School of Computer and Mathematics

Keele University

Undergraduate Project Handbook

The information in this handbook is correct for the academic year:
2019/20

And is intended for students on the following Level VI undergraduate courses:
CSC-30014

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1.1. Resources

All learning resources for the project modules can be found via the Blackboard module pages from the start of Semester 1. These resources will include a variety of important documents, forms and guidance documents, including the project marking forms and marking guidelines. Students are strongly advised to look at all documentation including on the Blackboard module pages at the start of Semester 1.

The department also has a dedicated Project Lab, which contains a number of machine where students are permitted to install specialist software that is not available on normal lab machines. In order to use the Project Lab you must obtain permission from your supervisor and the department's technicians. Students also have access to project reports from previous year groups – all non-commercially sensitive projects which recieved a mark of 60% or above can be found in the Project Library in the Project Lab. To get access to these project reports, students must first get permission from the School Office – a list of the previous year's projects that are available in the Project Library is available on Blackboard.

1.2. Reading List

There is no official reading list for this module. However, students are encouraged to read *"Success in Academic Writing"* by Trevor Day before attempting to write a project report. This book is available from the Library at shelf mark PE1408 .D2. Students are also expected to attend all project lectures and to read any additional lecture slides or relevant information found on Blackboard.

1.3. Getting Access to Academic Literature

Throughout the undergraduate project, students should be reading academic literature, mainly in the form of academic papers. There are a number of tools available for finding, accessing and citing academic literature, with the following three being particular popular and useful:

- **Google Scholar:** www.scholar.google.com

- **ISI Web of Knowledge:** http://wok.mimas.ac.uk/

- **CiteSeer:** http://citeseerx.ist.psu.edu/index

It is recommended that students search for acadmic literature either whilst on campus, or whilst logged into the Library website using their student log-in. Keele University Library provides free access to a vast number of academic journals and academic paper repositories.

When conducting literature searches, students should seek advice from their supervisor regarding the most useful sources of academic literature given their project topic. Supervisors will also be able to help students to differentiate between strong and weak academic sources. Students are also welcome to read textbooks, technical reports, PhD theses, newspaper articles and other scientific literature – however, all of these literature sources should be relevant and justifiable.

2. Overview and Important Information

Your project is a piece of original work on a topic of your choice which demonstrates your ability to work independently over an extended period of time. Projects come in many varieties, which makes it difficult for this handbook to make absolute claims regarding the best approaches to completing an undergraduate project. However, there are certain important aspects of an undergraduate project in Computer Science which all students are expected to consider – these aspects are outlined in this handbook (which all students are expected to have read).

2.1. What is an Undergraduate Project?

An Undergraduate (UG) Project or dissertation is a large piece of work, resulting in a write-up or thesis, that you undertake over both semesters in your 3rd year. All Computing Single Honours, Combined Honours and Major students take an Undergraduate Project module. As Computer Science is a technical subject, the project write-up or report is not like writing an essay on a topic, an Undergraduate Project report in Computer Science involves reporting on a series of technical achievements achieved during the project.

When proposing a project in semester two of year two (see below), and progressing with your project, it is important to keep in mind whether your project qualifies as a valid Computer Science project. Projects do not have to involve the creation of some coded or programmed software or simulations, but many will; projects that do no involve code or programming should involve the demonstration of technical computer science skills of the kind covered in the degree. The final project report should contain reference to relevant work and contain evidence of technical achievements relevant to the field of study. Any primary research (questionnaires, interviews, ...) must result in formal robust analysis or the creation of some product. Any systematic literature reviews must follow technical guidelines, be thoroughly evaluated or produce practical outputs. Any software that is created should be done so with a clear software development methodology, any simulations or experiments should have rational and justifiable design decisions and objectives. Ideally the process(es) outlined in the project report should be both systematic and reproducible.

During the project proposal and project supervision, your project supervisor (and the module co-ordinator) will advise you on how to ensure your project remains a valid project given the subject area.

2.1.1 British Computer Society (BCS) Accreditation

From 2018/19 all Computer Science single honours degrees have been professionally accredited by the British Computer Society (BCS). In order for these degrees to be professionally accredited, all the 3rd year projects (CSC-30014 or equivalent) must conform to what the BCS expects from such a project. It is up to students and their supervisor to ensure that the final project meets the requirements of the BCS – the key requirements are as follows.

Projects must involve the production of a report which should include:
- elucidation of the problem and the objectives of the project
- an in-depth investigation of the context and literature, and where appropriate, other similar products
- where appropriate, a clear description of the stages of the life cycle undertaken
- where appropriate, a description of how verification and validation were applied at these

stages
- where appropriate, a description of the use of tools to support the development process
- a critical appraisal of the project, indicating the rationale for any design/implementation decisions, lessons learnt during the course of the project, and evaluation (with hindsight) of the project outcome and the process of its production (including a review of the plan and any deviations from it)
- a description of any research hypothesis
- references

Projects must include the students undertaking practical work of some sort using computing/IT technology. This is most frequently achieved by the creation of an artefact as the focus for covering all or part of an implementation life-cycle.

Dissertations based solely on literature review activity and/or user/market surveys are not acceptable.

Currently, Combined Honours degrees are not accredited by the BCS and therefore the full BCS project requirements do not extend to Combined Honours students.

2.2. Project Stages and Deliverables

Undergraduate projects are typically broken down into a number of stages and deliverables, these stages are outlined below:

2.2.1. Project Proposal

Project proposals are typically completed during semester two of year two. The proposal process involves students completing a *project proposal form* in collaboration with an academic member of staff, this proposal is then submitted to the project module co-ordinator. All project proposals must be signed by an academic member of staff to ensure that the proposed project is an acceptable idea for a final year undergraduate project in Computer Science. The member of staff who signs the form will usually be allocated as project supervisor as long as they are available to supervise projects in the next academic year. If a proposal is not completed by the deadline set by the module co-ordinator an available supervisor will be allocated, with the student being expected to produce a project proposal within the first few weeks of semester. All potential supervisors have a quota of project students they should sign up – if a member of staff has already reached their quota of project students by the time you come to speak to them they are within their rights to refuse to sign your project proposal, so starting to speak to potential supervisors early in the project proposal process is important. Any student with exceptional circumstances during the semester two of year two, which impacts on their ability to seek a project supervisor should contact the module co-ordinator.

2.2.2. First Project Supervision

Week 1 of the first semester of third year is designated as a *project week*. Project weeks are similar to reading weeks in other departments. During project weeks student timetables in Computer Science will be freed of all lectures barring project lectures, enabling students to focus an entire week of study to their undergraduate project. During the week 1 project week all students are expected to have their first project supervision – it is the student's obligation to arrange and organise such a meeting with their supervisor. More details on project supervision can be found in section 2.5. Project Supervision & Meetings on page 8.

2.2.3. Ethics Documentation and Project Plan

The first set of submissions project students are expected to make are of a GDPR and Ethics Checklist and a Project Plan (more information in section 3. Ethics Documentation and Project Plan on page 10). These submissions are usually made midway through the first semester. For most project students there will also need to be a submission of an SCM Ethical Review Application form at the end of the autumn semester. Whilst none of these submissions carry marks toward the final project mark, failure to submit could lead to students being marked down at a later stage due to lack of proper project management or unethical conduct (as outlined in the Project Marking Form).

2.2.4. Project Poster and Poster Session

The second major deliverable in the project process is the submission and demonstration of a project poster. Midway through semester two students are expected to design and submit a project poster outlining their project progress to date. The project poster is assessed and is worth 10% of the final project mark. A poster session is also organised to allow students to demonstrate their project work to date and receive feedback on their work from members of staff and other students. Further information on the project poster and poster session can be found in section 4. The Project Poster on page 14.

2.2.5. Project Report Submission

The major deliverable in the project process is the submission of the project report. The project report is a substantial document that details the entire undergraduate project and is submitted towards the end of semester two. The project report is worth 90% of the final project mark. Further information on the project report can be found in section 5. The Project Report on page 16.

2.2.6. Project Demonstration

Following the submission the project report students are expected to take the opportunity to demonstrate the work they have done and the objectives they have achieved during a meeting with their first and second markers. This project demonstration is a marked component of your project report resulting in students loosing valuable marks for not conducting a project demonstration; failure to conduct a demo may also leave both markers unable to effectively mark your project report. It is the responsibility of the student to arrange a project demonstration. Section 6. The Project Demonstration on page 23 gives further information about the project demonstration.

2.3. Project Timetable

The table below shows the typical sequence of events on the project modules. These are typical dates, to give you an overview of the typical sequence; precise dates will vary from year to year and will be made available on Blackboard.

Time	Inidicative Timing	Event
Year 2	Second semester	Project talk to second years
Year 2	Second semester	Submission of Project Proposals
Year 3, Semester 1	Week 1	Supervisor allocation confirmed
Year 3, Semester 1	Week 1	Students arrange meeting with supervisor
Year 3, Semester 1	Week 1	Initial Projects Talks
Year 3, Semester 1	Week 4	Intellectual Property Talk (inc. Plan and Ethics Q&A)

Year 3, Semester 1	Week 5/6	Initial Plan and Ethics deadlines
Year 3, Semester 1	Week 7	Academic Writing Talk (1)
Year 3, Semester 1	Week 12	SCM Ethical Review Application (if required)
Year 3, Semester 2	Week 1/2	Poster talk
Year 3, Semester 2	Week 4/5	Academic Writing Talk (2)
Year 3, Semester 2	Week 5	Poster hand-in deadline, hard copy and soft copy
Year 3, Semester 2	Week 5/6	Poster session (about two hours)
Year 3, Semester 2	Week 7/8	Project write-up and demo talk
Year 3, Semester 2	Week 9/10	Deadline for handing in project write-up, hard copy and soft copy
Year 3, Semester 2	End of term	Demo week

ⓘ **Key Dates**
The key dates for the projects will be put on Blackboard.
(This is a more flexible arrangement than putting them in the handbook.)
We will inform you by email if the Blackboard dates are changed.
You should, however, check Blackboard regularly for changes to dates.

2.4. Project Lectures

During the 2019/20 academic year there will be around 8 hours of project lectures. All lectures are compulsory and we will be delivered by various members of academic staff. For an up-to-date timetable on lectures students should see the projects timetable uploaded to Blackboard and make use of the Keele Timetabling website (http://www.keele.ac.uk/timetabling/timetables/)

2.5. Project Supervision & Meetings

Each project student is allocated a project supervisor upon beginning their project. The project supervisor is expected to help and guide the student during the project process, it is not the responsibility of the supervisor to ensure project deadlines are met, or to read endless drafts of the project report. Students are expected to do the vast majority of their project work independently. However, it is expected that students and supervisors meet regularly to ensure the project is kept on track and remains grounded in Computer Science. We recommend that students see their supervisor for approximately 1 hour over a 2-3 week period, however some supervisors would prefer a weekly meeting whereas others may prefer a long meeting every 3-4 weeks. It is entirely up to the supervisor and student to arrange a mutually satisfactory supervision plan. It is recommended that students keep a record of project supervision meetings as an aid to project planning; some students choose to use a project logbook - you don't have to use a logbook, but many students and staff members find them useful.

Students are expected to act in a professional way throughout their project, especially when interacting with their supervisors (be in face-to-face or via e-mail). Often students ask project supervisors to act as a referee on job applications, so it is important to demonstrate professionalism and maturity throughout. If, for any reason, the supervisor-student relationship breaks down, then the student is encouraged to see the Project Module Co-ordinator.

2.6. Intellectual Property

Your project may have the potential to make money in some form, whether it be the sale of a physical software product, licensing of a research technique, or from some other means. A project may fall into one of the following categories:

- public domain – if research work is to be published, or if software is to be made available as freeware from the outset

- potential intellectual property – if your idea falls into this category from the outset, you should not discuss it with anyone other than the module co-ordinator, the project ethics and commercialisation officer, your supervisor and staff from the Office of Research & Enterprise

- external client property – if you work for a third-party, such as the client for an external project, you will not be expected to generate any new IP (they will own the rights to anything you develop under their guidance). If you identify a better way of doing something relating to the project, you should immediately inform your supervisor and the projects officer, but should not inform anyone else; you should continue working on the project in the way that was previously agreed. Your supervisor and the projects officer will meanwhile discuss with you the IP issues relating to your idea, such as the position of your external client with relation to the IP. This is a particularly complex area, and needs to be handled with particular care.

Your supervisor and/or the University may have a valid claim on any intellectual property which arises out of your project. This is a complex area and should be discussed with the projects officer as soon as you or your supervisor believe intellectual property has been generated, regardless of which category your project falls under.

Staff and students involved in commercialisation of student projects must not inform any external party of the mark received by the project. This is to prevent potential problems with conflicts of interest for staff when marking the project.

If, following the Intellectual Property Lecture in semester 1, you believe your project could have some Intellectual Property implications, advice should be sought immediately from project ethics and commercialisation officer.

2.7. Collaborative Projects

Some projects may be being pursued in collaboration with a member of staff from outside the department; some may be in other departments or faculties, others may be involved in the administration and management of the University. These projects will involve a departmental project supervisor, and an external member of staff from the other department acting as a client. Students pursuing these projects should seek to work with their supervisor and the external staff member when developing and producing their project. As these projects involve people from outside of the department, students pursuing these projects are expecting to act with impeccable professionalism.

3. Ethics Documentation and Project Plan

During the first part of your project you will submit a project plan and a GDPR & ethics checklist. The plan is a 4-6 page document which should be written in consultation with your supervisor. A Project Plan template will be available on Blackboard for you to fill in – all students are expected to use this template as it contains all the details we require.

The aim of the plan is to help you to plan what you intend to do in your project, how you intend to do it, and when you intend to do it. It acts as a point of reference for both you and your supervisor, and clearly sets out your aims and objectives. Your plan will not be given a mark, but may influence your final project report mark.

You will also need to complete a GDPR and ethics checklist, even if you are not gathering information from human participants (for example, if your project might involve processing online information which some people could find distressing). We will publish information about this separately, and will cover this topic in the initial project talk in week 1 (and again in the intellectual property and ethics lecture). A copy of the GDPR & ethics checklist may be found on each project module's Blackboard page.

Most projects, even those where human participation just involves evaluating a final artefact will now also have to complete an SCM Ethical Review Application form – though this will not be required until week 12 in Semester 1. Students should work closely with their supervisor, and if necessary the project ethics and commercialisation officer, when considering the ethical implications of their work.

A soft (digital) copy of the completed GDPR & ethics checklist and project plan should be uploaded to Blackboard by the ethics and plan deadline. The deadline will be announced on Blackboard. Despite having a deadline, we allow (and encourage) updated plans and ethics forms to be submitted any time during the academic year, this is especially the case if your project changes in such a way that you (and your supervisor) feel the information in the project plan and/or the ethics checklist is no longer valid. Your project plan need not be approved by your supervisor, but failure to properly consult your supervisor could result in your project being poorly planned and executed in an unprofessional manner – this could result in a significant loss of marks when your project report is marked.

However, expect all ethics documentation has to be signed (typed signatures will be OK) by the student and supervisor.

Failure to seek ethical approval for your work, especially in the case of significant ethical considerations, could result in ethical violations. Ethical violations could result in you being required to destroy any data gathered in an unethical manner (there are also larger consequences for severe breaches in ethical conduct).

On successful completion of your project, you should be able to demonstrate the learning outcomes for the module.

- Identify and plan an achievable programme of investigation with realistic objectives

- Survey relevant background literature which provides academic justification for the project

- Demonstrate professional conduct with regard to time management and supervisor contact

- Select and apply appropriate information modelling methods and processes

- Communicate problems and achievements at a professional level and publishable standard

- Produce software and/or research demonstrating skills acquired during course

For the purposes of your plan document, you should show how you intend to meet the outcomes listed above. The following sections give further guidance.

Students are expected to include their project plan in the appendices of their project report, and to have a copy of the project plan and ethics documentation to hand during a project demonstration.

3.1. Project Description and Objectives

This should be an expansion of the text you submitted for your proposal. Your description of the project should be short and clear. It should explain what the academic content of the problem is, and how it relates to issues in Computer Science.

Your objectives should form a meaningful whole, rather than being a random collection of ideas. They should be non-trivial and sufficiently specific to allow the markers to assess whether or not you have achieved them. The project mark form includes a criterion based on how well you have met your objectives. You should present your project objectives as a list of bullet points or short paragraphs.

3.2. Background Reading

It is crucial to link what you are doing in your project to relevant academic literature and to current professional best practice. This means finding relevant literature which underpins your project.

If your project is programming based you should find literature which places it in an academic context. (For instance, showing what the recent literature says about the problem you are tackling.) If you cannot find an academic or technical justification for your project, you may need to reconsider its focus. Technical manuals are not usually part of the literature about current best practice. If your project is research based your literature review should justify why your work is useful and what new contributions it will bring to an established research area.

Note that this section of your plan should not be the literature review itself. You should save that for your final report. All you need do here is list some of the relevant papers and texts you have found, or explain the areas you intend to explore. Your project research should be well under way by the time your project plan is submitted. If you are finding it hard to complete this section, it may indicate a weakness in the scope of your project.

3.3. Process and Methods

This aspect of the plan should describe and justify the process and method you have chosen for your project. Programming projects should be based on a well-founded design process, research projects should follow an established research technique and methodology. You should agree the process and method you will be using with your supervisor, and make sure you understand them. Your project plan should make it clear that you have considered the implications of your chosen process and method. If you are having difficulty writing this section, you should make sure your supervisor is aware of this. If your project process is poorly defined, you will end up with a poor final product.

3.4. BCS Project Criteria

This aspect of the plan should briefly describe how your project will remain in line with BCS project criteria. In order to complete this part of the plan students should have read the BCS project criteria document on the module Blackboard page, and have read section 552.1.1 British Computer Society (BCS) Accreditation on page 5 of the project handbook.

Students on a Combined Honours degree do not need to complete this section of the Project Plan.

3.4. Hardware and Software

This section should describe which hardware and software you are using, and why you are using these in preference to other possible options. Please remember that you should normally be using departmental hardware and software, unless you have previously made other arrangements with your supervisor. Remember also that if you are using non-departmental hardware and software, you must be able to show us that you have made arrangements for technical support. You will be responsible for the security of your data. In addition, you should remember that you will be expected to give a demonstration of your software, or a sufficient overview of your research, system or process, after submitting your project, and will have to make appropriate arrangements for hardware and software for this demonstration.

3.5. Table of Risk

Include a table of risks, the likelihood of each risk occurring, ways of avoiding them, and the actions you will take if they do occur. Common risks include: running out of time; losing data or electronically stored work; lack of rapport with supervisor; steep learning curve with chosen technology, process or method; etc. You can probably think of more which relate to your specific project.

This is an opportunity to demonstrate your knowledge of current best practice in risk assessment. You should demonstrate that you have really thought about the risks associated with your project, rather than simply listing "usual suspects" such as running out of time.

3.6. Time Plan (GANTT Chart or PERT chart)

This should contain a realistic plan of your intended activities on the project from its start to its completion. You will not be marked down if you depart from this plan, but if you do your plan sensibly, then you should find it helpful for completing your project on time. It will also look good to your markers if you can demonstrate professional and well thought out project management.

We expect you to produce a GANTT chart or PERT chart for inclusion in your charter. This is a common project planning tool which allows you to see at a glance how well you are progressing with (or deviating from) your plan.

It is a good idea to work closely with your supervisor when writing your project plan, particularly in relation to planning the project. Some parts of the project will probably take longer than you think.

3.7. Updating your Project Plan

Sometimes the scope, aims or objectives of projects change substantially during the course of a project. Usually this is a natural and expected result of an exploitative process like producing a project. However, if you feel that your project has significantly departed from your initial project idea, then we encourage students to consider producing and uploading a new project plan or significantly updating the original project plan. We do, however, recommend that students do not completely change their project after the first semester as this does not leave sufficient time to properly complete a project of a sufficient standard.

Students are encouraged to refer back to their original project plan throughout their project. Sometimes students find it useful to update their project plan (especially their time plan) to reflect the current state of their process. In these cases we do not expect students to upload a new copy of their plan.

ⓘ **Project Plan**

Your plan should be produced in collaboration with your supervisor to ensure your idea is feasible, ethical and in line with intellectual property regulations. Whilst the project plan and GDPR & ethics checklist carry no marks they may impact on your project report mark later in the module.

0%

4. The Project Poster

During the second semester you will be expected to produce a poster describing your project. There will be a poster session, when the posters will be displayed in the department and you will be expected to discuss yours with staff and other students. This generally takes around two hours, and is a lot more fun than it sounds and the feedback you will receive from attendees and participants should set you on your way to producing your final project report.

Note that this does not involve standing up and giving an oral presentation! You will stand next to your poster and answer questions on a one-to-one basis. The whole session is fairly informal and a good motivational boost to your project.

We normally display examples of good posters around the department throughout the year, so you are encouraged to study these as a source of possible inspiration. We will also offer attendees the opportunity to vote for the "best poster", with the winner receiving a prize; please note that the poster voted for will not necessarily receive the highest grade upon marking!

Your poster will be marked independently by three members of academic staff, and you will be awarded the median of the three marks. As with all assessed work the University Marking Scheme will be used to inform markers.

4.1. Poster Layout

Your poster should be A1 in size. You can either print it as eight A4 sheets (we will supply A1 card for you to glue them on to) or as one large A1 laminated sheet (using facilities provided by KUDIS or another suitable supplier). PowerPoint and OpenOffice Draw are good for poster design, but you may use any application capable of generating the required output. You will not receive more marks for professionally printing your poster.

We require you to submit an electronic copy of your poster as well as a printed copy, so do not to glue on extra items which cannot be included in the file itself. They often go missing or fall off during the poster presentation anyway! Your electronic copy should be identical to your final copy as it is your electronic copy that is often viewed by the markers and external examiners. The production and printing of a physical copy of the poster is not compulsory (neither is attendance of the poster session), but is strongly encouraged. Submission of the electronic copy of the poster is subject to usual department and University submission rules regarding plagiarism, late submissions and exceptional circumstances.

4.2. Poster Content

The content of your poster is similar to that of the project plan, but it will have far fewer words. It is intended as a visual summary of the state of your project: what it's all about, why it is important, how you have gone about it, what you have done so far, and what you have yet to do.

There should be some substance to your poster, not just pretty pictures. The balance between saying too much and not saying enough is difficult. Your supervisor will be able to advise on this.

You may use the Keele logo on the poster for display in the department. Be wary of using other trademarked or copyrighted logos without permission. We have found in the past that many companies are reluctant to allow their logos to appear on student posters.

> **(i) Project Poster**
>
> Your poster will be marked independently by three members of academic staff, and you will be awarded the median of the three marks. Further information can be found on Blackboard following the Poster Talk.
>
> **10%**

5. The Project Report

The project report (or dissertation) will probably be one of the largest pieces of extended writing you have ever undertaken. It is a skill which you may not be familiar with, so seek advice from your supervisor. Remember that your project mark is based largely on what you write, though marks may be also be obtained from any demonstrations you do and the supervisory process (see section 7.2. Report Marking on page 24 for more details). A good report can help to rescue a poor product, while a bad report can diminish any achievements in coding or research technique.

You will be asked to hand in two identical hard copies of your report. We will bind them for you. A standardised front page will be made available on Blackboard. You must also submit an electronic copy of the report itself, plus an electronic copy of any other supporting material you have produced as part of your project.

Remember to keep a third copy of the report for yourself, so that you can refer to it during the demonstration if necessary (we would be happy to bind this copy for you). It is important that your report is formatted correctly and is of a sufficient standard to publish in our project library. Project reports from previous years are stored in the Project Lab. Ask for the key from the School Office if you would like to view any of them.

Your report should be a formal piece of writing, so use appropriate academic language (third person passive; past tense). Take care to proof-read your work and remove typographical errors. Pay attention to grammar and spelling. You may ask someone to help with this, but not with the academic content or organisation of the report. If someone helps you with grammar and spelling, be sure to state this in your acknowledgements section. Your supervisor will be happy to proof read drafts of the project report, but only within a reasonable time-frame – do not expect your supervisor to read an excessive number of drafts (please see the Responsibilities of Supervisors and Students document on Blackboard for more information).

If you use technical terms in your report, make sure you do so correctly. You might want to include a glossary of terms and acronyms if there are a lot of unusual ones particular to your project. There is no need to explain standard computing terms or phrases.

The report must be your own original work throughout. We reserve the right to pass all electronic copies through plagiarism detection software. The University has strict regulations regarding academic misconduct. Plagiarism in your project may result in failure of the module, with consequent implications for your overall degree. Note also that you should not incorporate verbatim work that you have previously written for other purposes (such as coursework for modules in other parts of the course).

5.1. Presentation (inc. Word Counts)

We expect students to present project reports in certain way. Failure to do so could result in a loss of marks. We also expect the project report to be within the word counts set below – we will not explicitly cap marks for failure to adhere to work counts, but markers may see fit to mark down projects that are too long or too short due them failing to meet standards on report clarity and organisation. We recommend for students to use standard word processing software, but are happy for students to produce their report using LaTeX, however students should be aware that a style file

is not currently available.

Please see a summary of the report presentation requirements below:

Presentation

7000- 8000 words (CSC-30014)
A4 paper
Double-spaced text
One-sided printing
Times New Roman 12 point font (or similar)
Left margin of 1.5 inches
Right margin of 1 inch
Top and bottom margins of 1 inch
Sequential page numbers in footer
Headers and footers to suit style
Each chapter starts on new page
Subsections numbered and titled

5.2. Content

The content of each project will be different, however certain key sections are expected from the vast majority of Computer Science projects (see below). Students are also expected to include a clear contents page, and a table of figures.

Content

title page
abstract
acknowledgements
table of contents
table of figures (if desired)
specialist glossary (if necessary)
introduction
main report body
evaluation
conclusion
references
appendices (not in word count)
Project plan
Approved ethics documentation

5.2.1. Abstract and Initial Pages

The abstract is a clear, informative and above all concise summary of your project. Two paragraphs is the norm; certainly less than one page. You will usually write this last, after the main bulk of the report is completed. It should describe what you did and how you did it, and include any major recommendations or conclusions. The purpose of an abstract is to give enough information for future readers to decide whether or not your report will be useful to them.

The acknowledgements section is the one place where you can speak in the first person, with some emotion. Authors use this section for different reasons; to thank family and friends, or more formally to thank copy-editors and supervisors. If someone has sponsored your studies or contributed in some way to your project, mention that too. Make sure you spell names correctly, especially your supervisor's! You may acknowledge your human subjects and testers as a group, but not by name, due to anonymity.

Your table of contents should list all the chapters and sub-sections, at least to one level of nesting. If your report has more than two levels of sub-headings, it is an indication that it is probably too deeply structured. Include the page number for each section. Modern word processors can generate tables of contents automatically if you have used section heading styles correctly. Alternatively you can create the table manually, but be sure to keep page numbers up to date as you move things around. A table of figures is useful if you have a large number of diagrams and other illustrations, but it isn't compulsory.

This handbook has a table of contents to illustrate the concepts. Number your figures consecutively, even if they are of different types. Screenshots, diagrams, illustrations, tables and code snippets are all 'figures' in this context. Paying attention to these small presentational details can really help to sell your project to the examiners.

5.2.2. Introduction

The purpose of your introduction is to give the reader sufficient knowledge and understanding to tackle the rest of your report. You should put your work in context; refer to previous studies (if you've done research) or similar software (if you've coded something). View the discipline as a timeline. There will be things which have gone before, and which have motivated and informed your work. You should draw these strands together in justification of the report the reader is about to encounter. Your introduction should include the following items, which apply to all project types:

- A clear opening statement of the problem being investigated – what the problem is, and why it matters academically as well as practically

- A concise yet comprehensive overview of previous work in the field relating to your project, with references and citations

- Reference to an appropriate range of sources, including journal articles, conference proceedings, books and websites

- An explanation of any background information needed to understand technical aspects of your project with which the reader may be unfamiliar

- A concluding statement at the end of the introduction, describing the work which will be done in the project, and the aims and objectives

You may find it helpful to list your main objectives as a series of numbered bullet points. If you do this, then it is easy to refer to them in the main report and again in the conclusion, so that the reader can see clearly that you have assessed how well you met all your objectives.

Writing an introduction is often difficult because it is not clear what is introductory material and

what is main body material. One way to tackle this is to leave the introduction until last, or write it in parallel. You could write the main body of your report without worrying about how to introduce it. Then go back and note down all the assumptions you have made about the reader's knowledge and expertise. Anything which sticks out as an obvious assumption, or which is clearly obscure, should be explained properly in your introduction.

Do not be fooled by the name; your introduction can be as long as any of the main chapters. Often reading other academic work will help you see how a good introduction should be structured.

5.2.3. Main Report Body

There are no strict guidelines for the main body of your report. Each project is different; each student is unique. As a minimum, you should explain and discuss what you have done in each of the phases of your project (whatever they may be). The problem definition will have been covered in your introduction.

Implementation projects will follow a fairly standard approach to requirements definition, system design, and programming. Each of these should be covered in its own chapter. In each of these, you should explain clearly what choices you had to make (e.g. choice of development methodology, of programming language, etc.) and explain why you made the choice that you did. This demonstrates your breadth of knowledge, and your knowledge of current best practice.

If you are using a spiral model or some other iterative development model, then you should give each iteration its own chapter or sub-chapter, each using the same set of headings as the others, and each specifying what was introduced in the iteration.

Research projects can be similarly split into structured sections like any scientific report. These sections should take the reader from the introductory stages of the research (initial design, pilot study, parameter tests, …) through to the final test design and full study.

Illustrations, tables and diagrams all help to add visual appeal to your report. Large chunks of text can be boring. Try to structure your report so that there is at least one section heading, table, diagram, or other visual distraction (such as a code snippet) on each page. You won't always be able to escape a page of plain text, so make sure it keeps the reader interested. Humour should be avoided at this level of writing; don't use cartoon clip-art. Humour and cartoons suggest that your work isn't intended to be taken seriously; you need to avoid sending out such unwanted signals.

One of the most common mistakes in project reports is a reliance on text book theory to pad out the text. It's fine to say that you followed the waterfall model and talk about that in the context of your project, but you do not need to write paragraphs on what the model is. Similarly you might want to use ERDs or UML diagrams, but you don't need to explain what all the symbols mean. You can assume your reader is competent in the general area of Computer Science.

Your best source of advice will be your supervisor. They will have supervised many other students over the years, and also wrote their own dissertations long ago! They can help you to decide how best to split your work over a number of main chapters. There is no proscribed structure for the main report body, since each project is different.

5.2.4. Testing and Evaluation

This is often the section which students have most trouble with. There are three main aspects of testing and evaluation, all of which add to the overall worth of your project:

- unit testing – for implementation projects, showing how you tested the code for technical and semantic errors; for research projects, showing how you ensured your experimental technique was robust

- product evaluation – for implementation projects, showing that your finished system works as expected and meets its initial requirements; for research projects, showing that your work has addressed the original question or hypothesis. In the case of implementation projects, you need to demonstrate that you have done proper user evaluation, following best practice, not just stating that you think the software achieved the original objectives.

- introspection – reflecting on your own ability to undertake the project and showing that you have learned from any mistakes in your project management

You might find that aspects of the evaluation creep into previous chapters, particularly if you are writing about a research project. Try where possible to distinguish between the discussion generated by your research findings (which goes in the main report body) and the overall evaluation of your research process. The split between discussion and evaluation is often more clear cut in implementation projects.

5.2.5. Conclusions

The introduction and conclusion are two halves of the same thing. Together they establish what you have done, why you have done it, and whether or not you were successful. Think of them as a pair of brackets: whatever you open in the introduction you should close in the conclusion. List again your aims and objectives, and show how you met them, referring back to sections from your main report body.

The conclusion should focus on the problem being investigated, not on your own opinions about how well you worked. Sell the project, not yourself! Since this is the final part of your report, it will be fresh in the memory of the examiners when they mark your work. Leave the reader fulfilled and in a positive mood. Even if your project failed to meet its objectives, you can still discuss the reasons why in a positive manner.

You can demonstrate an understanding of the wider project context by including a section on further work. Very few projects are complete pieces of work. There will always be something extra you could have done, or something you might do differently with hindsight. By suggesting further ideas which a subsequent student might take up, you are showing that you have scoped your project, stayed within its boundaries, yet recognise its wider implications and applicability.

5.3. Appendices

Use appendices for things which are not part of the main report but which are nonetheless necessary or useful additions. These might include:

- Examples of all materials used in briefing subjects, data collection, evaluation, and so on (so

that anyone wanting to replicate your work can use exactly the same materials that you did)

- Anonymous examples of original data, such as a completed questionnaire used in user evaluation (it is not generally necessary to include all the original data, just one example)

- User manual (if applicable)

- Listings of any sections of code which are specifically discussed in the report

- Any tables, illustrations, or other figures which need to be included, but which are too lengthy to include in the main text

- Your Project Plan and GDPR & Ethics Checklist (for marker reference)

- A4 version of Project Poster (not required but often useful for marker reference)

The appendices should not contain anything new. Everything should have been referred to and discussed in the report. The purpose of an appendix is to include something which is perhaps bulky or unwieldy and would break the flow of your main report body. Material in appendices does not contribute towards the word count for the report.

As a rule of thumb, your project report should still make sense even if the appendices are missing. If this is not the case, you might like to move portions of the appendices into the main report. Getting the balance right is often tricky; the key thing is to use appendices to help keep the main report flowing smoothly.

It is generally a waste of effort and paper to include source code listings in the appendices. You will submit an electronic copy anyway. If you want to talk about a particular algorithm, or if the code is important in some other way, include the relevant source files, but where possible include code snippets as figures in the main body of your report. Code should be submitted as supporting material electronically, with your markers having access to that electronic submission.

5.4. References

References are sources of material which you have used in your report. Every quotation; every opinion which is not your own; every idea which has been expressed by someone else before you. If you include anything which is not in your own words, make sure to reference it. A more adept writing style will use paraphrasing and mix others' opinions with your own. Even so, you must still include a reference.

You should use the Harvard style of referencing. In summary, this means including the name of the author and the date of their work in brackets next to the text or idea you have used, even if it is in the middle of a sentence. Remember to reference diagrams if you have copied them from another source. You then list all references in this final section of your report, in sufficient detail that the reader can follow them up and locate the original source if necessary. There is an excellent tutorial on this on the Anglia Ruskin University website.

> ⓘ **Harvard Referencing**   http://libweb.anglia.ac.uk/referencing/harvard.htm

(i) **Project Report**

Your report will be marked independently by your supervisor and a second marker. If they cannot agree on a mark, or a failing mark is agreed, your report will be given to a third marker. Further information can be found later in this handbook.

90%

6. The Project Demonstration

The demonstration usually takes place near the time when your report is submitted. It is your responsibility to arrange a mutually convenient time with your supervisor and second marker. Project demonstrations last approximately twenty-five minutes. The demonstration gives you experience of presentation skills, and of describing your project to other people, which can be useful preparation for job interviews where you may be asked about your project.

You will begin by giving a general overview of your project and explaining the motivation behind it. If you created a software product the markers will expect to see it working, and may ask you to explain particular aspects of the code. If you conducted an experiment or other research, you should show the markers your raw data and final results.

For all types of project, your demonstration should show the process as well as the product. Research project demonstrations will often feel more like a discussion between you and your markers. Programming project demonstrations should clearly show how the requirements and design influenced the final product.

Software should be demonstrated on department machines, usually in one of the labs but occasionally on a staff machine if they have agreed this in advance. If you have been permitted to develop your software on your own machine, or mobile phone (in the case of apps) you may bring it to the demonstration. However, it would be a more useful demonstration if your software was stable and portable enough to run on any department machine or mobile phone.

For additional guidance on the kinds of things markers will be looking for during your demonstration see the Project Marking Form, Project Marking Guidelines and University Marking Guidelines, which are all available on Blackboard.

> ### ⓘ Project Demonstration
>
> The project demonstration carries marks on the project marking form, and so is considered as a component of the project report. It is also an important opportunity for you to influence the markers and show that you have understood and engaged in a full project process. Any documents showing project planning will come in handy at this stage to illustrate professionalism and ongoing project development.

7. Project Marking

Marking for Undergraduate Projects in broken down into two components:

- Poster: 10% of final mark

- Report: 90% of final mark

7.1. Poster Marking

Posters are marked mid-way through the second semester, with marks being made available before the submission of the project report. Posters are marked by three members of academic staff; the module co-ordinator, the project ethics and commercialisation officer, and an anonymous third marker. Each marker provides an independent mark, with the final mark awarded being the median of the three marks. There is no official mark scheme for the poster due to the diverse nature of project posters. However markers will be focussing on three primary components when deciding on a mark:

- Poster Content and Project Progress

- Spelling, Grammar, References and Academic Language

- Presentation

Students will not be marked down for not professionally printing their poster. Nor will students who cannot attend the poster session be marked down. Markers reserve the right to mark either the physical or electronic submission of the poster, so students should ensure both copies are exactly the same.

7.2. Report Marking

Report marking takes place in the weeks following the submission of the report. However, due to the time frames involved students are unlikely to find out the final mark for their report until close to graduation. Once marks have been finalised, and final project marks have been confirmed by internal and external examinations boards, they will be uploaded to Blackboard along with feedback. Project reports are marked by two markers. The first marker is your supervisor by default, with the second marker being allocated during the second semester from amongst the department's academic staff. Both markers are expected to come to a mark independently of one another. A final mark is then agreed following discussions between the two markers. If markers cannot agree a mark a third marker is assigned to arbitrate. Markers will be aware of the student's poster mark during the report marking process. When marking a project markers will make use of the Project Marking Form; markers will also make use of the Project Marking Guidelines and the University Marking Guidelines when deciding a project mark. Students are expected to read and be familiar with all three documents which can be found on Blackboard. The module co-ordinator will also moderate the cohort project marks to ensure consistency between projects and resolve any border line marks.