

Testing and Verification (DIT085)

Final Examination - May 25, 2015

Important Notes. It is not allowed to use study material, computers, and calculators during the examination. The examination comprises 4 question in 2 pages. Please check beforehand whether your copy is properly printed. In order to obtain a VG you need to obtain 80/100, for a G you need to obtain 60/100. Give complete explanation and do not confine yourself to giving the final answer. The answers may be given in Swedish or English. The solutions to the exercises will be available after the examination through the course page. **Good luck!**

Exercise 1 (20 points) Define the following concepts:

1. Bezier testing levels,
2. static analysis,
3. meta-scenarios in VGT, and
4. all-use coverage.

Exercise 2 (50 points) Consider the following program.

```
1: Input(x);
2: Input(y);
3: while x < y then
4:   x := x + 1;
5: end while
6: if y <= 20 then
7:   y := y + x;
8: end if
9: x := 2 * y
10: Output(x);
```

1. Draw the control-flow graph of the program (5 pts),
2. Calculate all prime paths of the control-flow graph. (10 pts),
3. Define a test suite that satisfies all DU-paths testing; for each test-case give the DU-path covered by it (10 pts), and
4. Calculate $Slice(10, \{x\})$. The final solution is not sufficient; you need to elaborate on the steps towards the final solution (include the relevant variables and the approximations towards the final slice). (25 pts)

Exercise 3 (20 points) Consider the following properties in the TCTL language. Describe them in words (English/Swedish):

1. $\langle \rangle$ deadlock (5 pts),
2. $A[]$ (m.s and (not mp.sp)) (5 pts),
3. $m.s \rightarrow mp.sp$ (10 pts),

Exercise 4 (10 points) Regarding Visual GUI testing, explain the benefits of VGT (versus GUI model testing and manual GUI testing).