

## i Introduction

**Day of exam:** May 28th, 2018

**Exam hours:** 14:30 - 18:30

**Permitted materials:** None

**Read this page thoroughly**

**The assignment consists of five parts.**

The first part is this introduction, while you shall answer the next four sections.

### **Part 2 - Multiple Choice questions**

- 15 multiple choice questions
- 2 points for each correct answer
- Maximum score for part 1: 30 points

### **Part 3 - text exercises**

- 5 text exercises to be answered briefly and accurately.
- The number of points may vary from question to question.
- Maximum score for part 2: 30 points.

### **Part 4 - Use of test techniques**

- Two test cases.
- 10 points for the correct solution of each case.
- Maximum score for part 3: 20 points.
- In this part you can draw sketches as a supplement to your text answers. Read the last paragraph of this title page thoroughly.

### **Part 5 - Text about a given topic**

- Maximum score for part 3: 20 points

*If any tasks are unclear, you can make your own prerequisites. If so, please explain them.*

### **Sketching**

In this thesis you will be able to supplement 2 of the text assignments with digital handwriting assignment (assignments 4.1 and 4.2). You use the sketch sheets you are given. It is possible to use multiple sheets per task. See instructions for filling out the sketch sheet on the desk.

You may NOT hand in sketch sheets for any other assignments than assignments 4.1 and 4.2. You will NOT be given extra time to fill out the "general information" on the sketching sheets (task codes, candidate number etc.)

## 1 Question

**Which statement about static analysis is true?**

**Select an alternative:**

- Static analysis finds all faults.
- When properly performed, static analysis makes functional testing redundant.
- With static analysis, defects can be found that are difficult to find with dynamic testing.
- Compiling is not a form of static analysis.

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Maximum marks: 2

## 2 Question

**Non-functional testing includes ...**

**Select an alternative:**

- ... testing the quality attributes of the system including reliability and usability.
- ... testing to see where the system does not function correctly.
- ... gaining user approval for the system.
- ... testing a system feature using only the software required for that function.

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Maximum marks: 2

## 3 Question

**Which of the following could be a coverage measure for state transition testing?**

V Number of states that have been reached.

W The response time for each transaction.

X Number of transitions that have been exercised.

Y Number of boundaries have been exercised.

Z Specific sequences of transitions have been exercised.

**Select an alternative:**

- V, X and Z
- V, X, Y and Z
- W, X and Y
- X, Y and Z

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Maximum marks: 2

#### 4 Question

The different test design techniques can be used in several of the areas below. However, you should match them so that *all* the techniques are applied to the *most* suitable area.

Please match the values:

	Use case testing	EP and BVA	State transition testing	Decision table
Testing systems that calculates for postage for letters and parcels, based on the weight.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Testing Coffee vending machines.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Testing access control systems where the access is depending on certain conditions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Testing the accessibility of Graphical User Interfaces.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*EP and BVA: Equivalence partitioning and boundary value analysis*

Maximum marks: 2

#### 5 Question

What are the potential benefits from using tools in general to support testing?

Select an alternative:

- Greater repeatability of tests, reduction in repetitive work, objective assessment.
- Greater quality of code, reduction in paperwork, fewer objections to the tests.
- Greater quality of code, reduction in the number of testers needed, better objectives for testing.
- Greater responsiveness of users, reduction of tests run.

Maximum marks: 2

## 6 Question

Consider the following statements about regression tests:

- 1 They may usefully be automated if they are well designed.
- 2 They are the same as confirmation tests (re-tests).
- 3 They are a way to reduce the risk of a change having an adverse effect elsewhere in the system.
- 4 They are only effective if automated.

Which pair of statements is true?

Select an alternative:

- 1 and 3
- 2 and 4
- 1 and 2
- 2 and 3

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Maximum marks: 2

## 7 Question

Which of these statements about functional testing is true?

Select an alternative:

- Structural testing is more important than functional testing as it addresses the code.
- Functional testing is useful throughout the life cycle and can be applied by business analysts, testers, developers and users.
- Inspection is a form of functional testing.
- Functional testing is more powerful than static testing as you actually run the system and see what happens.

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Maximum marks: 2

## 8 Question

Which of these statements about reviews of specifications is true?

Select an alternative:

- Reviews are a cost effective early static test on the system.
- Reviews are not generally cost effective as the meetings are time consuming and require preparation and follow up.
- There is no need to prepare for or follow up on reviews.
- Reviews must be controlled by the author.

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Maximum marks: 2

## 9 Question

Which success factors are required for good tool support within an organization?

Select an alternative:

- Acquiring the best tool and ensuring that all testers use it.
- Adopting practices from other successful organizations and ensuring that initial ways of using the tool are maintained.
- Adapting processes to fit with the use of the tool and monitoring tool use and benefits.
- Setting ambitious objectives for tool benefits and aggressive deadlines for achieving them.

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Maximum marks: 2

## 10 Question

Beta testing is ...

Select an alternative:

- ... performed by customers at the software developer's site.
- ... performed by customers at their own site.
- ... useful to test software developed for a specific customer or user.
- ... performed by an independent test team.

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Maximum marks: 2

## 11 Question

**Which of the following best describes integration testing?**

**Select an alternative:**

- Testing performed to expose faults in the interfaces and in the interaction between integrated components.
- Integration of automated software test suites with the product.
- Testing to verify that the test environment can be integrated with the product.
- Testing to verify that a component is ready for integration.

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Maximum marks: 2

## 12 Question

**During an early period of test execution, a defect is located, resolved and confirmed as resolved by re-testing. However, it is seen again later during a subsequent test execution.**

**Which of the following is a testing-related aspect of configuration management that is most likely to have broken down?**

**Select an alternative:**

- Test documentation management
- Traceability
- Configuration control
- Confirmation testing

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Maximum marks: 2

## 13 Question

**What is the purpose of confirmation testing?**

**Select an alternative:**

- To confirm that the detailed logic of a component conforms to its specification.
- To confirm the users' confidence that the system will meet their business needs.
- To confirm that a defect has been fixed correctly.
- To confirm that no unexpected changes have been introduced or uncovered as a result of changes made.

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Maximum marks: 2

## 14 Question

**A test plan is written specifically to describe a level of testing where the primary goal is establishing confidence in the system. Which of the following is a likely name for this document?**

**Select an alternative:**

- System test plan
- Project plan
- Acceptance test plan
- Master test plan

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Maximum marks: 2

## 15 Question

**The *ISTQB Foundation Syllabus* establishes a fundamental test process where test planning occurs early in the project, while test execution occurs at the end.**

**Which of the following elements of the test plan, while specified during test planning, is assessed during test execution?**

**Select an alternative:**

- Test tasks
- Test team training
- Exit criteria
- Environmental needs

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Maximum marks: 2

## 16 Exercise 1 - Fundamentals of testing











a) One of the seven testing principles is "*The Pesticide Paradox*".

What does "*The Pesticide Paradox*" mean and how we can meet the challenges it describes.

b) According to the ISTQB's syllabus the fundamental test process consists of five main activities. Two of these are "*test planning and control*" and "*test implementation and execution*".

What are the other three main activities?

Fill in your answer here

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Words: 0

Maximum marks: 5














17 **Exercise 2 - Testing throughout the software life cycle**

a) Give a short description of the four test levels in the *V-model*.

b) What is the purpose of *non-functional testing*?

Give at least three examples of characteristics that can be tested by *non-functional testing*.

**Fill in your answer here**

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Words: 0













Maximum marks: 7

18 **Exercise 3 - Static techniques**

a) Give at least four examples of types of information gathered by static analysis tools.

b) Give at least two examples of special considerations you should be aware of when using static analysis tools.

Fill in your answer here

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Maximum marks: 6

**19 Exercise 4 EP/BVA**

a) *Equivalence Partitioning* and *Boundary Value Analysis* are test design techniques that are often used together on problems where the input values are chosen from a given set.













**Note:** The word "set" is here used in mathematical sense.

a) Is it possible for an input value to belong to multiple partitions if you are using *Equivalence Partitioning* as test design technique? Justify the answer.

b) What requirements must the set of input values fulfill to be used in *Boundary Value Analysis*?

c) If you are able to apply **both** *Equivalence Partitioning* and *Boundary Value Analysis* to the same functionality, which test values should you choose from a valid partition? Specify the values based on their position in the partition.

**Fill in your answer here**

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Maximum marks: 5

20 **Exercise 5 - Usability testing**

- a) What does the abbreviation HCI mean and what is the purpose of HCI?
- b) Which four levels of considerations (from most important to least important) do we have in the HCI framework?
- c) Explain what *Persona* is, and its purpose in the development process.

Fill in your answer here

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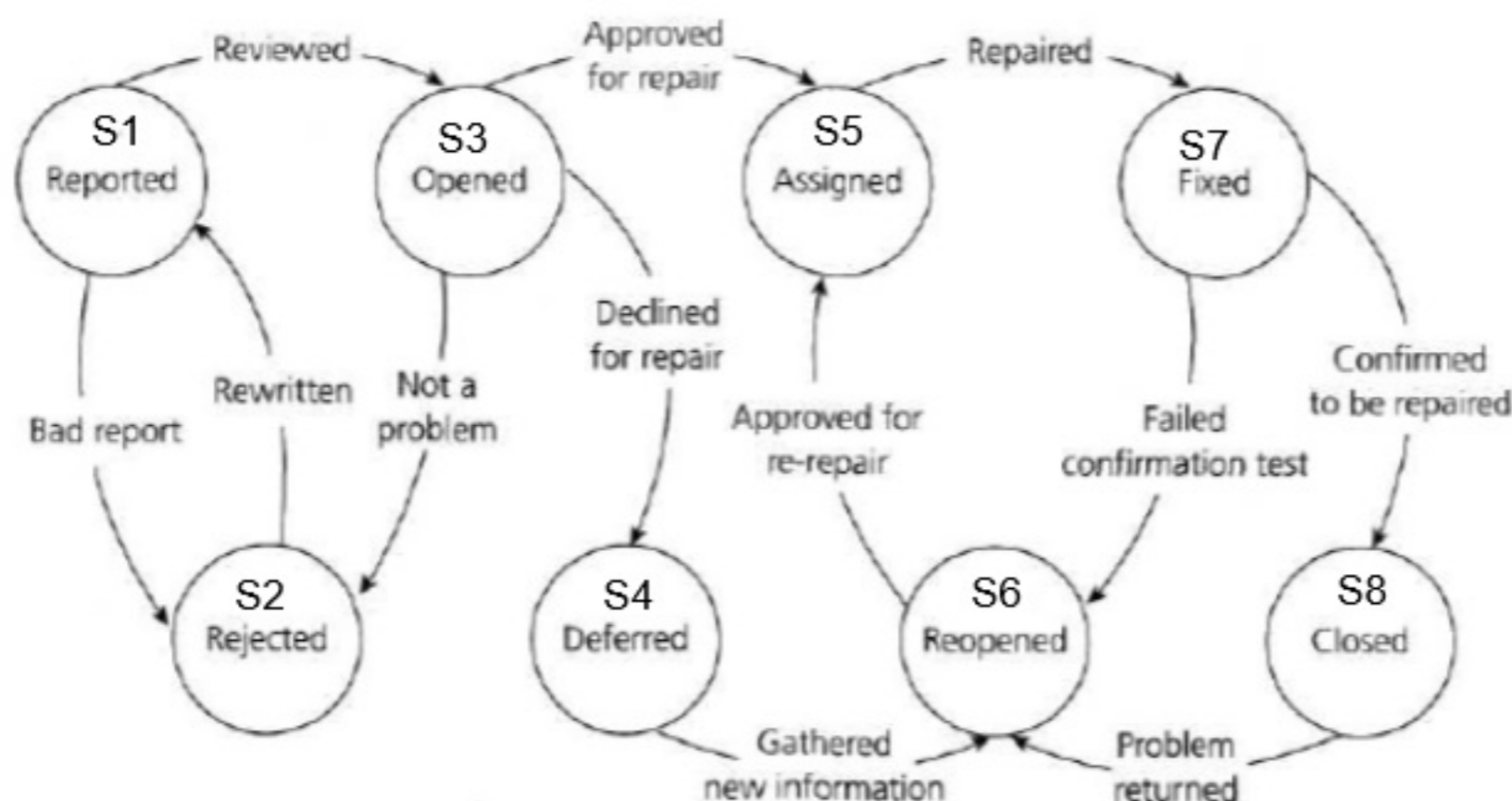
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Maximum marks: 7

21 **Case 1 - State transition testing**

In this task you can hand in sketches. Use the sketching paper handed to you in the exam room for this. See instructions on your desk.

Below you see a state diagram of the life cycle of an incident report.



- a) Imagine that a serious failure (incident) has been reported. Set up a test case for this scenario. The test case should be described as a path (sequence of states) from the incident is

reported (S1) to the incident report is closed (S8). You shall only follow valid transitions from one state to the next.

- What is *the state coverage* of this test case?
- What is *the transition coverage* of this test case?












**b)** Find the *shortest path* from the incident is reported (S1) to the report is closed (S8) which visits *every state*.

- What is *the state coverage* of this test case?
- What is *the transition coverage* of this test case?

**c)** How many test cases do we need to achieve a 100 % *transition coverage*? Justify the answer.

**d)** Which of the two types of coverage (*state coverage* or *transition coverage*) would you prefer as an *exit criteria*? Justify the answer.

**Fill in your answer here**

Format | **B** | *I* | U |  $x_2$  |  $x^2$  |  $I_x$  |  |  |  |  |  |  |  |  |  |  | ABC | 

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Maximum marks: 10

## 22 Case 2 - Decision table testing

In this task you can hand in sketches. Use the sketching paper handed to you in the exam room for this. See instructions on your desk.

A bank that offers mortgages uses a computer program to automatically assess loan applications. To get a loan, it is necessary that certain requirements for job, income and equity are met:

- Permanent job
- Minimum 15% equity (15% value of property)
- Maximum loan amount 5 times the income.

If the applicant does not have a permanent job but satisfies the other conditions, there is still an opportunity to get a loan. However, it requires that the application is processed manually. In this case the program will assign the applicant a case manager.

**a)** Draw a decision table which shows all the possible combinations of values the conditions may have. The decision table should include an action part.

**b)** Reduce the number of rules as much as possible without losing any information. Explain how you made the reduction.

However, it appears that many young people struggle to meet the banks requirements. The bank has therefore decided to reduce the requirement for equity to 10% value of property for people under 30 who buy their first home.

**c)** How many different combinations of values of conditions will there be in the decision table if all combinations are included? How does the number of conditions affect the use of decision tables?

**Fill in your answer here**

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Maximum marks: 10

**23 Write a text about reviews as a testing technique**

Reviews play an important role in the development process. Explain *review* as a testing technique by answering/discussing the following questions:

- What are the purpose and benefits of *reviews*?
- What are the fundamental steps for executing a *formal review*?
- What different kinds of *reviews* do we have?
- Which roles participate in the different kinds of *reviews* and what are the responsibilities of the different roles?
- Are reviews an efficient means of quality assurance? Justify your answer.
- What are the factors for a successful performance of *reviews*?
- Which testing principle is followed when using *reviews* in the early stages of the development process?
- How are static analysis and *reviews* related? Explain!

Fill in your answer here

Format | **B** | *I* | U |  $x_2$  |  $x^2$  |  $I_x$  |  |  |  |  |  |  |  |  |  |  | ABC | 

Words: 0

Maximum marks: 20