ASSIGNMENT IN THE COURSE SOFTWARE PRODUCT LINE ENGINEERING (DAT165)

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1 Introduction

The following assignment is mandatory in the DAT165 course, held at Chalmers in the autumn of 2008. It aims to give practical and real-world experience of software product lines (SPL) in industry, as well as give students a closer connection to relevant companies in the surrounding area.

The assignment is thus an important and major part of the course. **Students are expected to put a lot of effort into making the assignment a success, both for themselves and for the companies involved.** Companies that commit to your study and give you access will expect you to give something substantial back to them.

1.1 Deadlines and Dates

20081119 12:00 – Company information mail sent to Robert Feldt
20081126 08:00 – Draft of report with complete case study design sent to Robert Feldt
20090109 08:00 – Assignment report as PDF mailed to Tony Gorschek
20090112 13:15 – Assignment presentations 1 (schedule given later)
20090113 08:00 – Assignment presentations 2 (schedule given later)

All deadlines are hard deadlins; if you miss them you fail the assignment. There are no exceptions so do not ask for any.

1.2 Groups

The assignment will be carried out in groups of 4 students. The groups will be decided on by the teachers and presented on the course home page.

1.3 Formatting and submission

The assignment is to be reported using the IEEE Conference Proceedings template (available on the course homepage, http://trind.dyndns.org/~feldt/cth/sple). You should follow all rules specified by IEEE, i.e. also for references etc. The report shall:

- be no less than 12 pages and no more than 15 pages using the IEEE template, and
- include a minimum of 15 peer-reviewed references.

The reports shall be submitted via e-mail in PDF format. All e-mail communication with the assignment responsible shall have a subject line starting with the keyword ”DAT165” followed by the assignment title and the last name of the corresponding author of the report (e.g. “DAT165: Case Study (Lastname)”). The e-mail body shall include the names, surnames and email addresses of all group members.

After submitting the assignment the corresponding author will get a confirmation via email that the assignment has been received. It is the responsibility of the student/group to assure that the assignment is sent to the assignment responsible on time, missing a deadline equals an automatic fail grade on the assignment.

Please note that we present a range of page limits above. It is not a given that it is better to write longer; if you are able to write in the shorter end of the range, we welcome and encourage this. Your grade will be based on the quality of your work and report, in any case. References may extend to one or more pages in addition to the presented maximum number of pages, and the format of the references should follow the format given in the IEEE template. References should primarily be from sources of high quality (ACM, IEEE and similar journals and conferences). Web references and similar should be the exception (and are not counted as peer-reviewed).

1.4 Presentation

Each group will present their findings to the class as a whole. You will have 15 minutes for your presentation, and then 15 minutes for questions from opponents and the teachers. Be sure to use your time wisely and focus on the most important aspects. Don’t spend precious time on irrelevant or general information.

You are expected to have prepared slides and have the talk in English. You should have a maximum of 8 slides so plan and use them wisely. Bring your own apparel for presentation (laptop etc); there is a projector with VGA cable in the presentation room that you can hook up to. If you have no laptop, borrow from a fellow student or notify Robert Feldt at least 2 days before your presentation. In the latter case you need to send your Powerpoint/Keynote/PDF presentation/file(s) to Robert Feldt at least a day in advance.

To have a good presentation you should have rehearsed it beforehand so you can give it in 15 minutes. Using less than 15 minutes is unprofessional and not ending with a nice summary/wrap-up is rude. Don't be unprofessional or rude.

Some general advice on doing good presentations is listed below. If you do not follow them your grade will be lower.

Do **NOT**:

- Stand in front of the presentation screen.
- Point to your computer screen. If you want to point to things on your slides point to the screen seen by everyone.
- Have "dense" slides with very much text, which take a lot of time to read. Instead, use graphics, figures, lists, tables etc to give overview and summarize. You have to limit what you can include! You should not have to rush through slides in the end.

- Mumble. Instead speak clearly and loud enough so that everyone can easily hear you.
- Have spelling errors or other errors in your slides.
- Spend too much time on setup, methodology and general information like that. Often it is better to start with specifics and results and spend the majority of the time on them.

Make sure that:
- Everyone in the audience can see your presentation screen.
- Explain what diagrams and graphs show. What are on the different axes? Different elements? Colours?

1.5 Opposition

Each student will be assigned an assignment report to oppose on. Your opposition should critically review the context, design and findings of the case study in the report. The opposition shall be directed towards a constructive review and questioning of the respondent's work. As an opponent you shall not only question the work, but also bring forward alternatives. You shall strive for initiating and carrying on a conversation regarding the work.

Questions like: Why ...? How does this correspond with....? How come...? Have you considered....? are good for initiating discussions.

You should not focus on minor details like spelling etc. It is hard for the audience to follow and typically not the most critical part of a project. Instead focus on the most important issues and problems with the work.

1.6 Grading

A total of 40 points can be assigned to each assignment and counts towards your course grade (together with the 60 points max for the written exam). These 40 points are divided according to:
- maximum 32 points for the assignment report,
- maximum 5 points for the presentation,
- maximum 3 points for the opposition.

2 Case Study – Process Assessment and Improvement

Your assignment is to find a product development company (developing software or software intensive products) and perform a SPL process assessment and improvement of them. The company can either be in the region, in the rest of Sweden, or anywhere else in the world.

You are to plan and design a case study to investigate the company's product development process in relation to how product line concepts are (or can be) used. The company you choose can be using product lines explicitly, or use parts/some product line concepts, or none at all. Your choice of company dictates the assignment focus. If you choose a company that uses/has adopted product lines completely or in part you should use the BAPO Model (available in a paper on the course web page) to evaluate the product development process. You should follow BAPO and benchmark the company's process. The major focus after the process assessment is to look at state-of-the-art (peer-reviewed sources, course content etc) and compare what you found as a step in suggesting improvements.

If you choose a company that does not use product lines you should use the PLPA method (available in a paper on the course home page) to evaluate the potential of introducing product lines at the company. The major focus in this case is to develop a roadmap (overall plan and timeline) for the introduction of product line concepts (where relevant). This roadmap should be broken down into detailed recommendations of what practices/techniques/processes should be introduced. You recommendations should be based on peer-reviewed sources.

BAPO and PLPA are overview frameworks, and none of them delve deep into detailed processes/practices/techniques. You are expected to use the course material and other peer-reviewed sources to delve deep into every part as you perform your analysis and formulate your recommendations. For example, statements like "they should improve their scoping activities" is not enough, you need to concretely suggest how this is done, exemplify with e.g. techniques, and every part of this should be referenced properly to show what sources you cite as evidence for your recommendations.

You are allowed to expand/add aspects and questions not covered by the frameworks if you feel something is missing, see BAPO and PLPA as a mandatory base which you may need to expand to achieve the goals below. The goals of the case study are:

- Perform a SPL process assessment at the company using either BAPO or PLPA.
- (and in addition to BAPO/PLPA we expect you to elicit and report):
  - Short info about domain, products, customers/markets, technology (context)
  - The design of the study (selection, sources other than people, how the study was executed etc)
- Analyze collected data and compare it with:
  - a) the perspectives given in the course (i.e. cover the different perspectives from scoping, architecture, process/organization, business),
  - b) state-of-the-art in literature
- Present your findings and analysis with a concrete overall roadmap on how the company process can be improved (e.g. improve current product line use, or how to introduce product lines)
  - Present the "raw" findings of according to either BAPO or PLPA separately (if this takes too much space put the complete assessment in an appendix and summarize it in the actual report; the appendix pages are not counted in the 12-15 page maximum)
  - You main contribution is to look at state-of-practice in your company (what you get from using BAPO and PLPA), state-of-the-art in literature and given in the course, and make an explicit comparison, what is missing and why? What are the consequences of this?
  - Based on what is missing, suggest improvements to the process/techniques/practices. The improvements should also be discussed from a ROI perspective (covering such as initiation threshold, costs (e.g. training, introduction, tools etc), benefits and where and when these are planned to come through, and risks. All of this can be seen as a plan and justification for your recommendations.
  - Equally important as your suggestions as to what is to be improved/introduced at the company, is that you keep your recommendations realistic. See yourselves as

consultants where it is your job to actually help the company to improve, thus maximize the potential for ROI for every suggestion you make.

- On a meta level you are expected to shortly analyze and discuss how you found the framework (BAPO or PLPA) you used. Was it adequate, where parts missing, what parts? Give recommendations for improvement.

You are expected to contact the company (we recommend you do this sooner rather than later), and book times for interviews and other study related activities (e.g access to formal documentation etc). You also need to design the process assessment itself, this includes:

- Selection of whom to talk to (e.g. during interview(s))
- What questions to ask and what perspectives to cover (see BAPO or PLPA)
- What data/information sources to elicit in addition to interviews (e.g. study process documentation, design and architecture documentation etc). The more data sources you use in the assessment the greater the chance of triangulation and understanding. We will look favorably on a well designed and executed process assessment

In general you need to qualify your analysis and motivate your conclusions. The use of peer-reviewed references is a pre-requisite.

Except for the final deadline for submitting the complete assignment report there are two intermediate deadlines: Company info email and Case study design.

Company info email: You shall send an e-mail where you present which company you have contacted, which persons you are going to talk to in the company, their contact information, and the time for your meeting(s).

Case study design: You shall send the draft of your final report with a complete set of headings for the full report (as you plan to structure it) and with a completed case study design, as outlined above.