OXFORD BROOKES UNIVERSITY

Department of Computing and
Communication Technologies

UNDERGRADUATE PROJECT HANDBOOK

for

Computing, ITMB, Communications and Multimedia

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1 Introduction

The undergraduate project involves undertaking an individually agreed extended research study selected from a suitable area within the students field of study and expertise. The project should demonstrate the student's ability to argue coherently, to present evidence, to evaluate critically and synthesise from the relevant sources used and to identify and work using appropriate developmental methods. The project does not necessarily involve original research or the study of unpublished or primary material.

Students can choose their supervisor and topic of choice providing the title and outline has been agreed with the supervisor. U08999 students can choose a project from a list provided.

In computing the project typically involves the solution of a problem of some kind, and often involves the development of computer based systems or software. However a wide range of investigative projects are possible and some examples of projects are included in the field specific guidelines.

A project will require independent research to investigate the topic area, the use of an appropriate development methodology and project management to control the project development and delivery.

The project module runs over two semesters and details of the assessment deadlines are given in the schedule section. This applies to part-time as well as full time students.

Most students complete a double project and a consideration at registration is that the proposed project is of an appropriate scope and difficulty level.

The project assessment includes a proposal, interim report, final report and a presentation/demonstration. Details of the assessment weighting requirements and assessment criteria for each of these are given in the deliverables section.

The project is normally undertaken during the final two semesters a degree program. As a double module the project contributes significantly towards your degree marks and it is often seen as the highest point of your studies.

Prospective employers or admission tutors for postgraduate study often ask about project at interview. A good project will indicate that a student can use relevant knowledge, technical skills, problem-solving abilities, communication skills and organising capabilities successfully. All of these are important, as is the ability to appraise and develop your own work.

Joining a professional society (such as the *British Computer Society*) often depends on the quality of project work as well as demonstrated professionalism.

As an indication of the project work load it is expected that you devote around 30 working days per semester on a double project module.

1.1 Project website

This handbook is designed to provide a general introduction and guide to the project module and should be used in conjunction with the projects website, at

http://tech.brookes.ac.uk/modules/U08096/ and also U08096 on Brookes Moodle

This website applies to each of the modules described below in section 1.2. The projects website contains an online version of this handbook, and also contains additional up-to-date schedule and other information and resources.

1.2 Modules, Fields and Prerequisites

Students entering Stage 2 must pass at least 4 modules designated as Honours Component. This will normally include 2 module credits of project. All 4 Honours degree element module credits will be used in calculating the average that determines the classification of an Honours degree. The project is not compulsory for non-honours (ordinary) degrees.

U08096

The BSc Computing project module is U08096. This is a level 6 double Honours Component module. U08096 is compulsory for the single fields CP, GM, IL, MJ, NK, SA, SH and SQ. U08096 is optional for single fields CO, IF, IG, IN, MQ, MZ, NE, SD and SG. U08096 is also an alternative compulsory for the single field MV

U08194

The BSc Information Technology Management for Business project module is U08194. This is a level 6 double Honours Component module. U08194 is compulsory for the single fields IC and IY.

U08090

The Computing Interdisciplinary project is U08090 is for interdisciplinary fields and is optional for CO, IF, IG, IN, MQ, MZ, NE, SD and SG. This is a level 6 single Honours Component module. Interdisciplinary projects require a project module to be registered for both fields, using appropriate module codes and where the project has a supervisor for each module but where one of the modules is chosen for the purpose of assessment and recording project marks. Students taking an interdisciplinary project are reminded to also check and adhere to the regulations relating to the other project field.

U08999

The Communications Networks, Computer Networks and Multimedia project module is U08999. This is a level 6 double Honours Component module. U08999 is compulsory for the single fields NS and NW.

Prerequisites

The prerequisite module for all computing project modules is U08055, Professional Issues and Skills. This module is usually taken in the academic year prior to starting the project.

2 Schedule

This section gives a generic schedule from pre-registration to project completion. The projects website maintains current schedule details for students submitting in each semester. The schedule also applies to part-time students.

2.1 Schedule for Project Registration and Assessment

Around week 6 of the semester prior to registration	Module leader gives a talk on the project for students about to register. A copy of the previous talk can be found on the project website.
During semester prior to registration	Register on PIP for the appropriate project module. Choose a project topic and find a supervisor. Students should meet with their supervisor to discuss progress to be made over the vacation, and arrange future meetings, and to work on the project proposal document.
Project title registration	By week 12 in the semester prior to starting project. Obtain signatures on two M199 forms, from the supervisor and projects coordinator. Where the project module is already registered on PIP the M199T form should be used. Where the project will use personal data the Ethics Form E1 should also be completed. A copy of the M199 or M199T form is retained by the projects coordinator, the other copy is passed to the Academic Management Office to complete the project registration. Direct entry and returning placement students should register during week 1 of the semester in which the project is to start.
First semester of project Friday Week 2	Latest University registration for direct entry and returning placement students.
First semester of project Friday Week 4	Project Proposal report to be submitted to the U08096 post-box in Turing reception. Return with supervisor feedback within 2 weeks.
First semester of project Friday Week 10	Project Interim report to be submitted to the U08096 post-box in Turing reception. Return with supervisor feedback within 2 weeks .
Second semester of project Week 6	By this stage, students should be completing a first draft of the final report and should consult with their supervisor. Covers and cover sheet for binding the Project Final Report can be collected from the project administrator.
Second semester of registration 4pm, Friday Week 8	Submission of two bound copies of the final project report to the project administrator. Electronic submission of final report to Turnitin on Brookes VLE (instruction given nearer the time)
Second semester of registration, around Week 12	Demonstration and Presentation made to supervisor and second assessor. Presentation and demonstration dates arranged by the module leader and projects administrator. The presentation is for 10 minutes with 5 minutes for questions.
Second semester of registration Week 16 or 17	Examining committee approves project marks. Resubmitting students issued with resubmission instructions
Resubmission	Resubmission students submit two bound copies of the final

deadline as specified by the University	project report to the project administrator.

2.2 Assessment Weightings

The weighting factors for the assessed components of the project are as follows:

Proposal	10%
Interim Report	10%
Final Report	70%
Presentation	10%

The overall mark is obtained by aggregating the marks for each component using these weightings.

The assessment criteria for each of the above components are described in section 8.2

3 Choosing a Project Topic

The following sections contain general advice for students about to choose a topic for a computing-related project. For more specialized advice on whether a particular topic you have in mind is suitable, you should seek advice from the projects coordinator, your field chair, or a potential supervisor.

3.1 General Guidelines

For computing-related projects, suitable topics must be at an advanced level, appropriate to the final year of a Honours degree course and should relate to the field and modules studied. The project work may involve learning subjects and skills that are new to you, or more advanced study of a topic encountered already, for example in one of your modules, or whilst on industry placement. Developing new skills can form part of your project objectives. The project must not repeat work you have done before for a previous qualification, or work performed during employment, or work done by others. It must be fresh work that involves research, analysis, development and evaluation undertaken by the student.

The topic of your project should be such that you are able to demonstrate that you have attained high levels of technical competence, analytical skills, scholarship and understanding. See the assessment criteria section for more details of what your assessors will be looking for when they assess your work.

Technical Content of Projects

It is important that your project contain sufficient technical content. Precisely what is considered suitable technical content varies according to the project detail and from field to field (see the guidelines for individual fields), but some general guidelines are given here.

Most computing-related projects involve the development of a computer based system and usually includes the following elements.

- Research into appropriate, theories, methods and technologies.

- Problem specification and analysis of requirements
- Selection of method and alternatives
- Systems development: requirements, design and implementation
- Testing and evaluation

Program code:
Any program code submitted should be written by the student and not automatically generated. Whilst in some projects it may be appropriate to make use of automatically generated program code, such code does not count towards the intellectual content of a project. Where such code is presented its origin must be clearly stated.

Websites:
Some aspects of web site production involve more technical skill than others. Languages involving the presentation of documents (e.g. HTML, CSS) would not demonstrate advanced levels of technical competence, however substantial programs incorporated as part of a web site (client-side or server-side) do offer the opportunity to demonstrate technical skill.

Databases:
Whilst it may be appropriate for a project to incorporate entering data into a database, simply entering data into a database package is not acceptable on its own as a project, because this demonstrates only a very low level of technical skill. However data modeling and the choice of DBMS and a programming API for an application would be more appropriate. Projects focusing on databases should ensure that technical competence is demonstrated in aspects of the data modeling and achieving efficiency etc.

3.2 Guidelines for BSc Business Information Systems (IY), Information Systems (IF) and BSc Information Technology Management for Business (IC)

A project in Business Information Systems should map a problem space in business/management to a solution space in Information Systems. Problems encountered in business/management that are appropriate for a project in this field should highlight the need for improvements in the collection, processing, storage, utilisation or communication of information. Your solution to such a problem will, by definition, focus on the application of Information Systems.

Elements of a Business Information Systems Project

These are as follows:

Problem definition.
An analysis of any aspect of business/management which you can demonstrate to contain problem elements related to the collection, processing, storage, utilisation or communication of information.

Hypothesis formation.
Identification of factors which you think might be contributing to the problem and/or solution, and a possible set of relationships between these factors. This part of the project will involve a review of current literature which you should use to justify your hypothesis, and the factors which you have chosen to investigate.

Experimental design.

You need to construct a way of testing your hypothesis. This will involve you designing a means for collecting data about the factors in your hypothesis and their actual relationships. Research methods, which are also available from current literature, will provide ideas for doing this.

Hypothesis testing.

Use the data you have collected to prove or disprove your hypothesis. Whether your hypothesis turns out to be true or false is not important; the conclusions are equally valid.

Data collection.

The experiments you have designed need to be conducted in order to collect the data necessary to test your hypothesis.

Conclusions.

If your hypothesis was correct, then you need to interpret this in terms of the original problem and how it might be solved. Otherwise, you should reflect on the ways in which the hypothesis or the experiments could be altered in order to approach the problem in a different way.

Examples of Suitable Projects for Business Information Systems

All projects in Business Information Systems are expected to conform to the description given above. However, since such problems will vary enormously in scope and content, there are a variety of solution approaches that might be adopted. Some generic approaches are described here.

Constructing a piece of software

Hypothesis formation:

Your hypothesis is that it is possible to solve the problem by implementing a software system. In order to specify the hypothesis precisely, it will be necessary to analyse the business domain, and formulate the information system requirements. Results of this analysis form the factors of your hypothesis.

Hypothesis testing:

The means to test your hypothesis is a software system. Construction of the software should follow a method which incorporates the factors identified in your hypothesis. That is, selection of the method should be justified in terms of the business domain and the functional/non-functional requirements.

Data collection:

Having constructed the software, you now need to use the system to collect data. Test cases and/or end-user evaluation may be used, depending on balance of functional and non-functional requirements, and the nature of the business domain to be tested.

Analysis:

Analyse the results obtained from your data collection to determine how the factors chosen in your hypothesis have contributed to solving the problem you described.

Conclusions:

Reflect on the analysis, to discuss:

1. Your main hypothesis - does the software system solve the problem?
2. Were the factors identified in your hypothesis necessary/sufficient for the construction of the software?

3. Was the method selected for your hypothesis testing appropriate for the purpose?

Here are some example titles for a "Software Construction" type of project:

- Automated Support for Document Management in a Small Solicitors Office.
- Improving Communication between Remote Sales Teams.
- Coordinating Information Presentation During On-line Meetings.

Analysis and Design

Hypothesis:

Your hypothesis is that it is possible to solve the problem by implementing a software system, but the problem definition is too broad to construct such a system. In order to specify the hypothesis precisely, it will be necessary to analyse the business domain in the light of the perceived problem. Results of this analysis form the factors of your hypothesis.

Hypothesis testing:

The means to test your hypothesis is a specification and design of a complex software system. Construction of the analysis and design artefacts should follow a method which incorporates the factors identified in your hypothesis. That is, selection of the analysis and design method should be justified in terms of the business domain and the perceived problem.

Data collection.

Having designed the software system, you now need to use the design to collect data. Test cases and/or structured walk-through may be used, and may be supplemented by the use of prototypes, depending on the nature of the business domain to be tested.

Analysis.

Analyse the results obtained from the data collection to determine how the factors chosen in your hypothesis have contributed to solving the problem you described.

Conclusions:

Reflect on the analysis to discuss:

1. Your main hypothesis - does your designed system solve the problem?
2. Did your analysis in the problem description identify the appropriate elements of the business domain?
3. Did the method chosen for hypothesis testing allow the real business needs to be identified?
4. Whether or not the problem could be solved by an information system.

Here are some example titles for a "Analysis and Design" style of project:

- Project Management Support for Outsourcing Software Development Projects.

- Coordinating Supply Chains for Perishable Produce in Supermarkets.
- Integration of Disparate Databases in Forming Virtual Hotel Chains.

"Lab Experiment"

Hypothesis:

The problem elements you have identified in your problem description lead to a hypothesis which can best be expressed as a cause-effect relationship between factors. Using past research, and your observations of the particular aspect of the business domain, you should identify the factors you wish to measure, and hypothesise about the relationship between them.

Hypothesis testing:

The means to test your hypothesis is a controlled experiment that allows you to measure your chosen factors in order to decide whether your hypothesis is true or false (statistically). Good experimental design is not a simple task, and requires a sound understanding of statistical techniques. Your experimental design may include, questionnaires, interviews, and observations measuring subjects attitudes, response times, knowledge, etc.

Data Collection:

Conducting the experiment will provide data to test your hypothesis. It is often advisable to run a pilot study to ensure that the data you will collect is sufficient to prove/disprove the hypothesis. In this case, the pilot study results feed in to a second experimental design.

Analysis:

Analyse the results obtained from your data collection to determine whether your hypothesis is true or false.

Conclusions:

If your hypothesis was correct, then you need to interpret this in terms of the original problem and how it might be solved. Otherwise, you should reflect on the ways in which the hypothesis or the experiments could be altered in order to approach the problem in a different way.

Here are some example titles for a "Lab Experiment" style of project:

- Factors Affecting User Confidence in Online Transactions.
- Improving the Efficiency of End-User Interaction with Complex Systems through On-Line Help Facilities.
- Assessing the Impact of Diagramming Notations on Client Understanding of Requirements Specifications.

Case Study Analysis

Hypothesis:

Problems identified with a business process/project, or business change project may involve a longer-term study to identify factors influencing success or failure. To do a project of this type, you should be in a position to follow such a project in detail, although you do not need to be directly involved in its execution. Based on case studies, and other research, you

should firstly develop a hypothesis as to which factors affect the success of such a project.

Hypothesis testing:

You need to plan how to collect data that will test your hypothesis during the execution of an actual project. This means that your experiment is not controlled; which may make data collection more difficult, and will require considerable contingency planning.

Data collection:

By observing the actual project you should be able to collect data measuring the factors you have identified in your hypothesis.

Analysis:

Analyse the results obtained as a result of your data collection to determine whether your hypothesis is true or false.

Conclusions:

If your hypothesis was correct, then you need to interpret this in terms of the original problem and how it might be solved. Otherwise, you should reflect on the ways in which the hypothesis could be altered. In either case, you should reflect on improvements to the process under investigation.

Here are some example titles for a "Case Study Analysis" style of project:

- An Investigation into Software Rollout Projects in Global Organisations.
- A Proposed Methodology for Managing System Evolution Projects.

Adoption of Information System Support in Small/Medium Enterprises.

3.3 Guidelines for BSc Computing (CP), Computing (CO), BSc Computer Science (SQ), Computer Science (SD) and BSc Computer Games and Animation (GM)

The field of Computing is very general, and covers the fields of Computing Science, Software Engineering, Information Systems, Multimedia Systems, Intelligent Systems, and other computing-related topics.

Technical Content of a Computing Project

For advice about what the technical content of a Computing project could contain, see the guidelines for the technical content of Computing Science projects, Software Engineering projects, Information Systems projects, Multimedia Systems projects, and Intelligent Systems projects, as well as the general guidelines.

Examples of Suitable Computing Projects

For examples of suitable projects, see sections:

- 3.4 Examples of suitable Computing Science Projects
- 3.9 Examples of suitable Software Engineering Projects
- 3.6 Examples of suitable Information Systems Projects
- 3.8 Examples of suitable Multimedia Systems Projects

- 3.7 Examples of suitable Intelligent Systems Projects

Some projects suitable for Business Information Systems may also be suitable for computing field projects. For more information, seek the advice of the projects coordinator.

3.4 Guidelines for BSc Computer Science (Mathematical) (MJ)

The field of Computing Science is concerned with applying formal theories, techniques and methodologies to the study of computer systems and computation.

Technical Content of a Computing Science Project

The technical content of a project in Computing Science could include: design methodology, information representation/manipulation, methods for testing/analysis/verification, algorithms, understanding theories of computation.

Suitable Topics for a Computing Science Project

These include:

- Teaching tools associated with computing science
- Formally designed databases
- Fully specified, designed and implemented programs
- Syntax checkers/parsers
- Compiler design
- Functional programming projects
- Logic programming projects
- Applications of mathematics to computing eg cryptography, security protocols
- Applications of logic to computing e.g. formal specification
- Games (programming and strategy)
- Computer solution of numerical problems
- Projects that demonstrate an understanding of specific algorithms
- Projects that demonstrate an understanding of specific data structures
- Application of computing science techniques to modelling phenomena of scientific interest

Examples of suitable Computing Science projects

- Analysis, Design and Implementation of a Computer System (see section 3.9.2)

- Game Programming (see section 3.7.3)
- Computerised Marketing Research System (see section 3.6.2)
- Comparing different implementations of a 3D graphics algorithms (see section 3.8.2)

Data Visualisation

Projects fitting this description typically involve the following main components:

- Background research
- Specification and requirements analysis
- Program design and implementation
- Testing
- User evaluation

One such project was produced by Simon Wood (2001) on the topic of drought visualisation, and this "involved the development and implementation of a system that would aid hydrologists in the identification of generic patterns, among major past drought events that have occurred in Europe. The system turns numerical data into a sequence of animations so that it can be easily seen how droughts develop, spread, and then recede over an area of land. It is hoped that by identifying characteristics of past drought events they will be better understood, allowing some form of drought prediction and even prevention."

Devising a Protocol

A project topic could involve devising a new communication protocol. Such a topic might involve the following main components:

- Research into hardware and interfaces
- Research into communication protocols
- Design of the protocol
- Implementation of a prototype
- Testing and evaluation

One such project was undertaken by a past student, David Cox (2000), who produced a software packet modem and data link protocol.

3.5 Guidelines for BSc Computer Systems (CJ), BSc Computer Science (Systems) (SA), BSc Network Computing (NK), Network Computing (NE), BSc Mobile Computing (IL), BSc Computer Networks and Multimedia Systems (NS) and BSc Communication Networks (NW)

The field of Computer Systems is concerned with architecture, networks, operating systems, system administration and distributed systems.

Technical Content of a Computer Systems Project

It is likely that the majority of projects in the Computer Systems field will involve an element of programming. Websites are unlikely in themselves to be a suitable area for the Computer Systems fields, however, producing a web server or a back end to an existing server is an appropriate topic. This may involve the coding of some HTML (or some variant of HTML), but this should not be the main focus of the project.

It is possible in the Computer Systems fields to show technical ability through the analysis of an existing system or algorithm. However students should be aware, that this is not an easy option and would require either suitable testing or the competent synthesis of existing material.

Suitable Topics for a Computer Systems Project

These include:

- Network and Computer security
- Systems administration
- Distributed systems
- Computer hardware
- Robotics
- Networks
- Protocols
- Server software
- Systems level programming
- Low level programming
- Device drivers
- Operating System theory

- Open source development

For NS and NW students registered on U08999 a list of projects will be provided on the projects website. Students should select one of these projects and should contact the relevant supervisor for further details.

Examples of Suitable Computer Systems Projects

Some past projects have included:

Construction of a Beowulf Cluster

The student installed and ran some experiments on the School's first Beowulf cluster. For the student, this involved some systems administration issues, some low level kernel hacking and some distributed coding, as well as conducting some simple experiments using code they had created.

Network Intrusion Detection

The student analysed incoming network traffic, including attacks, as it reached their server. Some simple AI techniques were used to classify the network traffic and to warn if anything unusual had occurred. For the student this involved analysing the network traffic at the IP level and understanding how the network protocols worked, as well as producing a simple Minimum Description Length algorithm.

An Agent Based Server Management Tool For Large Organisations

The student created a client server system that would allow a systems administrator to monitor what software and hardware was on a machine as well as simple push installation of software packages. For the student this involved investigating how MS Windows stores configuration details, developing a client server system and developing a protocol to work over the network to transfer programs and information.

In addition, some previous titles of suitable Computer Systems projects include:

- SimBack Synopsis - saving and retrieving a phonebook via the WAP
- Evaluation of content management systems with particular relevance to Zope
- Computer Security with an eye towards network intrusion detection systems and securing web server

- Design and implementation of MOO and it's framework
- Adaptive Firewalls
- Testing an implementation of a VPN
- An investigation into improving the support offered to multimedia traffic by a proposed refinement in a Class Based Queuing System
- Voice over IP
- Construction of a Beowulf Cluster
- The cost of moving away from Microsoft dominated technologies for IT Business infrastructures
- Investigate, Code and Compare techniques used in Implementing Encryption Technology
- Network Intrusion Detection
- FTP client with Ncurses Library
- An agent based server management tool for large organisations
- A framework for the aggregation and manipulation of RSS News
- Linux Versus Windows in a Business environment
- Chat for You IRC
- The Development of a World Wide Web server using Delphi
- Privacy control on Corporate Memory
- Web Auction - XML in Practical
- A web based problem logging system for users in an organisation
- GSM Short message service and the internet
- File Transfer and Compression
- An Agent solution to cross platform connectivity

3.6 Guidelines for BSc Information Systems (IG) and Information Systems (IF)

The field of Information Systems is concerned with computer related solutions to problems associated with manual or computer systems, that collect, manipulate, store and transmit information.

Technical Content of an Information Systems Project

The technical content of an Information Systems project could include: the representation, manipulation and/or storage of information; security of information; telecommunications technologies; specification, requirements analysis, design and

implementation; testing and evaluation of information systems. The systems may be in any area: business, manufacturing, public service.

Examples of Suitable Information Systems Projects

- An E-Learning Website (see section 3.8.2)

Computerised Marketing Research System

A project of this type was undertaken by a past student, Andrew Towills (2002), who programmed an application based on an existing paper based marketing research questionnaire, to run on a personal digital assistant. The main components of such a topic would typically include:

- Specification and requirements analysis
- Research
- Design and Implementation
- Testing and evaluation

Design and Analysis of Web Site for a Company

A project of this type was undertaken by a past student, Louise Whitbread (2002), who created a website for a bathroom company. As well as actually creating the website, web technologies, design, and management techniques were researched and applied to the site. There was also some web programming involved, allowing the website visitor to create their own custom bathroom plan. Such a project would include the technical components:

- Specification and requirements analysis
- Research and analysis of existing sites
- Website management techniques
- Design and implementation, including web programming
- Testing and evaluation

3.7 Guidelines for Intelligent Systems (IN)

Intelligent Systems concerns the investigation and modelling of tasks that are carried out effectively by humans.

Technical Content of an Intelligent Systems Project

The technical content of an Intelligent Systems project could be the design, development and testing of a program that modelled some aspect of human behaviour, or it could involve creating a formal representation from which such a program could be written. It could involve the extraction of human knowledge from an expert, or it could make use of a software shell to implement such knowledge computationally. It could involve the use of logic to demonstrate the properties of

different representations of knowledge, or the construction of a neural network that could be trained to carry out tasks. It could involve the modelling of low-level human tasks such as visual processing, or high-level human tasks such as motion planning.

Suitable Topics for an Intelligent Systems Project

Suitable topics for an Intelligent Systems project include:

- Expert systems
- Implementation of an intelligent agent
- Data mining
- Knowledge acquisition
- Machine vision
- Natural language processing
- Neural networks
- Implementations of the genetic algorithm
- Mathematical proof systems
- Game programs involving advanced search or other AI techniques
- Symbolic modelling of physical entities
- Symbolic modelling of human cognition

Examples of Suitable Intelligent Systems Projects

Game Programming

The implementation of a challenging strategy game (e.g. Chess, Othello, Go, card games), using advanced techniques. For an Intelligent Systems project this should include search algorithms, planning algorithms, dynamic representation of artificial worlds or modelling of goal-oriented agents, or AI techniques.

Such a topic might involve the following main components:

- Research into game trees, minimax searches and alpha-beta pruning techniques
- Specification and requirements
- Selection of a suitable programming language
- Interface design
- Program design and implementation
- Testing results and evaluation

3.8 Guidelines for BSc Multimedia Computing (MV) and Multimedia Systems (MZ) and Multimedia Computing (MQ)

The field of Multimedia Systems is concerned with the presentation of data using several media in an integrated way and the efficient storage and transmission of such data.

Technical Content of a Multimedia Systems Project

The technical content of a Multimedia Systems project could include: understanding multimedia technologies, programming multimedia implementations, design and analysis of multimedia systems.

Examples of Suitable Multimedia Systems Projects

These include:

An E-Learning Website for a Children's Television Programme

A project of this type was undertaken by a past student, Muktadir Khan (2003), who developed a web site to accompany existing materials relating to the television programme. A quiz and game were included in the website, which made particular use of Flash and XML technologies. The main elements for that project were

- Background research into e-learning
- Specification and requirements analysis
- Graphical design
- Quiz and game program design and implementation
- Testing

Comparing different implementations of a 3D graphics algorithm

Projects fitting this description typically involve the following main components:

- Problem specification
- Graphics algorithms research
- Analysis of requirements
- Design and implementation of the programs
- Investigative testing and analysis of results

One such project was undertaken by a past student, Andreas Wasserbauer (2001), who compared a hierarchical implementation of the z-buffer algorithm to a conventional implementation.

3.9 Guidelines for BSc Software Engineering (SH) and Software Engineering (SG)

The field of Software Engineering is concerned with applying principles of engineering (systematic and disciplined approaches) to the design and implementation of software systems.

Technical Content of a Software Engineering Project

The technical content of a project in Software Engineering could include: specification, requirements analysis, design, programming, testing and evaluation.

Suitable Topics for a Software Engineering Project

Suitable topics for a Software Engineering project include:

- Teaching tools associated with software engineering
- Formally designed databases
- Fully specified, designed and implemented programs
- Formally specified computer systems
- Games (programming and strategy)
- Projects that demonstrate an understanding of specific algorithms
- Projects that demonstrate an understanding of specific data structures

Examples of suitable Software Engineering Projects

- Game Programming (see section 3.7.3)
- Computerised Marketing Research System (see section 3.6.2)
- Comparing different implementations of a 3D graphics algorithms (see section 3.8.2)
- Data Visualisation (see section 3.4.3)

Analysis, Design & Implementation of a Computer System

Projects fitting this description typically involve the following main components:

- Problem specification
- Analysis of requirements
- Program design
- Program implementation
- Program testing and evaluation

One such project was undertaken by a past student, Stephen Shellard (2003), who produced a hospital anesthetics system for the John Radcliffe Hospital in Oxford.

4 Registration

To allow time to set up supervision arrangements and adequate time to work on the project, it is essential to register your project by the end of the semester prior to project commencement.

These are the steps required to register a computing-related project:

1. Before registration can take place, you should choose a project topic and find a supervisor who is willing to supervise. You may choose a project from the list of available projects or preferably specify a project of your own idea. Most supervisors will want to see an outline *project proposal* (see Section 6.1) before agreeing to supervise.

2. The appropriate project module can be added to your programme by selecting on PIP but the project title must be registered separately when you have agreed your supervisor and project title.

3. Complete **two** copies of form M199, or form M199T if you have already registered your project module on PIP, and get them signed by your supervisor. Interdisciplinary projects may have joint supervision, one for each field. These forms are available from the Academic Management Office, or from the carousel in Turing reception, or from the projects website. Registration also requires ethical issues to be considered if your project involves human participants (for example, in a project requiring actual names of people to be testers in a usability evaluation). In that case, form E1 should also be completed. This form is also available on the projects website, or from the carousel in Turing reception. If further ethics approval is required, the student must obtain approval from the School Research Ethics officer before registering. In that case, ask the projects coordinator for advice.

4. **Departmental Registration:**
   Take your completed M199 or M199T forms to the projects coordinator for checking and signing, together with Ethics Form E1, if this is needed.

5. **University Registration:**
   University registration for the appropriate project module is achieved by submitting a copy of the M199 form to the Academic Management Office after completing your departmental registration.

Students will not be allowed to submit a project until properly registered and with an adequate interval between registration and submission. Registration after the Week 0 deadline will be at the module leader's and Academic Modular Office discretion. Late registration will not be accepted as grounds for any late submission.

5 Working on Your Project

The recommended text book for projects, *The Essence of Computing Projects* by Christian Dawson (2003), addresses all aspects of computing projects and provides a valuable resource for project work. There are copies of this book in the library at Wheatley.

5.1 Supervision

Suitable arrangements for supervisions are made between the student and the supervisor. As a guide, you may expect 5 hours worth of supervision per module credit so 10 hours for a double project over the entire course of a project.

It is your responsibility to ensure that you arrange sufficient contact time with your supervisor, with meetings at regular intervals throughout your project. You should recognise that your supervisor may have other demands on their time, and students should give adequate notice if you are unable to attend a scheduled meeting. Supervision can be arranged face to face, or by email etc as appropriate.

The supervisor's role includes:

- Providing guidance and discussion of general strategies for your work
- Help with the planning and progress of your project
- Offering advice on possible avenues for your background research
- Giving technical advice
- Giving support and encouragement
- Help with approaches to official or other bodies if needed
- Providing feedback on the quality of your work and how you are progressing

Ultimately, the project is yours, not your supervisor's. The supervisor is not in the role of a "boss"; the supervisor's role is only advisory. **You** are in charge of your own project: you have to use your own initiative and motivation, and make sure that your project work gets completed on time.

In addition, you and your supervisor may find it of benefit to keep track of your supervisions. Copies of log sheets are available online, via the projects website, and you may submit your log sheet as an appendix of the final project report.

Changing Supervisor

Supervision is a two-way process, but occasionally it does not work very well because of a clash of personalities. In such a case, students should feel able to approach their Project Coordinator to arrange for another Supervisor.

5.2 Managing your Project

Project planning is an essential element of any project. Managing a project plan will enable you to anticipate problems and areas of difficulty to ensure that work is completed on time.

You are encouraged to devote as much time and effort on your project as for other taught modules, i.e. approximately 300 hours for a double module.

Logbook

From the planning stage of your project you should keep a logbook. This will prove invaluable to you throughout the year. It should contain information concerning items such as: strategic decisions, and accompanying reasons, practical design considerations, experimental data, references to articles and other work, useful addresses, etc. It could be paper-based or electronic, depending on which you find more convenient.

Additionally a record should be maintained of your supervisions, whether face to face or email etc. Students should record the date and purpose for each arranged supervision or communication and then give the conclusion, decision or actions agreed. A recommended practice is for the student to send the supervision record back to their supervisor following the supervision. Records in your logbook will also allow students to discuss concrete details and problems with the supervisor in a more structured way.

This careful note-taking in your logbook will save you effort in the long run, because at the writing-up stage you should find all the relevant information in your logbook. After all, you don't want to look up references twice, and however good your memory, details of events that occurred several months earlier will be lost.

Records in your logbook will allow you to discuss concrete details and problems with your supervisor, to your benefit.

Backing up Computer Data

You are responsible for producing regular backup copies of any electronic files you produce as part of your project. You should organise your backup arrangements so that you will avoid putting yourself in the position where you could be devastated by the loss of electronic files stored on a single source.

Useful tips for backing up files during the course of your project:

- Make regular frequent backups of any electronic files, including some backups stored in a separate place from the computer you usually use.
- Include your student number and name on any portable storage media (e.g. memory stick), to ensure that they can be returned to you if you do leave them somewhere inadvertently.
- For any programs you produce, don't just keep backups of the latest version, but also keep some older versions of the code, carefully labelled with their date. This means that if you make a major change to the code and you can't get your program to work any more, even when you try and undo the changes, then you still have an older working version to go back to.

Remember computer crashes and disk failures are not an adequate excuse for late or missing work.

5.3 Research

You will need to research the background of your project topic at the proposal stage and research will continue during the main project activity as needed. You may wish to ask questions such as:

- Has similar work been done before?
- What methods were used?
- What lessons were learned?
- What gaps were left?
- How should I approach my problem?

However, before you even start to carry out your literature search there are a number of things you will need to consider:

- Where might I find the information?
- How up-to-date must it be?
- Should I only consider what is happening in this country, or internationally?
- Should my research be limited to publications in English?
- What sources could I use to begin my search?
- What help can I get (or shortcuts can I take)?

Having investigated these, you can start to look for information. Remember, you don't have to make final decisions at this stage - you will develop your ideas as your literature search and your research continues and develops.

5.3.1 Research Resources

Your project is to a large extent a research project and therefore needs up to date information. Current research, and even recent research, can be quite difficult to find out about. However, there are a number of ways to help make this easier.

Library Guides

> You should by now be familiar with the Library and its cataloguing system, but if you need a reminder there are 'Guides for finding Information' available, for Computer Science and other sciences. The guides are also available electronically by subject at www.brookes.ac.uk/services/library/subject.html

Reviews and Subject Encyclopaedias

> A review covers the entire scope of a topic, outlining what has been done and what is known about it. If you are fortunate enough to find a recent review, then you can search back using the references it cites and find other papers on the same topic. This gives a historical perspective of what is known already. Many subject areas have publications that review specific topics. They are in the *Quick Reference* section of the Library and typical names include: “Advances in..”, “Annual Review of....”, “Current Topics in ...” etc.

Examples in Wheatley Library are

- Advances in Computers (QR004ADV) annual from 1960 onwards
- Encyclopaedia of Software Engineering (QR005.103ENC) in two volumes, 2001
- Concise Encyclopaedia of Mathematics (QR510.3 WEI) 1999

You will also find a number of review journals in the Library e.g. "Trends in...". An example in the Wheatley Library is ‘Computing Reviews’ (published by the ACM). J004/A, from 1984 onwards.

Note: There are similar publications in the subject *Quick Reference* area of Headington Library

Journals

Most research is usually submitted for publication in journals. The Wheatley Library has a selection of relevant specialist journals on your subject. Many of these run back over a number of years. Lists of journals in different subject areas are available from the Library. Electronic journals are also available through the Electronic Library. Journal titles are also listed on the Library Catalogue.

Databases

Most subject areas tend to be covered by a variety of journals. Some of these are more obscure than others and you may not have come across them, particularly if they are not held in the Library. To find out what has been written in a subject area, you will need to look at various databases.

All the Brookes databases are listed in the Electronic Library and those for particular subjects are also shown on the Subject help pages for Computing. Some of the databases have full-text articles; an example is the ACM Digital Library. Many only give a short summary - or abstract - of the article as well as the bibliographic details; an example is Computer Abstracts International Database. Usually the abstract will give sufficient information to enable you to decide whether or not you need to see the original article. If the original is not available in the Library either in print or electronic form, you may need to do an Interlibrary Loan (see below).

Science Citation Index (SC1) on the Web of Science

This lists articles by authors who have referred to (or cited) an article, which you know about. Effectively you are able to see articles on the same topic, which have been published after your key reference and, therefore, you can bring your research right up to date.

Web of Science is available from terminals in the Library, and also from University networked terminals, as well as off-campus. You will need a user number and password to use SCI (these are available via your PIP page).

Past Project Reports

Some project reports from past students are stored in the library on Wheatley campus. They have leaflets in the library giving you instructions on how to view these reports. The copies can be looked at for up to 4 hours at a time, and cannot be removed from the library.

Learning to use these facilities

You will be able to use (on the Web of Science) Science Citation Index and the databases more efficiently if you first go on a short training course. Regular courses, or more specific information skills training and help, may be offered by the Subject Librarian for Computing.

See Christine Davis (Wheatley Library) for more information.

Further information about these and other Library services is available from the Library Enquiry Desks or on the Library web page at www.brookes.ac.uk/services/library.

As you search for information, you will almost certainly encounter references that are not held in Oxford Brookes University Library. There are other ways of getting hold of the information you need.

Other libraries

Oxford is the home of a variety of specialist and research libraries, including the Radcliffe Science Library (RSL), the science part of the Bodleian Library. You have no automatic right to use these libraries but you may be able to get access for references purposes.

To apply, you must be recommended by your supervisor and the Subject Librarian. Application forms and more information is available from the Library Enquiry Desk. You should not go to these libraries without prior authorization

Inter Library Loan (ILL)

This is a system by which books or journals may be borrowed from other libraries. To request an ILL you need to fill out an orange form (for books) or a yellow form (for journal articles) available from the Library Enquiry Desk, giving details of the reference you want to borrow. Your supervisor must sign these forms.

The actual cost of an ILL is about £6. You are entitled to submit up to 40 requests per year at a subsidised cost of £2.. If you exceed your quota, additional requests may still be made but these must be paid for in full.

Web Resources

See the Resources page on the projects website for links to useful web information resources.

If you need more advice or help in beginning your research or carrying out your literature search, see your Departmental Subject Librarian (Wheatley Library).

5.4 Working with External Clients

Some projects are developed in collaboration with external clients and this section provides guidelines for students and clients to be aware of to ensure a productive project and a harmonious and successful collaboration.

Such 'live' projects are highly encouraged since becoming involved in real development and business can provide a valuable experience for the student's professional development, and can add positively to the students C.V.
When setting up a client based project it is important for the student to understand the clients expectations and deadlines as well as the project requirements and the client to understand the students expectations and particularly the assessment requirements. It is not possible to change the project assessment or deadline dates so this should be made clear as constraints for the client when planning and setting out the project proposal.
Further project assessment must be undertaken by Brookes Computing staff as supervisor and second assessor. This is required to ensure that the assessment for each student is fair and equitable. Clients contact for different projects varies from minimal to projects with a strong client focus. Usually there is a individual client supervisor nominated to collaborate with the student. Such client supervisors may be invited to meet to discuss project issues with the Brookes project supervisor and may be invited to attend student presentations etc. Such client contact is encouraged but is not compulsory or essential. Also although clients do not formally contribute to the student assessment, informal feedback from the client may be considered in the overall assessment. Additionally the student will be assessed on how well the client and student interact and how well the student manages the required development process. Clients will generally have an expectation as to the technical competence and professionalism of a student.
It is understood that the university does not have control over the way the client interacts with the project. If things start to become difficult it is obligatory for the student to keep their university supervisor informed so that steps can be taken to ameliorate the situation and possibly to account for it in the assessment.
Finally since the work is being undertaken for an external client then any copyright will be held by the client so that they can make further developments as needed. Should the work be of a confidential nature then appropriate arrangements, such as setting up formal non-disclosure agreements, can be arranged by the university supervisor or projects coordinator.

5.5 Project Report Writing

In addition to your supervisor and the project module leader the University Upgrade team provides a general study skills service that includes resources and individual tuition that includes report writing and project management. See www.brookes.ac.uk/services/upgrade.

6 Format of Project Reports

The project schedule specifies the following deliverable documents to be produced:

- Project Proposal – described in section 6.1
- Interim Report – see section 6.2
- Final Report – see section 6.3
- Presentation and Demonstration – see section 6.4

The overall project assessment for these documents is described in section 8.

6.1 Project Proposal

It is important to plan your project. A project proposal is document that sets out the objectives for your project and a plan of how you are going to manage the work within the time allowed. Suggested sections to include within your project proposal are as follows:

Title Page

Choose an appropriate title that describes what your project is about.

Include your name, student number, supervisor, module code(s) and department etc.

Introduction

Brief introduction to the topic area and key issues. Description of the project aims, deliverable and context, e.g. third parties and other constraints.

Rationale

Describe the relation to your field and subject interest and give the motivation behind your choice of project. Explain the originality element in terms of the product, service or process being developed.

Objectives

Describe the main purpose and goals (objectives) of your project. Describe the proposed deliverables and include any practical applications. You should explain any technical terms that need explaining.

Research

Give an account of the subject area identifying any gaps you plan to address. Evaluate any appropriate existing material of similar work as a literature survey and review.

Methodology

Describe your proposed programming or development approach

Explain how you plan to achieve your project objectives

Explain how you plan to test and evaluate your deliverable.

Resources

List the resources that will be needed. These can include:

- skills (e.g. new programming languages and help from others)
- information
- equipment (e.g. hardware, software)
- testing facilities (for example, will you need human testers?)

Schedule

Give approximate timescales for the main activities involved in the project. A Gantt chart is a suitable way to describe this. Remember to leave sufficient time for the testing and the final report write up. Schedule to finish earlier than the deadline (projects frequently take longer than you think!).

References

Give a list of relevant references

When planning a project it is advisable to familiarise yourself with the assessment criteria given in section 8. . If you have not produced a large written work before

you may wish to take this opportunity to ask your supervisor for feedback about your writing style.

6.2 Interim Report

The purpose of the interim report is to provide useful feedback on how your project work is progressing, part-way through your project. The interim report is normally around 6 A4 pages.

Your supervisor may indicate what you should include in your interim report but the following general content is suggested:

1. An update on research you have undertaken since producing the proposal. You can report on relevant material and ideas that you have found that is to be utilised, for example the choice of suitable algorithms and data structures.

2. An update on development methods if these were not set out in the proposal. This should include a justification for your choice of methods

3. Details of your progress and achievement to date. This should suggest possible solutions to problems you have encountered. Against the progress you have achieved you can describe any changes required to your project plan, particularly if changes may impact on project objectives or deadlines

4. The interim report can outline the proposed structure of the final report. Remember, the interim report can form a basis for your final project report.

6.3 The Final Report

When you write your final report, you are primarily writing for yourself and for the examiners. It is also possible that your report might one day be in the library and read by future students.

The second assessor and external examiner are likely to have a good knowledge of the general area of your study, but not about the specific details. It is advisable to assume that the reader of your report will have the knowledge that you had when you started your project work. You will have to set the scene for your reader, setting the level of your report at that of say another student in the final year of your field.

Your finished project final report should include the following:

- A clear statement of your project objectives
- A literature review and evidence of research through the correct use of references
- Your use of appropriate analytical and developmental methods
- A justification of your design or development methods
- The development of logically coherent arguments
- A conclusion derived from the presented results and discussion

- A critical evaluation of your achievements and a self evaluation of your personal development undertaking the project

Details of the usual report sections are as follows:

Final Report Content:

Title Pages

The first page consist of a standard form obtainable from the Project Administrator (Turing Building, Wheatley). The Project Administrator will also supply you with card covers, and the Print Room (Gipsy Lane Campus) can bind the report.

Fill out the standard form ensuring you include the following:

- the project/dissertation module number(s) (two numbers for Interdisciplinary Projects);
- the title of the project (as recorded by the projects coordinator);
- your student number and name;
- the name of your supervisor;
- the field(s) for which the module project is acceptable and the date of submission.

On the reverse side of the standard form is a copyright agreement. You are encouraged to sign this, because it will allow future students to be able to access your work and learn from it. For more details about what measures Oxford Brookes University takes to safeguard authors' copyright, please see section 9.10 Deposit and Use of Project Reports.

If you wish you can include a separate front page to begin your final report document.

Abstract

The purpose of the abstract is to summarize the project report, giving the reader of the report a quick overview of the project. It should be enough to convince them to read the rest of it or decide if it is inappropriate to their interests.

Abstracts are roughly 300 words, and should explain both what you did and what you found. In practice it is usual to write this section last. Below is an example abstract from a computing project. Have a look at some published papers for more examples of the style and format used in abstracts.

A Neuron Hierarchy Renderer for use with GENESIS

The project involved the design and implementation of a ray-tracing system, in ANSI C, suitable for rendering images of neural hierarchy data. The system is intended to complement the GENESIS neuron simulator, by providing a utility for creating photorealistic images suitable for presentations and reports. The text first introduces the subject of ray-tracing, with the emphasis placed on aspects used by the project software. Practical topics include: object modelling,

ray-casting, intersection tests, and surface illumination followed by a brief note on improving ray-tracer efficiency.

With background knowledge complete, the document moves into the specific requirements of the system. This is followed by the construction and refinement of a software design plan for the system. The design analyses and specifies five key aspects of the software: programme structure, data input, object rendering, image output and user interface.

Implementation and testing issues, which were performed in parallel, are then discussed, with emphasis placed upon aspects such as development language and environment, implementation issues and known problems with the system. This is followed by a discussion of project issues, including a revised method of implementation, using an object-orientated language, which would have been ideal for the project.

Acknowledgements

If you wish to make any personal acknowledgements (or to dedicate your work to someone) then the page following the summary or abstract is an appropriate place for this.

Table of Contents

This follows the title page and is a list of the sections, subsections, etc. Page numbers should be given for each section. You may use as many subdivisions of sections as are necessary.

After the table of contents there should be a list of tables and a separate list of figures. These should be listed in the order in which they occur in the body of the report, giving page numbers.

Body of the Project Report

The body of the project follows after the introduction and research sections.. The format will depend on your own and your supervisor's ideas of the most appropriate way to display the development process, information and result. For example, in a computing project that is most likely concerned with the development of a computer cased system, the structure of the report is likely to use headings such as

- Introduction
- Requirements & Systems Analysis
- Design Process
- Implementation

- Testing
- Results and Evaluation

However this is not the only possible format possible, and it would also be acceptable to divide each section into subsections etc. Headings of sections should be numbered in the same format as on the contents page. Identical headings should occur on the contents page as are found in the body of the report.

The guidelines in section 3 provide further guidance on specific content for the various fields.

The writing of the interim report is an ideal opportunity for you to get feedback from your supervisor concerning a suitable structure for your final project report. See Section 6.1 Writing an Interim Report.

Conclusion

The information provided in the body of the report should lead you to some conclusions and, if appropriate, to recommendations. Your conclusions should reflect on the main project achievements in terms of the original project aims and objectives. Ideally your conclusions will tie in with your introduction section.. If you feel that recommendations are required then these should be based on the material presented. It is important not to introduce new material to the conclusion section.

The conclusion may include a critical self evaluation of your project work. You can give a personal assessment of your project progress and of the methods that you used. You should aim to be positive and focus on your achievements but you can indicate your projects strengths and weaknesses. Perhaps the areas of weaknesses can be addressed as suggestions for further work, rather than project omissions. In addition to the technical development your self evaluation can describe your personal learning and development that you feel has been achieved.

Appendices

Reports often include one or more appendices. These are placed at the end of your project report, and one appendix should be your interim report.

An appendix is "an addition subjoined to a document or book having some contributory value, but not essential to completeness" (OED). For example you may have collected 7,500 items of data in your project, the result section could contain a series of tables or graphs to summarise the data; the raw data could be held in an appendix.

Generally the appendix is for technical material that is related but not vital in the main body of text.

Do not place materials in an appendix that should be in the main body of the report, simply to reduce the word count of the document. If your report looks like it will be longer than 10,000 words, take it as a sign that you are being too long-winded, and try and write more compactly in other sections. Also the appendix should not contain material content that is easily available elsewhere.

Final Report References

The purpose of citing references in the text is to acknowledge the ideas and work of other authors and to enable your reader to find the source of your information if they should wish. References should be cited using the Harvard System, and the following examples are intended to illustrate how it should be done.

The text could contain

> Stachowitz (1987) shows that physical graph representation is directly inspired from the classic control graph formalism

or, for example,

> Physical graph representation is directly inspired from the classic control graph formalism (Stachowitz 1987)

whilst the list of references after the main body of the report contains the matching reference:

> Stachowitz R. A., Combs, J. B. & Chang, C. L. (1987) Validation of knowledge-based systems. Second AIAA/NASA USAF Symposium on Automation , Robotics and Advanced Computing for the National Space Program, Arlington, VA (USA).

Within this example, the "Stachowitz (1987)" or "(Stachowitz 1987)" is a *citation*, giving the surname and year, which provides a way for the reader to look up the reference.

The actual information provided on each reference depends on whether you have a book, journal article, chapter in an edited book, etc. The system is fully explained in British Standard 5605 (you can find this in the Library). The Library also produces a very useful free handout on citing bibliographical references.

A section entitled References should follow the Discussion section. All references cited in the text **must** be listed in the reference section. Papers and books, which you have read but not referred to in the text, should not be included in the reference section.

Final Report Layout and Style

Information sheet M144 (Projects and dissertations) available at the Modular Programme Office gives general guidelines on how to present the final report.

The following guidelines are recommended within computing:

- The document should be produced in black type in12 point Arial font.
- Use a line spacing of 1.5
- Margins should be not less than 30mm on the side of the binding (left hand side) and not less than 20mm on each of the other sides (right, top and bottom).
- All pages should be numbered consecutively (including contents, through to references and appendices). If appropriate contents and references can be numbered separately.
- Page numbers must be located centrally in the bottom margin (about 10mm up).
- Drawings should be in black. Photographs may monochrome or be in colour providing that they remain understandable if a monochrome copy is taken.
- Numbers and captions to figures and tables should be at the bottom of the figure or table. If the figure or table is mounted sideways into the report, then its bottom is on the right hand side of the report.

The report itself should not normally contain more than 80 tables or figures, and should be bound as a single volume.

The appropriate length or style of a project report will vary according to the topic chosen. As a guide, a final project report should normally be about 10,000 words. You should aim to be concise in your writing.. Excessively long reports will be penalised (see section 8.5 Final Report).

When producing your project final report, you should have received feedback from your supervisor from earlier assessed work. If your style needs correcting then your supervisor may correct two or three pages in detail to show you how it should be done, but may not always correct the whole document. If your mathematics is suspect or your diagrams are faulty then they will draw your attention to that. Your supervisor will not write your report for you or check every word. It is required for you to use a word processor to produce your report so do use the spell-checking and grammar facilities.

Each final report copy should be accompanied with a CD containing the final report in electronic form together with all other project documentation, software and data etc. The CD should be securely attached to the inside back cover of the report.

Avoiding Plagiarism

Writing reports is intended help you develop to express yourself. Your report must be based on your own work and written in your own words. Most authors take considerable care in choosing the right words to convey a situation. If they have selected the best combination of words to communicate an idea, then you may find it difficult to match their argument with your own words. In such circumstances it may be appropriate to quote them but to give them credit for their intellectual property.

If you choose to quote someone else's writing, then you **must** give them credit by enclosing their words in quotation marks. For example,

> "non-response bias is conceptually separate from sampling bias"
> (Lynn and Jowell, 1996)

indicates who wrote the words, citing them as the source of the quotation (see subsection 6.2.2 References).

Note that excessive use of quotations is not advised, as it suggests that you are unable to formulate an argument or a discussion of your own.

Failing to use quotation marks for someone else's words gives the misleading impression that you wrote them, and that is plagiarism. If it becomes apparent that you are plagiarising other peoples work, then you will be severely penalised in the marking of your project. You may also face further disciplinary action by the University. See Section 9.9 Cheating.

Use of Auto Generated Program Code

In certain situations CASE tools can be used to automatically generate program code, based on some form of input specification. In this situation it is important that the origin of any program code presented in a project be clearly indicated as arising from such a source. Failure to do so may, in certain circumstances, can be considered cheating.

Further Help

For more detailed advice and related resources on writing up your work with the Assessment criteria in mind, see the Project Final Report section of the projects website.

6.4 Presentation and Demonstration

After submitting final project reports, students are required to give a presentation and if appropriate a demonstration of their project work to their supervisor and second assessor. The presentation arrangements are made by the module leader for around week 12 and may be organized as small groups presenting together. Each presentation should be approximately 10 minutes but 15 minutes if a demonstration is included, with a further 5 minutes for questions. The presentation can use powerpoint or OHP.

Students should give a brief description of the project and its objectives, then summarise the progress made as compared to the original plan, discuss the achievements and also suggestions for any further work. The talk should explain

the choice of the development approach and technologies used and also give some reflection as to an evaluation of the development and result or deliverable and also some discussion of personal achievement and development.

For the presentation content here is a suggestion:

Title - with a brief introduction of what the project is about, aim and objectives
Motivation - Why I chose this project
- What is the problem
- Why is it interesting

Research - mention any significant related work and mention any relevant theory or technology that you plan to use, but no need explain standard material
Methodology - How you organised and managed your development, for example the programming environment, design methodology, use of tools, project planning etc.
Technical Work - Your results and achievements. How problems were solved, the design process etc Include screen shots and examples etc
Conclusion - Evaluate possible applications, any limitations and perhaps suggestions for future work etc

If you plan to include a demonstration this could be included with the technical work, or alternatively the demonstration could be organised separately at the end.
Be aware of the assessment criteria for the presentation that you can find in the assessment form. Most important is enthusiasm and to provide interest for the audience.
Timing - ensure you use the available time to cover the important points you wish to make, best to rehearse. As a guide each slide will take between 1 and 2 minutes.

But please vary the content according to your particular project

The purpose of the demonstration is to give your assessors a better context in which to evaluate your work. For example, if you wrote a program, but didn't explain very clearly what the program does within your dissertation, then an assessor can get a better idea of the scope of your achievement by seeing you give a demonstration. Ideally the presentation can be incorporated into the presentation. If it is impractical to provide a demonstration at that time, for example of the resource requirements or complex setup needed then this should be arranged separately for the supervisor and assessor.

Section 7: Submission

7.1 Project Proposal

The project proposal document content and assessment is described in section 6.1 and 8.3. The proposal should be submitted to the U08096 post-box and emailed to the supervisor by Friday week 4 of the first semester. Written feedback from the supervisor should be returned within 2 weeks of submission.

7.2 Interim Report

The interim report should be submitted to the U08096 post-box, and also emailed to your supervisor by Friday Week 10 of the first semester. Written feedback should be returned within 2 weeks of submission.

Section 6.2 gives general guidelines and a suggested contents list for the Interim Report . However your supervisor may suggest a different format, depending on the nature of your project. The Interim report assessment is described in section 8.4.

Interdisciplinary Projects
For projects that are interdisciplinary with a field that is not computing-related, the above applies, and the interim report should be submitted as described. The other field may have other arrangements for which you should refer to the guidelines of that field.

7.3 Final Report

Two copies of the completed final project report should be submitted to the project administrator by 4pm on Friday of Week 8 in the semester in which the project is to be assessed. The administrator will accept project submissions any time up to the deadline. On submission the administrator will need to ensure that the front cover page is included, completed and signed. This is to confirm that students are aware of the regulations for academic misconduct and that the report can be made available in the Library. One copy of the report should include an electronic version of the final report, proposal and interim report, as well as other related documentation and software etc, e.g. as a CD that is securely attached to the inside back cover of the report. There is likely to be other students submitting close to the deadline so you are advised to hand in your project in good time. After the deadline projects will be accepted at the office but marked as late and so will incur a penalty. Section 7.7 gives details of the penalties for late Extension of Deadlines.

Additionally an electronic copy of the final report should be uploaded to Turnitin on Brookes VLE before the submission deadline. Details of the procedure for this will be provided to students in good time.

As well as the two copies you submit, you may also want to keep another copy for yourself.

One copy of the submitted reports can be returned to the student on collection after the assessment, if required. The other copy is retained at Brookes and examples of some of the better projects that have given their permission are held in the library for use by future students.

Project reports should be bound, either spiral bound or heat bound in the provided card cover. All costs of production (including printing, photography, scanning, cover and binding) must be borne by the student.

All the material that is being submitted as your final report should be bound into the report. If it is impossible to include all the material in the report then supplementary material must be suitably packaged and clearly labeled separately.

Note that your final report must include a signed copy of the standard title pages form available from the administrator. If your dissertation does not include the title and originality declaration cover form (that states that the work described in the dissertation is, apart from where it is mentioned specifically, is all your own work) (see section 9.9 Cheating), then it may be returned to you un-assessed.

Further instructions and advice about the content of the final report are given in section 6.3 Writing the Final Report

Interdisciplinary Projects
If your project is interdisciplinary with a field that is not computing-related, then you must, in addition to requirements in computing, submit sufficiently many copies to fulfil the requirements of that field, to its module leader/administrator as detailed in the guidelines of that field.

7.4 Presentation and Demonstration

Projects students are required to give a presentation of their work as described in section 6.4. There is no formal submission for this part of the assessment but students may pass on copies of presentation material to their supervisor if this is requested

The project presentations will take place around week 12 of the semester in which the project is to be assessed. Staff and students from the Computing Department may be invited and where possible similar projects may be grouped together.

Interdisciplinary Projects
For projects that are interdisciplinary with a field that is not computing-related, the above applies for the computing related module assessment.

7.5 Late Submission

If a student fails to submit assessed project work by the due deadline a mark of zero for that component will be recorded. Submission extensions can only be granted via the University mitigating circumstances procedure.

7.6 Extension of Deadlines

Extensions for the submission deadline for any of the project deliverables can only be made in exceptional circumstances that are clearly beyond the student's control, and which do not constitute a contingency for which provision should have been made.

In all cases requests for extensions should be made via the mitigating circumstances procedure.

Examples of such permissible circumstances are:

- illness for a period at which key work was due to be carried out along with a medical certificate covering indisposition;
- late arrangement of supervision because admission with credit took place;
- an unexpected bereavement;
- failure of a third party to honour a previously arranged agreement to provide data or facilities;
- failure of University equipment that had been allocated for the project;

- absence of a supervisor at a point when key supervision had been specifically planned.

Examples of circumstances that would **not** normally be sufficient for an extension:

- loss of a computer disk (backups should be kept);
- problems with binding, or failure of a printer (printing should be done well in advance of the deadline);
- change of (paid) work schedule, unless imposed at short notice by management (evidence required);
- difficulty with travel arrangements of any kind.
- Late registration of the project

Note that in any case an extension cannot be granted beyond Friday of Week 12 (so maximum 4 weeks extension) to allow sufficient time for the assessment process within the same semester.

7.7 Resubmission

If a student's project does not attain a pass grade, then either a fail grade or a "re-sit coursework" (RC) grade will be awarded. Re-sit coursework are automatic for overall marks obtained in the range 30% to 39%.

Students who attain a re-sit grade will receive a guide to their resubmission from their supervisor. This will highlight the areas in which the project proved to be less than satisfactory and specify what further work will be required in order to obtain a pass on resubmission. Note that the project resubmission assessment is based on how well the resubmission requirements have been met and not simply attempting to gain a few additional marks to pass.

Resubmitted projects should be submitted by **4pm on Friday of the week specified by the university for resubmitted work**. If a resubmitted project is subsequently passed, the result will be 40 P unless it was a medical re-sit (MR), in which case full marks are awarded. In the latter MR case, and in the situation that the project falls in the 30-39% mark range, then the project will be eligible for a re-submission coursework, as if a ‘first submission’.

Section 8: Assessment

8.1 General Assessment Criteria

Rationale, Aims and Objectives

The criteria for assessment includes whether the student fully understood the objectives of the project and If relatively limited in scope, has he or she investigated possibilities beyond the initial specification.

First Very focused, clearly defined.
2.1 Reasonably focused, clearly defined.
2.2 Not very clear or precise.
Third Poorly defined, lack of precision.
Fail No clear objectives for the project.

Methodology
First Totally appropriate to stated objectives and precisely defined.
2.1 Appropriate to objectives with no more than minor omissions.
2.2 Lacking clarity in choice of methods to match aims.
Third Hazy understanding of methods to answer questions posed.
Fail No clear idea of how to answer questions posed.

Research and Literature Survey
First Comprehensive review with major emphasis on relevance to stated objectives.
2.1 Comprehensive review with some emphasis on relevance.
2.2 Comprehensive review with some omissions and lacking clarity on relevant material.
Third Some major omissions and lacks focus in discussions.
Fail Superficial, lacking substantive information and discussion.

Technical Development
First Evidence of substantial development work clearly related to the task.
2.1 Evidence of substantial work without as clear a focus as for a First.
2.2 Evidence of substantial work but not always totally relevant to the task.
Third Small scale work not completely useful in meeting project requirements.
Fail Little evidence of work over and above basic requirement.

Critical Appraisal of the Project
First Excellent insight and honest questioning of project outcomes, methods used and assumptions against contemporary work
2.1 Good insight and honest questioning, as for first.
2.2 Shows critical awareness but not always using appropriate techniques.
Third Shows little critical awareness or adopts invalid appraisal techniques
Fail Shows almost no critical awareness and has few results to analyse.

Conclusions and Recommendations
First Some original conclusions put into the context of the limitations of the project.
2.1 Critically aware conclusions based on sound data with a good awareness of project limitations.
2.2 Sound conclusions but showing some misconceptions.
Third Conclusions lack precision and/or an awareness of the limitations of the project.
Fail Conclusions are poorly based and the student shows no real awareness of the fragility of them.

Presentation of the Report

The main criteria here are: clarity and conciseness; well structured; attractiveness and logical development of thought.

First Use of English, quality of referencing, use of appendices, structure of content and appropriateness of illustrations all excellent.
2.1 As above, all good.

2.2 Some of the above but some aspects lack precision. Third A minority of the above are poor in quality, others no better than acceptable.
Fail All or most of the above are poor.

8.3 Assessment form

Project Proposal Assessment (10% of marks)

To be completed by supervisor and returned as feedback to student:

Criteria	marks awarded	Comments
Introduction and Aims - relation to field and interests, purpose, practical applications, outcomes, deliverables, project originality	**/20**	
Research - overview of subject, evaluation of existing material, research relevance, use of references	**/20**	
Methodology – development approach resource requirements, project plan: activities and milestones (Gantt chart), risk analysis, testing and evaluation	**/40**	
Report Writing document structure, clarity & logical presentation, citations and references.	**/20**	

Overall Proposal mark %	Proposal mark as 0-10	Overall Comments
%	**/10**	

Supervisor:
Date:

Project Interim Report Assessment (10% of marks)

To be completed by supervisor and returned as feedback to student:

Criteria	marks awarded	Comments
Research – literature review, use of material influencing work	**/20**	
Methodology – theoretical framework, relevant technologies, justification of methods, constraints & limitations	**/20**	
Progress and Achievement – use of supervision, progress to date, problems encountered with solutions proposed, project management giving work completed and changes required	**/40**	
Report Writing Structure, clarity & logical presentation Final report structure use of references	**/20**	

Overall Interim Report mark %	Interim Report 0-10 mark	Overall Comments
%	**/10**	

Supervisor:
Date:

Project Final Report Assessment (70% of marks)

To be completed by **supervisor**:

Criteria	**marks awarded**	**Comments**
Understanding – Purpose, context, aims, objectives & originality. Report structure	**/10**	
Research – use of relevant theory and technology. Literature survey and use of literature	**/10**	
Methodology – Choice, justification and use of appropriate methods. Constraints & limitations.	**/10**	
Technical & Practical problem solving Development process. Results & achievements Discussion, critical appraisal & conclusion. Self evaluation	**/30**	
Written Presentation – Readability, clarity and logical presentation. Referencing	**/10**	

Overall Final Report mark %	**as 0-70 mark**	**Overall Comments**
%	**/70**	

Supervisor:
Date:

Demonstration and Presentation Assessment (10% of marks)

To be completed by **supervisor**:

Criteria	**marks awarded**	**Justification**
Presentation - Presentation material relevance and quality Verbal presentation Effective use of material Project context, aims and objectives Interest and enthusiasm Timing	**/30**	
Technical Progress Research background Theoretical and technical aspects Methodology choice Development work Results & achievement Effective demonstration Project management Critical evaluation	**/40**	
Response to questions Breadth and depth of knowledge	**/30**	

Overall mark for presentation %	**as 0-10 mark**	**Overall Comments**
%	**/10**	

Supervisor:
Date:

9 Project Issues

9.1 Counting Module Credits

The rules for counting module credits for projects are as follows:

1. If a double project is set wholly within a single field, both module credits will count towards the minimum required for that field.

2. For an interdisciplinary project/dissertation one module credit will count for each of the fields for which it is acceptable.

9.2 Part-Time Students

The arrangements for part-time students undertaking a project are the same as for full-time students. When planning a programme of studies, care should be taken to allow sufficient time for project work in the same way as for any other double credit modules.

9.3 Interdisciplinary Projects/Dissertations

Administrative Responsibility

Only one of the module leaders for an Interdisciplinary Project/Dissertation has the administrative responsibility for the mark sheet and moderation process. This is specified using form M199 and may be changed up to the end of week 8 in the semester in which the work is assessed. [If an M199 is submitted after this date there can be no guarantee that the change will be incorporated into the mark sheet.]

Submission Requirements

Students undertaking interdisciplinary projects/dissertations should note that a non-computing field may have different requirements than computing-related fields. If students find that the requirements for deadlines, style, format or content from the two fields are conflicting or incompatible or otherwise appear to inhibit the appropriate investigation of an approved topic, they should resolve this with the respective project coordinators/module leaders.

In cases of difficulty the Assistant Dean should be consulted. SEC must therefore have delegated to the Module Leader responsibility for agreeing modifications to the Field Requirements for Interdisciplinary project/dissertation in appropriate circumstances.

9.4 Exchange Students

Students intending to go on an exchange in their final year are expected to make arrangements with their supervisor before they leave the UK, and it is their responsibility to keep in touch with the supervisor and to keep them updated of any developments or changes of direction to the project whilst they are away.

9.5 Change of Registration

A student or supervisor may consider a project has changed direction during work on it and wish to transfer the registration from one (set of) module number(s) to another, or from one field to another. The module leaders must approve the change on a form M199 and the form submitted by the end of Week 8 in the semester in which the work is assessed.

Note that if a title change is required for the project, re-registration is not necessary providing the change is minor. Any change to the title that has been agreed with the project supervisor can be made by informing the project coordinator and using the new title on subsequent project work. More extensive project changes are not normally possible but in all situations would need to be approved by both the supervisor and project coordinator.

9.6 Deletion/Withdrawal

A student who wishes to withdraw from a fully registered project module must do so before the **end of Week 2 of the semester in which the project was to have been assessed**. This is achieved by completing the deletion section of an M199 form.

Withdrawal from a project or dissertation module and subsequent re-registration implies **re-negotiation of the project or dissertation from scratch with a different title**. This procedure means no student can withdraw from a module at a late stage and hence achieve a one-semester extension. Re-registration requires a new project and M199 form.

9.7 Problems During Project Work

Projects are large challenging pieces of work, and problems can occur from time to time for a variety of reasons. Planning and managing your project well can avoid many of these difficulties (see section 5 Working on Your Project).

If unexpected problems during the project are encountered students should in the first instance contact their supervisor for suggestions. Further advice can be obtained from the projects coordinator.

Very unusually, unexpected circumstances can affect your project work so much that you might need to apply for an extension. In such circumstances it is important to keep your supervisor informed about your progress. See section 7.5, Extension of Deadlines, for details of rules concerning extensions and how to apply.

9.8 Cheating

You are reminded of this extract from the Student Conduct Regulations:

2.2.1 Students shall comply at all times with the provisions of the Regulations for Candidates taking Assessments. In particular they shall not commit impersonation, collusion, plagiarism, falsification, duplication, submit the work of others as their own, or otherwise cheat in any assessment.

2.2.2 Students shall not provide false information, or withhold information, with intent to gain unfair academic advantage or other academic benefit or service.

Terms Used in the Student Conduct Regulations:

Impersonation
: means taking an assessment on behalf of another student, or allowing another person to take an assessment on your behalf.

Collusion
: means producing assessed work by working with someone not in your coursework group. This includes allowing another student not in your coursework group to copy your work.

Plagiarism
: means submitting the work of someone else as if it were your own. If you include material by someone else in your assignment, you must show clearly in the text how much was copied from elsewhere. It is not enough just to list references at the end of your assignment. Guidance on the correct use of references can be found in a handout in the Library, which is also available on www.brookes.ac.uk/services/library.

Falsification
: means presenting data which have been invented as if they had been obtained by observation. This includes claiming that a program works when it does not, or that it produces results which it actually does not.

Duplication
: means submitting work for assessment which has been assessed before, either in this University or elsewhere, without acknowledging the extent of the previous submission.

It is your responsibility as a student to make sure that you do not break any of the Student Conduct Regulations. If you do so, you may be disciplined according the University Disciplinary Procedure and a penalty may be imposed upon you. The full Student Conduct Regulations can be viewed in the Library, and can be accessed on-line at: http://www.brookes.ac.uk/regulations/sturegs.html

9.10 Deposit and Use of Project Reports

The copyright of a project report rests with the student.

These are the regulations governing the deposit and use of Oxford Brookes University Modular Programme Projects and Dissertations:

1. The ‘top’ copies of projects/dissertations submitted in fulfilment of Modular Programme requirements shall normally be kept by the School for at least one year. In cases where the "top" copy incorporates examples of original artwork, photographs, etc. it may be returned on request to the student after consideration by the external examiner. In these circumstances a second copy must be retained by the School.

2. The author is required to sign a declaration agreeing that the project/dissertation be available for reading and photocopying at the discretion of the Dean of School in accordance with 3 and 4 below. The copy can then be made available in the Library.

3. The Dean of School shall safeguard the interests of the author by requiring persons who consult the project/dissertation to sign a declaration acknowledging the author’s copyright.

4. Permission for any one other than the author to reproduce or photocopy any part of the dissertation must be obtained from the Dean of School who will give his/her permission for such reproduction only to an extent which s/he considers to be fair and reasonable.

If you are concerned about copyright issues, it is recommended that you take a look at some previous project reports in Wheatley library, to see what measures Brookes takes to protect authors' copyright.

References

Dawson, Christian (2003). *The Essence of Computing Projects*, Prentice-Hall.

Project and Dissertation Guide for Fields, Oxford Brookes University
http://www2.brookes.ac.uk/services/asd/modular/pd_guide/ch1.html

Researching and writing a dissertation or project, Brookes Library Research Guide
http://www.brookes.ac.uk/library/guides/researchingthesis04.pdf