



Software Engineering (5DV003)

1st exam, fall 2007

Writing time: 9:00–13:00 (4 hours)
Aids: None (inga hjälpmedel)
Exercises: 8
Points: 35

Instructions:

- You can answer in English or in Swedish
- Write your name 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:
 - Start a new page for every question
 - Write only on one side of the paper
 - Order your papers by question number
 - Mark all questions you have answered
 - Leave a margin for comments

Thanks and good luck, lycka till, viel Glück!

Question 1 (4p)

Effort or cost estimation is an important step in project management. Describe two different approaches to achieve accurate estimations and compare their advantages and disadvantages.

Question 2 (3+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) Give some examples for non-functional requirements (you get credits for at most four).

Question 3 (4+2p)

In project management PERT charts can be used to describe a project graphically.

Task	Predecessor	Expected duration (days)
A	none	9
B	A	12
C	B	3
D	C, H	7
E	A	11
F	none	8
G	F	14
H	E, G	5

- (a) Draw a PERT chart for the project described by the tasks in the table above.
- (b) Determine the critical path in (a) and describe its importance for project management.

Question 4 (4p)

What is an architectural style? Name and describe at least two architectural styles together with their respective advantages and disadvantages.

Question 5 (1+1+2p)

- (a) Explain the design principles of coupling and cohesion.
- (b) Explain why a high degree of coupling in a software design can make maintenance very difficult.
- (c) How could you measure coupling and cohesion? Propose at least one measure for coupling and one measure for cohesion and explain how these measures could be used to determine coupling and cohesion.

Question 6 (1+1p)

- (a) What is the difference between test cases and test data?
- (b) Why is it important to carefully document all tests?

Question 7 (1+2+5p)

White-box and black-box testing are the two most common test methods for software.

- (a) What are the main differences between white-box and black-box testing?
- (b) Explain the main idea behind coverage-based testing to develop test cases.
- (c) Apply white-box testing to the following example:

```
function gcd( x, y: integer): integer;  
(* Precondition: x,y > 0 *)  
begin  
    while x <> y do begin  
        if x > y then  
            x := x-y  
        else  
            y := y-x  
        end;  
        gcd := x  
    end;  
end;
```

Question 8 (2p)

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