PROJECT PROPOSAL

THE USE OF ETHERNET SIMULATION AS A TEACHING TOOL

AUTHOR: ISMAILA JATTA

SUPERVISOR: FASH SAFDARI

DATE: MONDAY, 09 JANUARY 2006

STATEMENT OF ACADEMIC INTEGRITY

I declare that the information contained in this report is the work of the author. Any other work or information used has been fully referenced to the persons responsible.

Signed:  Date: 09/01/2006

Printed: Ismaila Jatta

ABSTRACT

This report forms part of an individual final year undergraduate project on the use of Ethernet simulation as a teaching tool in academic institutions. The package will be used as a support tool to aid teaching and learning of the more abstract concepts of computing which are hard to comprehend by traditional means of teaching. This teaching technique is of great benefits to staff as well as students. A research was undertaken to prepare a project proposal for the development of an Ethernet simulation prototype teaching tool.

The finished product will be used to support academic staff while teaching complex computing topics such as Carrier Sense Multiple Access with Collision Detection (csma/cd). An access control method used by Ethernet to control workstations accessing the transmission medium within the network.

ACKNOWLEDGEMENT

I would like to thank Fash Safari for his support in supervising this project, Leeds Met library information staff for their support in providing relevant information and skills material, fellow colleagues and other online sources for providing all the necessary documents.

TABLE OF CONTENT

1.0 INTRODUCTION

This section provides an introduction to the problem domain and its implications in higher education institutions.

1.1 SIMULATION TEACHING PACKAGES

A recent survey showed that “100% of students would like to see a tool to help them understand concepts surrounding TCP and 70% of those students went on to say that these concepts should include end to end transfer of packets across an Ethernet network. A further 80% showed interest in packet loss and recovery techniques [QResult1 q3]” (Marshall, 2005, p7). The author evaluated areas of level 2 computing at Leeds Met that could have benefited from a simulated teaching tool. However, the report was narrowed to a specific topic area “Sliding Window Protocol” thereby failing to highlight other equally important and difficult topics such as Carrier Sense Multiple Access with Collision Detection (CSMA/CD).

This project investigates the use of Ethernet simulation packages as a teaching tool in academic institutions. A teaching technique that has greater benefits in modern day teaching and learning as computer systems and other educational software are widely used to produce lecture materials and other supporting documents. But in the classroom setting, there is little tool support in the form of simulation packages. “It has long been argued that students of any age learn better when they are actively involved in the learning process itself.” (Neely, 1996). The author further explains that the use of simulation teaching packages or visual effects to aid learning can be extended to almost all areas of education. Higher education institutions such as Leeds Met are no different and using a simulation teaching package would be of great benefit to both lecturers and students as they will be more actively involved in the teaching and learning process respectively.

1.2 RESEARCH QUESTIONS

The following research questions guided this review.

- What is Ethernet technology?
- Which simulation packages are available?
- Which simulation development tools are available?
- Which simulation development tool is recommended?

2.0 WHAT IS ETHERNET TECHNOLOGY?

This section explains Ethernet technology and how it has been used in the past, present and what the future holds for Ethernet technology and explores specific areas of networking that could benefit from a simulation teaching tool.

2.1 BACKGROUND KNOWLEDGE

Ethernet technology was invented at the Xerox Corporation‘s Palo Alto Research Centre in the early 1970s. Presently 802.3 is the institute of electrical and electronic engineering (IEEE) standardisation code for Ethernet.

In its original version, an Ethernet LAN consisted of a coaxial cable, called the ether, to which multiple computers connect and operated at speeds of 10 Megabits per second (Mbps), then came the fast Ethernet that operated at 100 Mbps, the Gigabit Ethernet then follows suit operating at 1000 Mbps/1 Gigabits per second (Gbps) and the most recent version 10 Gigabit Ethernet operating at 10000 Mbps/ 10 Gbps.

Ethernet employs different methods of transmitting data, stations on a full duplex Ethernet can send and receive data simultaneously but in a half duplex Ethernet, only one station can send/receive data over the channel at any given time, If two or more stations try to transmit data at the same time, the data collides and this causes collisions. CSMA/CD is used to control this phenomenon, a key topic area of this project.

2.2 CSMA/CD

CSMA means stations wishing to transmit data first listen to the network traffic before transmitting any data. If another station is transmitting, the station wishing to transmit data waits until the sending station completes transmitting. If the channel is sensed to be idle, the station then begins transmitting data.

CD is where a transmitting device continues to listen to the channel while transmitting data. If another station is detected, both stations backs off and each station restarts retransmitting at a random time generated by means of a random number protocol. Please refer to **Appendix 8.5** for more details.

2.3 CONCLUSION

From the explanation of CSMA/CD process, it is pretty hard to comprehend the processes involved, but with the introduction of an Ethernet simulation, teachers will be able to provide visual representation of the CAMA/CD processes to support the more abstract theories.

3.0 EXISTING SIMULATION PACKAGES

The following simulation packages were identified and evaluated.

Existing Simulation Packages		
✓ Animate	✓ Netsim	✓ Real 5.0
✓ Cnet	✓ Netsim++	✓ S3
✓ GloMoSim	✓ Ns2	✓ Simured
✓ GTNetS	✓ OMNeT++	✓ SWANS
✓ Insane	✓ OPNET	✓ Traffic v2.0
✓ Macromedia captivate	✓ Performance Prophet	
✓ NCTUns 2.0	✓ QualNet	

3.1 CRITICAL EVALUATION

3.1.1 Animate

This simulation package is more targeted for the business user; however it can be used in academia as a teaching tool. It's got good graphical user interface, but the simulation process doesn't show the concepts pretty clearly and lacks flexibility, i.e. additions and deletions not supported. License required.

3.1.2 Cnet

A discrete-event network simulator enabling experimentation with various data-link layers, network layer, routing and transport layer protocols. It is widely used in undergraduate computer networking courses by students worldwide. It has a graphical interface showing simulated packages travelling in a virtual network environment <http://www.csse.uwa.edu.au/cnet/ethernets.html> [15 December 2005].

3.1.3 GloMoSim

GloMoSim is a scalable simulation environment for wired and wireless network systems. It employs parallel discrete-event simulation capability provided by Parsec and currently supports protocols for a purely wireless network, although, the developers are anticipating adding functionality to simulate wired as well as hybrid networks. Easy to operate but slow in operations, available to academic institutions for research purposes <http://www.idsia.ch/~andrea/simtools.html> [25 November 2005]

3.1.4 GTNetS

The Georgia Tech Network Simulator (GTNetS) is a full-featured network simulation environment for studying the behaviour of moderate to large scale networks, GTNetS creates simulation environment that is structured much like actual networks are structured and has clear and distinct separation of protocol stack layers. Freely available <http://www.ece.gatech.edu/research/labs/MANIACS/GTNetS/> [5 December 2005]

3.1.5 INSANE

An Internet Simulated ATM Networking Environment for testing various IP-over-ATM algorithms with realistic traffic loads derived from empirical traffic measurements. IP, TCP, and UDP are the supported protocols. Written in c++ and freely available but only on Unix.

3.1.6 Macromedia captivate

This application records a user's action and produces a video clip of all the activities. A very effective technique for teaching and training end-users. Unfortunately, this application isn't useful for simulation as it fails to show detail information about the internal operations of the system.

3.1.7 NCTUns 2.0

A high-fidelity and extensible network simulator/emulator capable of simulating various protocols used in both wired and wireless IP networks, it can also be used as an emulator by using Linux TCP/IP protocol stack to generate high-fidelity simulation results, Its core technology is based on the novel kernel re-entering methodology. NCTUns is commercialised, therefore not freely available to academia <http://nsl.csie.nctu.edu.tw/nctuns.html> [25 November 2005].

3.1.8 NetSim

Netsim provides a very detailed simulation of single segment bus networks running the Ethernet (CSMA/CD) protocol. Finite population networks are modelled, with the simulation taking station position into account in determining the duration of collisions and the beginning of the backoff period at each station involved in a collision. An experiment description file allows the user to set a wide variety of parameters for a simulation run, including very flexible traffic generation processes for individual hosts on the simulated network. Freely available.

3.1.9 NetSim++

It is used to measurement performance in existing or future communications networks with wide ranges of conditions for the analysis and simulation of queuing systems.

3.1.10 Ns2

A discrete event simulator targeted at network research. It provides substantial simulation support of TCP, routing and multicast protocols over wired and wireless networks. The good thing about Ns2 is its flexibility, it allows specification of almost everything e.g. bandwidth, queuing model, topology etc. Ns2, however, involves programming Tcl scripts to invoke the simulation process, which can be hard to understand by novice users. Available on Unix and Windows.

3.1.11 OMNeT++

A component-based modular and open-architecture simulation environment with strong GUI support and an embeddable simulation kernel. It is easy to use for modelling communication protocols, computer networks, traffic modelling, multi-processors and distributed systems, etc. OMNeT++ also supports animation and interactive execution. Freely distributed under academic public license <http://www.omnetpp.org/> [25 November 2005].

3.1.12 OPNET Modeler

A combination of predictive modelling and comprehensive understanding of networking technologies to enable users to design, deploy, and manage network infrastructure, network equipment, and networked applications. OPNET Modeler is a development environment, allowing the design and study of communication networks, devices, protocols, and other applications. However, there are limitations to the use of OPNET, the simulation process only shows the behaviour of the network instead of the actual processes and also limited to devices on the simulation package. There are downloadable streamline versions for use on windows platforms <http://www.opnet.com/> [5 December 2005]

3.1.13 Performance Prophet

Used for modelling and simulating high performance computing systems by predicting the execution behaviour of the application model on cluster and grid architectures. The package doesn't show actual processes <http://dps.uibk.ac.at/projects/prophet/> [25 December 2005]

3.1.14 QualNet

QualNet is claimed to be the fastest real-time traffic modelling tool for wireless and wired networks, The Animator allows graphically design of network models from a wide library of components to describe the network behaviour. Windows and Linux demo versions available. <http://www.scalable-networks.com/products/qualnet.php> [25 November 2005]

3.1.15 Real 5.0

A network simulator originally intended for studying the dynamic behaviour of flow and congestion control schemes in packet-switched data networks. Real 5.0 simulates flow control algorithms such as TCP and various queuing disciplines. Written in C. Uses NeST simulator and freely available but a license form must be filled and returned, operates only on Unix.

3.1.16 S3

Scalable Self-Organising Simulation Software for simulating the Internet. Free downloads for Unix and Windows

3.1.17 Simured

Simured is a simulation tool for computer cluster traffic. open source for Unix and Windows systems.

3.1.18 SWANS

SWANS is a scalable wireless network simulator organised as independent software components that can be composed to form complete wireless network or sensor network configurations. Its capabilities are similar to ns2 and GloMoSim, but SWANS is able to simulate much larger networks. It's designed to achieve high simulation throughput, saving memory, and running standard Java network applications over simulated networks.

3.1.19 Traffic v2.0

A simulation product designed to solve complex call-centre modelling problems, but it can also be applied to any other queuing problem. It has an easy to use graphical interface and it runs on Windows.

3.2 CONCLUSION

From the various simulation packages above, Cnet is found to be more user friendly and therefore highly recommended due to its cost effectiveness, ease of use and greater flexibility. Cnet however has some limitations. It supports a fixed transmission rate of 10Mbps, a slot-time of 52usecs, broadcast addressing, collision detection, jamming, and binary exponential bakeoff. It does not support sub-microsecond timing, jitter control and multicast addressing. Each segment is considered to be a full 2.5km long, and all nodes on a segment are considered to be equally spaced along the segment.

4.0 SIMULATION DEVELOPMENT TOOLS

The following development packages have been identified and evaluated.

- **Macromedia applications** e.g. authorware, director and flash are easy to learn and very effective in creating simulation packages.
- **Programming languages** like C/C++ and Java are very effective development packages but the involvement of programming might be hard for novice users.
- **Studio max**, a very powerful animation development tool. The only setback is cost.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Developing an Ethernet simulation application by an average user involves (A) learning the application's scripting language (B) the actual coding of the product. It's fairly easier to learn macromedia applications than learning programming in a high level language such as java and C++. Therefore, macromedia applications are recommended for the development of the simulation prototype. This is because a combination of macromedia applications is very effective in producing multimedia applications with easy means of distributing online.

RECOMMENDATIONS:

- An interactive Ethernet simulation prototype be developed using Cnet style format and the development tools should include
- A combination of macromedia tools like flash, authorware, director etc.
- Distribution of the teaching tool will be via CD/DVDS and online.

6.0 REFERENCES

- *Authorware vs. Flash as a development tool*, [OnLine], n.d., Available: http://groups.google.com/group/macromedia.authorware/browse_thread/thread/5496e3981f88631f/59c862a257736763?lnk=st&q=simulation+development+tools&rnum=10#59c862a257736763 [5 December 2005].
- *Data Communication and Computer Networks (CD recording)* c2 November 2005, A Business User's Approach, Designs with Attitude.
- *Events as objects and object-oriented simulations*, [OnLine], n.d., Available: http://groups.google.com/group/comp.simulation/browse_thread/thread/763023569efb28ec/5b8fe0d1a5afb921?lnk=st&q=ethernet+simulation+packages&rnum=10#5b8fe0d1a5afb921 [5 December 2005].
- *GTNetS*, [OnLine], n.d., Available: http://www.ece.gatech.edu/research/labs/MANIACS/GTNetS/ [5 December 2005].
- *High-Level, Application-Specific Development Tools and Libraries*, [OnLine], n.d., Available: http://www.ni.com/labview/whatis/high_level.htm [5 December 2005].
- Marshall, D. c2005, Educational Simulator for teaching Data Communication, B.Sc. theses, Leeds metropolitan University.
- *NCTUns 2.0 Network Simulator and Emulator*, [OnLine], n.d., Available: http://nsl.csie.nctu.edu.tw/nctuns.html [25 November 2005].
- Neely, M. c1996, *The complete Internet Guide for Teachers, Students and Parents*, [Electronic], MaxiBooks, Available: Online Library [1 November 2005].
- *omnet++*, [OnLine], n.d., Available: http://www.omnetpp.org/ [25 November 2005].
- *opnet*, [OnLine], n.d., Available: http://www.opnet.com/ [5 December 2005].
- *Performance Prophet - A Performance Modeling and Prediction System for Cluster and Grid Computing*, [OnLine], n.d., Available: http://dps.uibk.ac.at/projects/prophet/ [25 December 2005].
- *QualNet Family of Products*, [OnLine], n.d., Available: http://www.scalable-networks.com/products/qualnet.php [25 November 2005].
- *Scalable Wireless Ad hoc Network Simulator*, [OnLine], n.d., Available: http://jist.ece.cornell.edu/ [5 December 2005].
- *SimTools*, [OnLine], n.d., Available: http://mat.gsia.cmu.edu/simul.fil [5 December 2005].
- *Simula Research Laboratory*, [OnLine], n.d., Available: http://www.simula.no/ [25 December 2005].
- *simulation software development frameworks*, [OnLine], n.d., Available: http://www.topology.org/soft/sim.html [25 December 2005].
- *simulation tools*, [OnLine], n.d., Available: http://www.idsia.ch/~andrea/simtools.html [25 November 2005].
- *Teaching and Learning Technology Resource*, [OnLine], n.d., Available: http://www.csd.uwa.edu.au/tltr/images/preview_browne.html [5 December 2006].
- *The cnet network simulator - IEEE 802.3 Ethernet segments*, [OnLine], n.d.,

Available: http://www.csse.uwa.edu.au/cnet/ethernets.html [15 December 2005].
- *The Industrial Ethernet Book - Articles*, [OnLine], n.d., Available: http://ethernet.industrial-networking.com/ieb/articledisplay.asp?id=50 [07 January 2006].
- *Traffic and Queuing Software*, [OnLine], n.d., Available: http://www.erlang-software.com/ [5 December 2005].
- *UCLA Parallel Computing Laboratory*, [OnLine], n.d., Available: http://pcl.cs.ucla.edu/projects/parsec/ [6 January 2006].

7.0 BIBLIOGRAPHY

- Al-Holou, N.: Booth, K.K : Yaprak, E. c2000, 'Using computer network simulation tools as supplements to computer network curriculum', *30th Annual Frontiers in Education conference.: Conference Proceedings*, Building on a Centuryof Progress in Engineering Education, Kansas City, MO, USA, 18-21 Oct 2000, Stripes Publishing, USA, pp. 13-16.
- *ASCI Simulation Development Environment*, [OnLine], n.d., Available: http://www.llnl.gov/asci/pse/asde/ [5 December 2005].
- *Automation Studio - Circuit Design and Simulation Software*, [OnLine], n.d., Available: http://www.automationstudio.com/english/html/educational/testimonals.htm [5 December 2005].
- Brandt, D, Scott. c1997, 'computer network resources, Information retrieval, internet studying and teaching', *Tutorial, or not tutorial, that is the question*, [Electronic], vol. 17, no.5 May, p. 44, Available: EBSCO Host [1 November 2005].
- Brebner, G. 1997, *Computers in Communication*, McGraw-Hill, Maidenhead Brebner.
- Butterfield, J. & Pendegraft, N. c1998, 'Information Science', *Fourier Analysis: Creating A "Virtual Laboratory"*, Using Computer Simulation, [Electronic], vol. 3, Available: Online Library [25 November 2005].
- Cisco.com. n.d., *Cisco Documentations*, [OnLine], Available: http://www.cisco.com [17 November 2005].
- Dawson C.W. 2005, *Projects in Computing and Information Systems - a Student's Guide*, Addison Wesley, Harlow.
- Dowson & Dawson C.W. 2000, *The Essence of Computing Projects - a Students Guide*, Prentice Hall, Harlow.
- *Embest IDE for ARM 2002 Introduction*, [OnLine], n.d., Available: http://www.embedinfo.com/English/Product/productmain.asp [5 December 2005].
- *Everything You Need in Simulation!*, [OnLine], n.d., Available: http://www.maad.com/index.pl/micro_saint [5 December 2005].
- Forouzan, B.A. c2003, *Data Communications and Networking*, 3rd edn, McGraw-Hill.

- Jones, G.B. & Stipids, E. c2000, 'Academic use of commercial network simulation tools', *Computer Software, Engineering -- Study & Teaching*, International Journal of Electrical Education, [Electronic], vol. 37, no.2, Apr., p. 136, Available: EBSCO Host [1 November 2005].
- *knowledgedynamics*, [OnLine], n.d., Available: http://www.knowledgedynamics.com/ [5 December 2005].
- Knowles, L. c1999, 'Sofware', *The journal*, Educational technology Mathematics -- Study and teaching Internet in education United States, vol. 26, no.10, May, p. 24.
- Kuros, J.F & Rose, K.W. 2001, *Computer Networking, A Top-Down Approach Featuring the Internet*, Addison Wesley, Kurose, J.F & Ross, K.W.
- O'Daniel, M. c2002, 'Looking up animated gifs', *Looking up animated gifs*, Sept..
- *Online training simulation creation tools and developers*, [OnLine], n.d., Available: http://www.brandon-hall.com/publications/simkb/simkb_method.shtml [25 november 2005].
- Ozturk, Y.: Lamouri, S.: Tomay, K. c2000, NetSOM: network simulation object model, paper presented at Proceedings of the communication Network and Distribution Systems Modelling and Simulation, [Electronic], ed.Znati, T, : Simon, R., San Diego, 23-27 Jan 2000, San Diego, pp. 87-92, Available: Inspec [1 November 2005].
- *Products and systems for virtual reality and simulators*, [OnLine], n.d., Available: http://www.cgsd.com/ [5 December 2005].
- Zec, M. & Mikuc, M. c2003, Real-time IP network simulation at gigabit rates, paper presented at ConTEL 2003 - 7th International conference on Telecommunications, [Electronic], vol. 1, ed.Jevtic, D & Mikue, M, Zagreb, 11-13 June 2003, Croatia, pp. 235-242, Available: Inspec [1 November 2005].
- Zec, M. & Mikue, M & Pullen, J.M. c2000, 'The Network Workbench', *Network simulation software to academic investigation of internet concepts*, [OnLine], vol. 32, no.3, Mar., ed.Jevtic, D. & Mikuc, M, pp. 365-378, Available: http://Inspec [1 November 2005].

8.0 APENDICES

8.1 PROJECT PLAN

TITLE

The Use of Ethernet simulation as a teaching tool

PROJECT TYPE

Research and Evaluation, industry based

AIMS AND OBJECTIVES

AIM

- To investigate current Ethernet technology simulation teaching packages for use in academic institutions

OBJECTIVES

- To research Ethernet technology
- To evaluate existing simulation packages
- To research, evaluate and recommend effective simulation development tools
- Possible development of an Ethernet simulation prototype

OUTCOMES AND DELIVERABLES

- A project poster
- A project report
- Possible prototype development of an Ethernet simulation

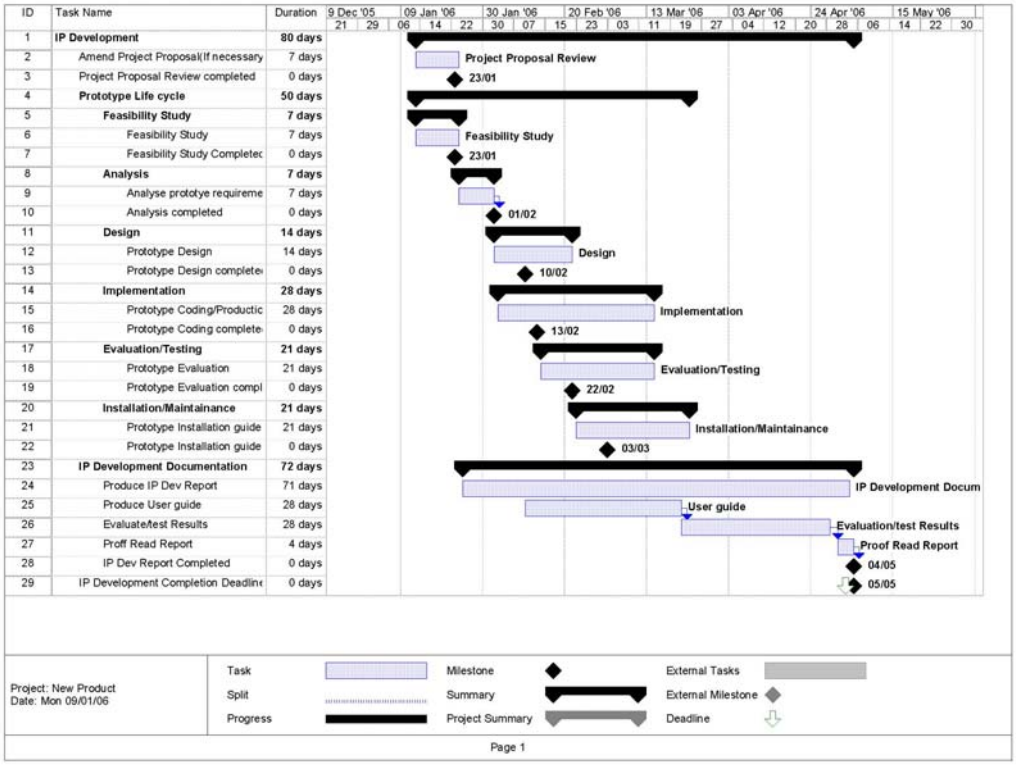
RESEARCH METHODOLOGY

- Literature research

HARDWARE AND SOFTWARE REQUIREMENTS

- Macromedia packages
- evaluation copies of simulation packages

8.2 PROJECT DEVELOPMENT PLAN



ID	Task Name	Duration
1	**IP Development**	**80 days**
2	Amend Project Proposal(If necessary	7 days
3	Project Proposal Review completed	0 days
4	**Prototype Life cycle**	**50 days**
5	**Feasibility Study**	**7 days**
6	Feasibility Study	7 days
7	Feasibility Study Completec	0 days
8	**Analysis**	**7 days**
9	Analyse prototye requireme	7 days
10	Analysis completed	0 days
11	**Design**	**14 days**
12	Prototype Design	14 days
13	Prototype Design complete	0 days
14	**Implementation**	**28 days**
15	Prototype Coding/Productic	28 days
16	Prototype Coding complete	0 days
17	**Evaluation/Testing**	**21 days**
18	Prototype Evaluation	21 days
19	Prototype Evaluation compl	0 days
20	**Installation/Maintainance**	**21 days**
21	Prototype Installation guide	21 days
22	Prototype Installation guide	0 days
23	**IP Development Documentation**	**72 days**
24	Produce IP Dev Report	71 days
25	Produce User guide	28 days
26	Evaluate/test Results	28 days
27	Proff Read Report	4 days
28	IP Dev Report Completed	0 days
29	IP Development Completion Deadlin	0 days

8.3 PROJECT SUPERVISION MEETING RECORD LOG

Date	Agenda	Details of Discussion
26/09/05	To discuss project titles	General discussions and overview of my project title **Actions:** My target for next meeting is to produce a draft project plan.
03/10/05	To evaluate draft project plan and Gantt chart	The structure of my plan was ok but the scope is too broad, therefore, I was asked to narrow my project aims and objectives and to elaborate more the project objectives. **Actions:** Target for the following week is to make changes to my project plan and Gantt chart to include more milestones.
10/10/05	To review updates project plan and Gantt chart	The project's scope is been fine tuned and more defined now. **Actions:** Gantt chart is also well structured just needs slight adjustments to incorporate certain aspects of the project.
12/10/05	Final review of the project plan and Gantt chart	Almost all aspects of the project are taken into account, all I need to do is to rewrite and rephrase some sentences. **Actions:** Rename certain tasks on my Gantt chart
19/10/05	Review of project plan	Reviewed the project plan and discussed about possible additions. **Actions:** There is no need to change anything on the plan, therefore I will continue as planed.
26/10/05	Ethernet Technology review	Reviewing the research material about Ethernet technology **Actions:** To research Ethernet technology, and begin writing the report

Date	Agenda	Details of Discussion
02/11/05	Overview of Ethernet Technology review	Discussed the relevancy of the research materials collected. **Actions:** - Remember to write the report in third person, and to restructure the wording in the report. - to start evaluating existing simulation packages - to start designing the project poster
09/11/05	**No Meeting this week** But work continued (Investigating and evaluating existing simulation packages)	Researched and investigated a number of simulation packages, produced a draft project poster **Actions:** To continue investigating other simulation packages,
16/11/05	Review project Poster	Evaluated the draft poster, and also looked at the report structure. **Actions:** To change the layout of the poster to landscape To structure the flow of information and colour sequence.
23/11/05	Research simulation development tools	To investigate and evaluate simulation development tools. **Actions:** To contact Cisco corporation about simulation development tools To evaluate macromedia packages
30/11/05	**No meeting this week**	N/A
07/12/05	Brief discussion about progress	An overview of the project progress **Actions:** To produce a draft copy of the report for next week's review.
14/12/05	Review project proposal report	Reviewed the draft report poster **Actions:** More research is needed as the report lacks relevance. Needs to do more research on existing simulation packages

Date	Agenda	Details of Discussion
03/01/06	Project proposal review	Revision of the project proposal and poster **Actions:** Research work is much better now, needs to proof read report and also tidy up the poster. Also make sure the report conforms to the aims and objectives set out in the project plan.

Supervisor Name: Fash Safdari

Supervisor Signature: ……

Student Name: Ismaila Jatta

Student Signature: 

8.4 PROFESSIONAL DEVELOPMENT LOG 2

1. The Gantt Chart/Project Plan included in your Project Plan and section 3 of your Professional Development Log 1 indicated the GOALS that you set yourself **for this stage** in your project. Have you achieved these goals?

   Yes, I have achieved my entire goal and also achieved additional goals that were not mentioned in PDP log1. Like research strategies methods.

2. If not, why not? (give concrete reasons rather than 'excuses')
   How do the goals need to be readjusted now?
   How will you restructure your time/use of time to ensure that you can achieve the restructured goals before the end of the project?
   What help or resources would positively contribute to you achieve your readjusted goals? (e.g. human resources – staff, colleagues; reading and research; generic Leeds Met resources such as Skills for Learning; web based resources)

N/A

3. If you have achieved your goals then what challenges did you overcome to achieve them?
   Do you think there will be any future obstacles to successfully achieving all your goals by the end of the project?
   Would it be appropriate to readjust your goals, perhaps to set your targets higher?

The challenges I had was to get the relevant literature and evaluation materials, this was easily overcome by utilizing the skills for learning website and other online sources. For the future, there shouldn't be any such problems as more flexible and challenging goals will be set.

8.5 TECHNICAL ARTICLE: LOOKING DEEPER INTO ETHERNET

There has been much discussion recently regarding the applicability of using Ethernet at various levels of the control hierarchy. Since Ethernet is so prevalent in the office and frequently used as the enterprise network for high-end controllers, it would seem to be a natural to use Ethernet at the control level or even at the device level as proposed by some in our industry. The arguments for its use include low cost, good connectivity and simple migration to higher speed networks. The cry to use "standard" Ethernet for control applications requires an understanding of the basics of Ethernet.
By George Thomas, Contemporary Controls < http://ethernet.industrial-networking.com/ieb/articledisplay.asp?id=50 >