Memorandum

To: MSSE Students and Faculty
CC: CDTL Staff
From: Dr. Mats Heimdahl, DGS
Date: 7/15/2002
Re: Plan B project requirements and procedures

Overview
This document outlines the expectations on a Plan-B project for the Master of Science in Software Engineering degree. The document also outlines the procedures to define a project, select an advisor, assemble a committee, and execute and present the project.

The Plan-B Project
To graduate with an MSSE degree, students must demonstrate familiarity with the tools of research or scholarship in their major field, the ability to work independently, and the ability to present the results of their investigation effectively, by completing a Plan B project. Thus, the project should be selected to highlight the student’s knowledge of the field, problem-solving skills, ability to perform an independent investigation, and proficiency in written and oral communication.

The Plan B project should involve a combined total of approximately 120 hours (the equivalent of three full-time weeks) for a student familiar with relevant research in the topic area of work. Should the student lack background in the project area, a significantly larger time commitment is expected.

Project examples
A project can take on many shapes and forms. Below is a (non-exhaustive) list of examples.

♦ **Software Implementation**: Finding an interesting problem, capturing the requirements, designing and implementing a solution, and documenting the work. The problem may be found in a research group in, for example, the CSE department or the student’s own work environment. The problem could also be associated with the educational needs in the MSSE program or the CSE department.

♦ **Technology Evaluation**: Evaluating and comparing new emerging technologies, tools, and techniques.

♦ **Process Assessment and Improvement**: Evaluating and documenting the current state of an organization, identify problem areas and potential solutions, and suggesting and documenting an improvement plan.
Literature Survey: Perform an extensive literature survey of some topic (where no comprehensive survey is currently available). The survey should be in the line of ACM Computing Surveys, but does not have to be quite at that depth and detail.

Plan B Procedures

The plan-B project is scheduled as a course during the student’s last semester in the MSSE program. However, the students are encouraged to find an advisor and start the project well in advance of the last semester. Working ahead of schedule and completing the project before the end of the last semester is encouraged.

The plan-B project follows a few reasonably well-defined steps (all discussed in detail in the following sections). The project progresses as follows:

1. Identify a suitable project and prepare a project proposal
2. Identify an advisor and prepare a project plan
3. Register the project with DGS
4. Prepare a status report to demonstrate you are making progress
5. Prepare a draft report
6. Prepare a final report and submit to your committee
7. Present your project
8. File for graduation!!

The various steps in the process can be approached as discussed below. The timeline is approximate and the due dates for each year will be announced for each year-class.

Identify a project and prepare a project proposal (fall semester and Christmas)

Your project shall demonstrate your proficiency in the area of software engineering. As an advisors and committee members we are looking for something that is interesting and reasonably novel (the exact program, survey, or study does not exist already). In short, as committee members we want to feel like we have learned something when we walk away from your presentation. Note here that your project must be of reasonable scope—you will not be able to solve all the world’s problems. Selecting a too ambitious project is the most common mistake. If you are faced with a huge project, pick the most interesting subtask or consider a team project (see below).

In your project proposal, you must include:

1. The project title
2. Description of the problem (what is the problem you are solving?)
3. Description of related work (why is this a problem?)
4. What you propose to do (how will you solve this problem?)
5. Some evaluation or completion criteria (how do you know if you have solved the problem?)

All of this shall be no more than one (preferred) or two (if you absolutely need it) pages.

Identify an advisor and prepare a project plan (first two weeks of spring)

To find an advisor we suggest you think of possible faculty in this order (1) the faculty you have had in your courses, chances are they are the right people for a project in the MSSE program, (2) other faculty in the department of computer science and engineering, check their web pages to see in what they are interested, and (3) use the DGS (Mats Heimdahl for 02-03—msse-dgs@cs.umn.edu, 612-625-2068) and discuss possible advisors with him/her.
With your newfound advisor, you revise your project proposal and come up with a draft schedule. This revised and expanded project proposal will act as your project plan.

Register the project with DGS (second week of spring semester)
After you have found your advisor and prepared your project plan, you must register the project and advisor with the DGS via email. A form for doing this together with instructions is included at the end of this memo. Send the forms to msse-dgs@cs.umn.edu.

Prepare a status report to demonstrate you are making progress (9th week of spring semester)
As you are working with the project we expect you to make continual progress during the spring semester. At the middle of the semester we want you to notify the DGS of the project status via email so we can track the progress of the students. Note here that projects that start to slip and are not presented at the scheduled presentation times in May (or shortly thereafter) are likely to never be presented. The graduation rate for students that have not presented their projects by the end of the summer is very low. Stay on schedule and work on your project—do you really want to spend two years in the program and have nothing to show for it?

A form for status reporting is included at the end of this memo. Again, this will be sent to msse-dgs@cs.umn.edu.

Prepare a draft report (12th week of spring semester)
As the end of the semester approaches, you must prepare a draft report and discuss your work with your advisor. Typically, you will need to make major revisions and additions to your report and you need some time to prepare the final report.

Prepare a final report and submit to your committee (14th week of spring semester)
Based on the discussions with your advisor (and possible several drafts), you will now have a final report. This report must be disseminated to your committee members. Your committee will be assembled in collaboration with your advisor, CDTL, and the DGS. The exact procedures of how to assemble a committee are currently under revision and will be clarified later on the spring of 2002.

Present your project (end of spring semester)
The project must be presented in what is called an “oral examination”. In essence, you will explain why what you did was important, present what you did, and present your conclusions and lessons learned. This “exam” shall last no more than about 1 hour total. This hour includes time for questions and discussion so your actual talk (and possible demonstration) should not take more that at the most 40 minutes.

The presentation is in front of your committee (this procedure may change in the future).

File for graduation!!
If successful, the committee will sign the paperwork declaring that you have successfully completed your plan-B requirements. Note here that you should be successful—you r advisor should not let you go through with the presentation unless you have completed an acceptable project with an acceptable report. CDTL will collect the forms and file for your graduation. You should receive your diploma some months later. Congratulations!
Working in Teams
The students in the MSSE program are allowed and encouraged to do their plan-B project in small teams. Should you choose to work in a team, the project should be more ambitious and larger than an individual project. The project advisor determines the acceptable size and scope of a team project.

Students planning a team project should keep the following in mind:

1. The project overview may be presented as a team.

2. Each member of the team should be responsible for a clearly identifiable piece of the project that can be presented individually.

Thus, it is possible that a team may have members that pass the final oral examination and other members that fail. Each student’s contribution to the project as a whole must be clear.

Not Getting it Done
As mentioned above, if you do not get the project completed the summer of your graduation year, the chance of getting done dramatically decreases—if you do not get your project done, you will not get your degree. If this is not incentive enough, there are other consequences of not completing your project on schedule.

1. Your computer account here at the U expires the month of your scheduled graduation. If you still have project work to complete, we can file for a short extension. If you take too long though, you will have to pay the computing fees for the fall (and subsequent semesters) out of your own pocket. The cost varies from year to year, but it is not small change.

2. If you do not complete your project within a year of taking your last course, you will be removed as an active student. This means you will have to enroll again as a student and this involves a couple of hundred dollars in fees. You must also enroll for (and pay for) at least one more credit. Again, this money will come out of your own pocket. There is also a “late Plan-B fee” charged by CDTL to cover the administrative headaches of enrolling a student again and preparing for the presentation.

The University procedures mentioned above are subject to change without notice and if you are in this situation you are encouraged to discuss what to do with the MSSE DGS or CDTL staff.
Project and Advisor Reporting Format
When you have selected a project, found an advisor, and prepared the project plan, please email the DGS (msse-dgs@cs.umn.edu) the following information.

Put <MSSE Plan-B 200x> (where x is the graduation year) in the Subject line.

Example: Subject: MSSE Plan-B 2002

In the body of the mail you have to provide

1. The title of your project
2. Project abstract (one to two paragraphs)
3. Name of your advisor
4. Email of your advisor

Example:

Project Title: Exploratory Analysis of Software Specifications

Abstract:

Computer software plays an important role in safety-critical computer controlled systems. Examples include medical devices, transportation systems, and avionics systems.

Currently, the state-of-the-art in software development for critical systems does not provide industry with the theory, tools, and techniques to produce software of high-enough quality.

Previously, we investigated how safety-critical software can be specified (write down what the software must do), a crucial step when developing high-quality software, and how to test a specification to see if it behaves as expected. Our proposed project will investigate how mathematical techniques can be used to complement the testing efforts. These static analysis techniques will assist systems and safety engineers to systematically evaluate the safety of a proposed software system, a task that today is rarely done. This work will help engineers to, dramatically improve the quality of critical software controlled systems, reduce cost, and--most importantly—enhance safety.

Advisor: Mats Heimdahl

Email: heimdahl@cs.umn.edu
**Progress Reporting Format**

This report is simply to make sure you are making progress on your project. The report must indicate if your project is progressing according to plan and when you plan to present your project. Send the report to the MSSE DGS (msse-dgs@cs.umn.edu).

Put <MSSE Plan-B Progress 200x> (where x is the graduation year) in the Subject line.

**Example:** Subject: MSSE Plan-B Progress 2002

Your progress report must include the following:

1. A statement if you are on schedule (behind schedule, on schedule, ahead of schedule)
2. A statement about when you plan to present your project (ahead of scheduled presentations, on the scheduled dates, after the scheduled dates). If you indicate you will present your project late (after the scheduled presentation times at the end of the semester), you must explain why and an estimate of when you will be able to present your project. Note again that projects that are not presented before the end of the summer after the completion of classes are likely to **never** be presented! Do you really want to risk spending two years in the program and have **nothing** to show for it?

**Example:**

Status: Behind schedule

Presentation schedule: After the scheduled dates.

Explanation: A consulting assignment has kept me out of the cities during the last two months. I have commuted back from Timbuktu for classes every week and I simply have not had any time to work on the project. My consulting assignment will be over in early May and I will devote all my time to the project starting when I get back. In consultation with my advisor, we have revised the schedule and I will be able to present my project by the end of July.