106, and we can have a brief chat to set you up with a project worth investigating.

There is an extensive literature on all aspects of computer networks and security. Three journals that frequently publish papers in this area are *IEEE Transactions on Communications*, *IEEE Journal on Selected Areas in Communications*, and *Computer Communication Review*.

IEEE also publishes three magazines - *IEEE Internet Computing*, *IEEE Network Magazine*, and *IEEE Communications Magazine* that contains surveys, tutorials, and case studies on networking.

Other important journals in this area include ACM journals like *Communications of the ACM*, *ACM Transactions on Computer Systems*, *Computer* etc.

In addition, there are a number of conferences such as SIGCOMM that handle papers on networks.

Here is some reference material (other than the required texts by Comer and Kaufman et al.) I found useful while teaching the course. Perhaps you can find pointers for research projects here.

References

- [1] T. BERNERS-LEE, A. CAILLIAU, A. LOUTONEN, H.F. NIELSEN, AND A. SECRET, *The World Wide Web*, Communications of the ACM, 37(1994), pp. 76-82.
A perspective on the World Wide Web by one of its founders.
- [2] D. BONEH, *20 years of attacks on RSA*, Notices of A.M.S., 46(1999), pp. 203-213.
- [3] S. GARFINKEL AND G. SPAFFORD, *Practical Unix and Network Security*, 2nd edition, O'Reilly & Associates Inc., 1996.
- [4] B. KRISHNAMURTHY AND J. REXFORD, *Web Protocols and Practice*, Addison Wesley, 2001.
A comprehensive book on all aspects of the World Wide Web.
- [5] D. KAHN, *The Codebreakers*, 2nd edition, New York: Macmillan, 1995.
- [6] W. STALLINGS, *Cryptogtaphy and Network Security: Principles and Practices*, 3rd edition, Prentice Hall, 2002.
An excellent introduction to the science of cryptography and its use in network security.
- [7] W. RICHARD STEVENS, *TCP/IP Illustrated, Vol I*, Addison-Wesley Professional Computing Series, 1994.
Provides a comprehensive treatment of TCP/IP protocols illustrated with various examples.
- [8] A.S. TANENBAUM, *Computer Networks*, 4th edtion, Prentice Hall 2003.
Perhaps the most up to date of the various books on TCP/IP protocols. Covers security as well. Has an extensive bibliography worth delving into.
- [9] E.D. ZWICKY, S. COOPER, AND D.B. CHAPMAN, *Building Internet Firewalls*, 2nd edition, O'Reilly, 2000.
A comprehensive introduction to network security and firewall design.