

DAT 165 Software Product Line Engineering

Exam

Monday December 15, 2008

Examiner

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Contact person during exam

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Allowed tools

Dictionary to/from English

General information

Numbers within parentheses show the maximal points awarded for each question.

Maximal points can be given if:

- The answer is correct.
- The presentation of the answer is readable and clear.
- The answer is given in English.

One sheet of paper may only contain parts of solutions belonging to one question.

Grading

In order to pass the course one need to:

- Pass the exam (min 30 and max 60 points).
- Complete and present the assignment, i.e. the industry case study (min 20 and max 40 points).

The course is graded Fail/3/4/5. The grades are based on the sum of exam and assignment results:

0 – 49 points:	Fail
50 – 66 points:	3
67 – 84 points:	4
85 – 100 points:	5

Results

Exam results will be available from the course homepage.

Review

Time and place will be announced on the course homepage.



1. Commonality and Variability

- a) What is a variation point? (1p)
- b) What is a variant? How does it relate to a variation point? (2p)
- c) Give examples of three realistic variation points in a software platform for a mobile phone? (3p)
- d) Describe two variants for each of the variation points in c above. (3p)

2. Orthogonal variability model

- a) What is the Orthogonal Variability Model (OVM)? Describe it in detail. (2p)
- b) Describe three different artifacts from traditional, non-SPLE Software Engineering projects and show how the OVM could be used to capture variability in them. (3p)
- c) What are the benefits of using the OVM? (1p)
- d) What are the drawbacks of using the OVM? When is it hard to use? Why? (2p)
- e) Discuss some alternatives to the OVM, describe them and how they could improve on some of OVM's drawbacks. (2p)

3. Domain engineering roles

Describe the central roles in the process of Domain Engineering, describe each shortly and characterize their interdependencies (hint: interdependencies=how they interact and/or what they deliver or get from each other). (5p)

4. Requirements engineering in SPLE

- a) Describe how requirements engineering differ for Domain and Application Engineering. (2p)
- b) Name two commonality analysis methods in Domain Requirements Engineering, describe how they are used as well as one positive and one negative thing (each) about their application/use. (2p)
- c) Name, describe and discuss trade-offs in/between (up to four) different Domain Realization Strategies. (2p)

5. Organizations for SPLE

For each organizational type below, shortly characterize and give two positive aspects and two negative aspects from a SPLE perspective.

- a) Product oriented organization (2p)
- b) Process oriented organization (2p)
- c) Matrix organization (2p)

6. To go for SPLE or not – that is the question

Read the scenario stated below and then answer the questions.

- a) Give at least two solid and non-trivial arguments **for** adopting a SPLE approach. (2p)
- b) Give at least two solid and non-trivial arguments **for NOT** adopting a SPLE approach. (2p)

- c) What information would you need in order to take a more informed decision on whether to go for SPLE or not? Describe the type of information and how you would get it. (2p)

Scenario (question 6): You are a newly started company with 20 employees. Your domain is home entertainment systems, and you offer installations to both end-customers and companies. All of the core products you offer as a part the installation are bought in (e.g. amplifiers, TVs, projectors, speakers, DVD players etc). A core product, e.g. an amplifier, can be bought from any number of vendors, depending on price and opportunity. Your specialization is to combine the best products in a complete "solution" offering to the customer. This involves installing, configuring, connecting, and testing the solutions properly. Your company does develop some products also, namely a universal control system (you have two variants, wired and wireless where the wired is usually installed in company settings as reliability is crucial). The control system connects all products and is comprised of hardware (the unit) and software for communication with the different core products. A selling slogan for your control system is "dim the lights, turn on DVD, Receiver, Amplifier, TV, with the press of one button".

7. Transitioning to SPLE

You work in a company that develops NAS:es (Network attached storage) for home and small business users. Your company currently sells three different systems and is now looking to expand their business by offering new budget versions of the systems that target new market segments and new markets. Up until now you have developed each NAS as a single system development but you reuse large parts between the systems in an ad-hoc manner.

- a) What would be your main motivation and potential risks/disadvantages with moving to a SPLE approach? List three major benefits and three risks/disadvantages. Motivate your answer. (3p)
- b) Recommend and describe a transitioning strategy for your company when transitioning to SPLE. Why that one? (2p)
- c) Describe a roadmap for the transition, i.e. which transition tasks should be done and in which order? (3p)

8. Future of SPLE

Given the knowledge you have gained about SPLE, how do you think that the area will develop in the future? Discuss the SPLE field based on the BAPO model and consider both how the area itself will develop and how it will be used in the areas of Business, Architecture, Process and Organization. (10p)

Total: 60p