Software Engineering
(Programvarumetodik / Programvaruteknik)
Exam, 2002-08-14

Lars-Henrik Eriksson
Institutionen för informationsteknologi
Uppsala Universitet

Duration 09:00 - 14:00.

- Start by reading all the questions to see if anything is unclear. I will come by around 09:45 to clarify questions.
- You will be provided with a form which **must** be used as the front page for your answer sheets.
- Answers may be written in Swedish or English, or any reasonable mixture of those.
- Don't use a red pen!
- Leave a margin on each sheet for comments. It is best if you use answer sheets with preprinted margins.
- Swedish-English (or your-native-language-English) dictionaries may be used.
- **Important instructions about how to answer. Failure to comply with these items may cause delayed grading, or a points deduction, or both**.
  - Don't put the answer to more than one question on each sheet!
  - You should not need more than one page for the answer to each question (given a normal size handwriting). You must not use more than two pages.
  - The handwriting should be easy to read and the answers easy to understand.
- The maximum number of grade points you can get from the exam is 44 or 50, depending on the version of the course you were taking. To this you should add the credit you got from participation and (for "Programvaruteknik" – the 4/5p version of the course) assignments while taking the course. For "Programvaruteknik" these can be at least as many as you can get from the exam itself. E.g. a DVP student with full bonus credit (50 points) need only 8 points on the exam to pass the course!

Number of points required for the various grades (*estimates – could be changed*).

Course	Grade	Points
Programvarumetodik, 2p	3	27
(max bonus 10)	4	38
	5	45
Programvarumetodik, 3p	G	27
(max bonus 10)	VG	41
Programvaruteknik, 4p	G	58
(max bonus 50)	VG	75
Programvaruteknik, 5p	G	70
(max bonus 70)	VG	90

Good luck!

Lars-Henrik

1. (4p.) Describe the "V" model for validation and verification. You must briefly explain the various parts of the model – simply making a drawing with labels is not sufficient.

2. (4p.) Give two examples each of: a) functional product requirements, b) non-functional product requirements, c) process requirements

3. (6p.) Requirements can be formulated in various languages: natural languages, semi-formal languages and formal languages. For each class of languages: a) what are its two most important advantages?, b) what is the most important risk of using such a language?

4. (6p.) a) What are the steps of designing a system? b) Why is there no hard border between requirements specification and design? c) How is the design process altered if many reusable components are available?

5. (6p.) Explain the four dimensions of dependability: availability, reliability, safety and security.

6. (6p.)
a) What is "defect testing"?
b) What is the other main kind of testing called and how does it differ from defect testing?
c) Name one kind of non-functional requirement for which defect testing is an appropriate verification technique and one kind for which it is not appropriate. Motivate your answer!

7. (6p.) Would you want to work in a company that fully applies the Cleanroom model in every project, and that only accepts projects for which the Cleanroom model is suitable? Motivate your answer. (Since both "yes" and "no" and even "it depends" are correct answers, points are given for motivation only. Your motivation must show that you know what Cleanroom is.)

8. (6p.) A quality management system defines several different quality management activities. What are the main activities and how do they relate to the individual software development project?

Question number 9 is for students taking the 4/5 point version of the course ("Programvaruteknik") ONLY. These students are primarily DVP students.

9. (6p.) Give arguments for and against the statement that "Formal Methods is the Silver Bullet"