Test Model-tentamen-SWT-2021

Test instruction

Proctorio information
- If you intend to use blank paper, during you desk scan please show the pages on both sides to the camera before you start the exam, to demonstrate that they are unwritten.
- If you forgot to make a deskscan instead of a roomscan, we would like to ask you to show your desk now to the camera and all the allowed materials on it.
- If you encounter technical problems during the exam you can use the Proctorio live chat in the widget, extension or at proctorio.com/support. If you really can't be helped by Proctorio's live chat, send an email to onlineproctoring.soz@vu.nl.

This is a closed book individual written exam.

No printed material or electronic devices are admitted for use during the exam.
You can use white schratch paper during the exam which you have to show to the camera in the beginning of the exam.

The answers have to be given in English.

The exam is graded on a 1 to 10 scale.

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

The final grade is calculated as 0.6*GROUP + 0.4*INDIVIDUAL
where INDIVIDUAL = BUG-HUNT * 0.7 + EXAM *0.3

A pass is given only when both INDIVIDUAL and GROUP components are >= 5.5.

Question 1 – Model−Q1a – 253288.1.0

Model-Q1a. Enumerate and shortly describe four ways to perform integration testing of embedded systems. [10p]

Grading instruction

Criterion 1 (Number of points: 10)

Model-Q1b). Explain what symbolic execution is and show how it can be used to generate test inputs for this program. [10p]

```
   int x, y;
1  if(x > y){
2     x = x+y;
3     y = x-y;
4     x = x-y;
5     if(x - y > 0)
6        assert false;
7  }
8  print(x, y)
```

Grading instruction

Criterion 1   (Number of points: 10)

Question 3 – Model-Q1c – 253287.1.2

Model-Q1c. Enumerate five criteria that can contribute to the decision to stop testing. [10p]

Grading instruction

Criterion 1   (Number of points: 10)

Question 4 – Model-Q2 – 253285.2.1

Model-Q2. For the Therac-25 radiation overexposure accident in particular the Malfunction 54 failure, identify the accident, the hazard that caused it, the causal scenarios, the safety constraint that has been violated and imagine a test case that could have found the bug. [20p]

Grading instruction

Criterion 1   (Number of points: 20)

Model-Q3. Below you can find the specifications for a store software module that provides customer benefits. Generate test cases for this module using a decision table approach. [20p]

```
CUSTOMER
    If the customer is a new customer, offer 20% discount on next order
    If the customer is a repeat customer, offer free shipping

RISK LEVEL OF GOODS
    If the risk level of goods is high, then
        If the customer is a new customer, check their credit record
        If the customer is a repeat customer, then:
            If the past orders total > £500, fine
            Otherwise check their credit record
```

Grading instruction

Criterion 1   (Number of points: 20)

Model-Q4. For this pseudocode snippet:

1. Read Weight (w)
2. Read Height (h)
3. IF w > 400 THEN
4. Print "invalid weight"
5. ENDIF
6. If h > 3 THEN
7. Print "invalid height"
8. ENDIF
9. BMI=w/(h*h)
10. Print ("BMI = " BMI)
11. IF BMI < 20 THEN
12. Print "underweight"
13. ELSE
14. IF BMI >= 20 AND BMI <=25 THEN
15. Print "ideal weight"
16. ELSE
17. IF BMI > 25 THEN
18. Print "overweight"
19. ENDIF

a) Generate a test suite that achieves 100% statement coverage. [5p]
b) Enhance if necessary your test cases from b) to achieve 100% decision coverage. [5p]
c) Generate a mutant and show a test case that will kill it. [5p]
d) Generate an equivalent mutant. [5p]

Grading instruction

Criterion 1   (Number of points: 20)