

COSC490 Project Guide

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1 400-Level Project Options

There are two 400-level project papers offered in computer science: COSC480 (Applied Project) and COSC490 (Research Project). Both are full-year, 40-point papers.

- If you are enrolled in an Honours degree (BA Hons or BSc Hons), you must take COSC490.
- If you are enrolled in a Postgraduate Diploma (PGDipArts or PGDipSci), you do not have to take a project paper unless you intend to carry on to the one-year MSc or MA by thesis. If you do decide to take a project paper it would normally be COSC480.
- If you are enrolled in a Masters of Applied Sciences (MAppSci), you do not have to take a 400-level project paper (although you must take APPS597). If you do decide to take a project paper it would normally be COSC480.
- If you are enrolled in the first year of a two year Masters degree (MA or MSc), you must take a project paper and it would normally be COSC480.

Honours students are required to take COSC490 as the research component is an important aspect of an Honours degree. This is less of a focus for Postgraduate Diplomas, and Masters projects may be preliminary work for thesis work in the second year of the degree. For these reasons there is more flexibility in the nature of the projects, and so COSC480 is more appropriate.

If you have any questions about which papers to take, please contact 400projectadmin@cs.otago.ac.nz or our adviser of studies, adviser@cs.otago.ac.nz.

The remainder of this guide focusses on COSC490. If you are taking COSC480, then there is a separate document with material relevant to that paper. The material in here may, however, be of use to COSC480 students when planning their assessment criteria and timetable.

2 Project Timetable

The following table gives the timetable for projects and a summary of the assessment due dates for COSC490. All documents and reports can be sent directly to 400projectadmin@cs.otago.ac.nz, preferably in PDF format.

Date	Submit	Assessment
2 March	Project Selection (Section 4)	
16 March	Aims and Objectives (Section 5)	
9-13 July	Project presentation (Section 6)	5%
20 July	Interim report (Section 7)	20%
5 October	Final report (Section 8)	75%
	Total	100%

Notes:

- Your project choices, in order of preference, should be emailed to 400projectadmin@cs.otago.ac.nz.
- Paper copies of the reports are *not required*. Electronic copies (preferably in PDF format) should be emailed to 400projectadmin@cs.otago.ac.nz.
- The final report will be marked by two members of staff. The supervisor does not mark the report, but will provide an overview or summary to the markers. After arriving at their marks independently, the markers may meet with the supervisor to seek further information.
- Requests for extensions (with reason) will be considered, but are likely to be treated more favourably the earlier they are made. Such requests should be directed to 400projectadmin@cs.otago.ac.nz, and should have the support of your supervisor.

3 What is a 490 Research Project?

The COSC490 project is designed to develop your research skills by working on a substantial, independent project. The project will give you experience in computer science research, problem solving and analysis, time management, use of primary source material, experimentation, report writing, and public presentation. You will find these skills important for any career in computer science, whether in industry or in academia.

The project should also be seen as an opportunity to become an expert in a highly specialised area of computer science. The department supplies a range of projects, mostly from our own research groups, sometimes in collaboration with researchers in other departments. Projects cover a wide range of topics, and may be self-contained or part of a larger research effort.

Each project has an associated supervisor, who will be your primary source for advice. In order to get the most benefit from your supervisor you should stick to regular meetings and supply drafts of your work well in advance of deadlines for final submission.

COSC490 is worth 40 points, which represents around two full-time days per week for the whole year. Your interim and final reports will need to reflect the full amount of effort. Some of you may be tempted to work in short bursts over the vacation. Such a strategy is doomed from the start. The most successful projects are those which are worked at consistently every week.

You will be assessed only on the material you submit, that is the interim report, the project seminar, and the final report. The aims and objectives document, while not formally assessed, will provide the frame of reference for assessment. The marking of this material will be distributed among the academic staff.

4 Choosing a Project

A list of potential project topics will be provided via the paper website. You should choose at least three projects and email your choices, in order of preference, to 400projectadmin@cs.otago.ac.nz. Be sure to

include both the project number and title to make sure there is no misunderstanding. You must talk to potential supervisors to learn more about the projects before making your selections. This will let you make an informed decision, and mean that supervisors know who is interested in which projects in order to resolve any conflicts that might arise.

If you have a project of your own you would like to undertake instead, then you must discuss it with the 400-level project co-ordinator, 400projectadmin@cs.otago.ac.nz, or a member of staff who you think may be interested in supervising the project. In the past we have often created special projects so that students can follow their interests. Additionally, many of the staff members have other interests that might be suitable for a project – you can find out about these by talking to them! In any case, suggesting a project that is not part of this list requires the agreement of a potential supervisor.

5 Aims and Objectives

You are asked to provide a statement of aims and objectives for your project by 16 March. Your supervisor will help you to do this. The statement of aims and objectives is important because it provides a description of the purpose of a project by which its success will be judged. It also serves as a guide for you. Your project work will suffer if you do not start early with some clear idea of what you are trying to do. It is only too easy to waste several precious weeks feeling around the subject if you have no clear programme.

By *aims* we mean the long-term goals of the project: what should be done by the end of the year. These can be described in two or three sentences. *Objectives* are more precise, short-term goals which provide a timetable for the project. One good way to express these is as a list of points. It may even be possible to suggest target dates for each objective. They must be short, simple and to the point. The whole statement should not be longer than two pages.

6 The Project Presentation

Project presentations (seminars) will be held in the first week of the second semester at times to be advised. Presentations must be *no longer than 15 minutes* and will be followed by 5 minutes of questions. Standard projection facilities will be available, but it is up to you to check that they are compatible with your choice of presentation type in advance of the date of the presentation.

We expect you to go to every presentation session. This will give you a chance to learn about the other projects and to give your classmates valuable support and feedback.

You will be describing your project, and your current progress, to a general audience who will not necessarily be familiar with the topic. Keep this in mind when preparing your presentation.

The presentation should start with the background knowledge necessary for understanding your project. Do not leave this out, but do not spend too long on it either otherwise you will have no time to talk about your contribution. Move on to describe what you are trying to achieve and what you have achieved so far.

Many people find public speaking difficult and intimidating. Do not panic. The audience is *not* there to give you a hard time. Regard your presentation as an opportunity to explain your project to your friends. Think about presentation skills. Do not just read notes such as your interim report. Try to use slides that summarise main points and fill these out without the use of further notes. You will all have attended enough lectures to know what good and bad presentations look like.

Rehearse your presentation. Seek the help of fellow students, family or friends to hear you. Without rehearsal, you will not get the length or level of detail right. Even very experienced presenters need to rehearse.

7 The Interim Report

In the interim report we are looking for evidence of good progress and an indication that the project can be completed in the time remaining. The report provides an opportunity for staff members other than your supervisor to provide feedback on the state of your project. The report should show that you understand the problem, give results to date and provide plans for the remainder of the project. We are not expecting complete systems or full solutions at this stage.

The exact form of the report will vary with the type of project being undertaken. However, all reports should contain:

- A concise statement describing exactly what it is you are trying to achieve.
- Background for the problem, including a review of the relevant academic literature.
- A section describing your achievements to date.
- A section describing what you *realistically* expect to achieve in the remainder of the year.
- An updated Aims and Objectives document if significant changes have been made as a result of the work in Semester 1.

A report must stand alone as a coherent technical article. We are assessing writing and communication skills as well as technical skills. It is your responsibility to ensure that the report reflects the work that you have done without simply being a project diary. Organise the report around background issues, the problem, results, and directions. Read your own drafts carefully, as if you are an outsider to the project. If possible, share your drafts with other students and respond to their comments. Enlist your supervisor's help as necessary.

You are expected to demonstrate familiarity with previously published work in the problem domain. The scope of this literature review will depend on the project; however, all students are expected to read relevant recent publications. Your supervisor will advise on what is appropriate for your topic.

Keep the interim report short, normally fewer than 3000 words. Express yourself clearly and simply and avoid repetition. Two academic staff members will assess your report. For further information, refer to the Final Report Guide ([Section 8](#)), particularly the "Do" and "Do not" lists.

8 The Final Report

The report will be a self-contained final report, and so you may include material from your interim report in order to make a complete document. There is no guarantee that your markers will be the same as those who read your interim report. *Make good use of the examiners' feedback of your interim report.* If you repeat mistakes from the interim report you will be penalised again.

Length: This will depend on the nature of your project. The body of the report should normally be no longer than 8000 words, excluding appendices. Some reports (e.g. critical literature reviews) might be slightly longer. Your supervisor or the project coordinator can advise you (but not at the last minute!) about the appropriate length for your report. As in the interim report, you should aim at clear, concise writing.

Submission: We do not require printed copies of your report. Your reports should be emailed (preferably as PDFs) to 400projectadmin@cs.otago.ac.nz by 5pm on the due dates.

Language: Your report is not like an exam script addressed to an expert. You should imagine that your reader has a background in computer science but little or no specialised knowledge in your area. You must explain everything in plain language and provide a glossary for specialised technical terms. A lot of technical writing, including published research papers, fails to communicate well because the authors try to make their writing sound grand or eloquent. This is a mistake. You should choose the simplest words that will do the job.

Layout

There is no universally best way to lay out a report but the following suggested structure would suit almost all. You are strongly advised to use it. You may find it useful to look at good reports from previous years. Selected recent reports are available from the [COSC490 web pages](#).

Title Page: This will contain the title of your report, your name and your supervisor's name. This is also the place to put an abstract or summary. Get advice on layout from your supervisor.

Contents Page: A list of the sections of your report with page numbers. This is essential.

Introduction: Normally the first chapter, its purpose is to describe the background to and reasons for the work you are reporting. A common mistake is to make this section too long. The introduction should set out the problem to be solved, some background to the problem including a literature review of relevant previous work and, if appropriate, an overview of your approach in solving the problem. A good introduction prepares the ground for the technical discussion which follows: a bad introduction is just off-putting.

Work Done: The main body of your report, it may need to be in several chapters. See the further comments below for some "do & do not" advice.

Results: A short description or analysis of what has been achieved or what conclusions may be drawn from your work. If you have large amounts of data or very detailed analyses which are needed to support your results then these belong in appendices.

Conclusion: A brief discussion of the results. It should state how far you have progressed in achieving your stated objectives, hopefully tying up the threads of the year's work. Do not worry if you have not achieved the original aims. Be honest, discuss any shortcomings, and suggest how they might be overcome. Describe how your work might be extended in the future. For MSc students (see above) the description of future work will usually relate in detail to the proposed thesis topic, and will form a significant part of the report (perhaps a separate chapter).

References: A list of all material you have referenced in the body of the report. A standard and consistent citation style is expected within the text.

Bibliography (Optional): A list of material not directly referenced, but which a reader could use to gain a wider knowledge of the subject.

Glossary (Optional): A description of the technical terms you have used.

Appendices (Optional): Tables of results, program listings and other bulky items. These are things which a reader might be expected to leave out unless he or she wants to do further work on your project.

Index (Optional): A list of technical terms or key words you have used with pointers to occurrences in the text. Useful in longer projects with many definitions.

Assessment

We know that some students, despite having put in a lot of effort into their project, produce a poor report. Remember, that what we mark is the report that you write. It is, therefore, worth putting in the effort to write a good report. The markers do not have access to your supervisor's knowledge of the project nor to the time you spent debugging instead of writing. Your final report will be marked by two independent markers neither of whom will be your supervisor and your supervisor's role in the marking process will at most be an advisory one. It must be clear from the report what work you have done and what results you have achieved. It is especially important in the case of group projects to make it clear what part is your contribution and what is not. In the case of a practical implementation, it is important to make the computing content clear: how your project fits in, the reasons for implementation decisions, the design of data structures and algorithms, possible improvements and so on.

Do

- Provide adequate examples showing how your program behaves (if applicable) and, most importantly, to convince the marker that it works. Describe any special characteristics of your program, or in the case of a survey, be as rigorous as you can.
- If appropriate, describe and argue for your choice of data structures and algorithms – don't forget that this is a Computer Science project so this issue is important.
- Tell us what you are trying to achieve. Pay particular attention to a clear statement of your objectives in the introduction. Avoid jargon, don't overuse acronyms and define clearly any of the technical terms you use. The best advice is to assume that your reader is a critical postgraduate student.
- Plan the presentation of any experimental data carefully. Detailed experimental data should generally be relegated to an appendix – in text presentation should be in a form that the reader can easily appreciate, for example a summary table or graph.
- Report on negative as well as positive results of your experiments. Report any shortcomings of published techniques that you find.
- Start writing early. Good reports normally require *at least* a month of concentrated effort.
- Ask your supervisor to proofread rough drafts. Somebody who is not familiar with your work should also read your drafts. Friends are useful here.
- Use a spelling checker, but do not imagine that this is a substitute for proof reading. Many spelling errors are still 'correct' words.
- Look at good examples of previous years' project reports. A selection of these are provided on the [course Web site](#).

Do Not

- Just write a history of what you have done. A common form of poor report spends much time tracing out the author's steps in doing the project. It is better to organise discussion around issues, results, and interpretation.
- Tell us a sad story. Do not say how many days were wasted because the computer was down, or the proper documentation did not exist, or the cat got sick. Problems of theoretical importance that influence the direction of the project should be reported of course, but life's day-to-day hassles should not. Formal mechanisms exist for handling genuine medical and other emergencies – talk to your supervisor and the project coordinator, 400projectadmin@cs.otago.ac.nz, if you are in this situation.
- Sacrifice time that should be spent on preparing your report to an attempt to fix an incomplete or buggy implementation. Your project cannot pass, let alone get a reasonable grade, without a decent report. On the other hand, the graders understand that it is not always possible to iron out all the implementation problems within a fixed time period.

Production of the Report

L^AT_EX is often recommended for the production of reports, as it is designed to produce professional scientific documents. Other options such as Microsoft Word are fine as well. No matter what software you use, *be sure to learn how to use it effectively*. Learn how to manage citations and bibliographies; use cross-references to sections, figures, and tables; typeset mathematics correctly; and use semantic rather than ad hoc layout (Section headings rather than manually putting in 16 point bold Arial text etc.).

It is important to remember that Murphy's law usually prevails. As the deadline approaches everything that can possibly go wrong will. Keep a backup, or better yet two backups, of all your important files. Make

that three, one of which is outside of NZ. In the final stages of preparation it is important to allow sufficient time for the seemingly endless cycle of proof-reading, spelling checks, correction, supervisor's reading, supervisor's corrections, proof-reading again etc. If this is left to the last minute then your supervisor, who has many other responsibilities, will not have time to provide adequate feedback, and your report will lack the polish and punch that graders are looking for. This can have a serious effect on your final grade.