Vrije Universiteit, Department of Computer Science

Examination paper for **Software Testing**
29 May 2012 15:15-18:30 M639,M655

This is a closed book written exam.

No printed material or electronic devices are admitted for use during the exam.

The answers have to be given in English or Dutch.

Both homework and exam are compulsory and graded on a 1 to 10 scale.

The exam grade is calculated as (Q1+Q2+Q3+Q4+Q5 +10)/10.

The final grade is calculated as 0.4*homework + 0.6*exam

A pass is given if both homework and exam components are >= 5.5.

	Q1	Q2	Q3	Q4	Q5	ΣQi	Maximum credits= (ΣQi+10)/10
a)	3		3				
b)	3		12				
c)	5						
d)	5						
e)	7						
f)	7						
Total	30	10	15	10	25	90	10

Good luck!

Q1. Concepts [30p]

a. What is a latent fault? Give an example [3p]
b. What is an equivalent mutant? Give an example [3p]
c. Define the terms "verification" and "validation". Show the place of validation and verification in the V model diagram of the testing process.[5p]
d. Give 5 criteria that can contribute to the decision to stop testing. [5p]
e. Take 2 regression testing techniques and explain how they work. [7p]
f. Explain how test driven development works. Give one advantage and one disadvantage of this method. [7p]

Testing from requirements [35p]

Q2. [10p]

Consider a program that takes in an element and an array as arguments, searches through the array for the element, and returns a result depending on whether or not the element is found in the array.

Generate test cases for this program by using a multidimensional equivalence partitioning.

Q3. [15p]

Admission to Stateless University is made by considering a combination of high school grades (GPA) and ACT test scores. The entry requirements are:
ACT <= 36, GPA <=5, 10GPA+ACT >= 71.

a) Draw the valid input domain. [3p]
b) Generate test cases to cover these boundaries using the 1x1 domain analysis process.[12p]

Q4. [10p]

Given the following requirements:

[76] The system shall calculate discounts for members.
[77] The system shall calculate a discount of 5% if the value if the value of purchase is less or equal than 100 euro. Otherwise the discount is 10%.
[78] The system shall write the discount % on the invoice.
[79] The system must wrote in the invoices to nonmembers that membership gives a discount.

Design test cases using a decision table to test the calculation and printing on the invoice. The validity of inputs and calculation correctness will be tested elsewhere.

Q5. Code based testing [25p]

Consider the following pseudocode for the routine `maxsum`, that returns the sum of all integers from 0 to value, unless this sum is less that maxint. Otherwise it returns the message "too large".

```
1 PROGRAM maxsum ( maxint, value : INT )
2 INT result := 0 ; i := 0 ;
3 IF value < 0
4 THEN value := - value ;
5 WHILE ( i < value ) AND ( result <= maxint )
6     i := i + 1 ;
7     result := result + i ;
8 END:
9 IF result <= maxint
10 THEN OUTPUT ( result )
11 ELSE OUTPUT ( "too large" )
12 END.
```

a) Draw the control flow graph [3p]
b) Generate a test suite that achieves 100% statement coverage. [5p]
c) Generate a test suite that achieves 100% decision coverage. [5p]
d) Generate a test suite that is adequate with respect to the all-uses criterion [7p]
d) Generate a mutant and show a test case that will kill it. [5p]