



TENTAMEN/EXAM

**Kurs/course: Programvaruteknik / Software Engineering
(5DV087)**

Ansvarig lärare/responsible teacher: Jürgen Börstler

Datum/date: 2009-04-21

Tid/time: 13.00-17.00 (4 timmar/hours)

Kod/code: _____

Instructions:

- You can answer in English or in Swedish
- **Write your code and the question number in the upper right of every page**
- Motivate your answers and explain all assumptions
- Please do the following to speed up correction time:
 - Write only on one side of the paper
 - Start a new page for every question
 - Order your papers by question number
 - Mark all questions you have answered
 - Leave a margin for comments

Exercise number	X	Points
1		
2		
3		
4		
5		
6		
7		
8		
TOTAL		

Thanks and good luck, lycka till, viel Glück!

Please mark exercises you have solved in column X.

This page must be returned together with your answers.



Question 1 (4p)

Describe and discuss the main differences between agile and traditional software development processes. If possible, use the four statements (values) of the Agile Manifesto as a basis for this discussion.

Question 2 (3+2p)

- (a) Describe the basic principles and problems of *algorithmic* cost modeling/estimation; use COCOMO as an example.
- (b) What are cost drivers? Why are they needed and how are they used? Give at least two examples.

Question 3 (1+4p)

- (a) Describe the idea of design patterns.
- (b) Describe a particular design pattern and discuss how this pattern's usage can improve a software design.

Question 4 (3+1+2p)

In the lecture, we have talked about functional requirements, non-functional requirements and business rules.

- (a) Describe each of these three terms and give an example for each.
- (b) Why is validation of non-functional requirements particularly difficult?
- (c) Formulate concrete examples for non-functional requirements that are reasonably easy to validate (you get credits for at most four).

Question 5 (3+2p)

- (a) Name and describe at least two graphical notations for requirements documentation.
- (b) Give a small example for each of them.

Question 6 (3p)

- (a) What are formal inspections? Please explain what characterizes formal inspections and how they are carried out.



Question 7 (2p)

What is traceability? Why is it important and how can it be supported?

Question 8 (1+2+6p)

- (a) What is the main purpose of testing?
- (b) Explain the main idea behind coverage-based testing to develop test cases.
- (c) Develop test cases for reaching branch coverage for the following example:

```
function binSearch (var a: array [1..n] of integer;
                   left, right, key: integer): integer;
    var middle: integer;
begin
    found := false;
    while (left <= right) and not found do begin
        middle := (left + right) div 2;

        if a[middle] = key then
            found := true
        else if a[middle] < key then
            left := middle + 1
        else
            right := middle - 1
    end;

    if found then
        binSearch := middle
    else
        binSearch := 0
end;
```