Lecture 14: Exam Preparation

Spring 2021

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Lectures

• Lecture 1 (11.02) – Introduction to Software Testing
• Lecture 2 (18.02) – Basic Black-Box Testing Techniques: Boundary Value Analysis & Equivalence Class Partitioning
• Lecture 3 (25.02) – BBT advanced: Combinatorial Testing
• Lecture 4 (04.03) – Basic White-Box Testing Techniques: Control-Flow Coverage
• Lecture 5 (11.03) – BBT adv.: State-Transition, Metamorphic, Random Testing
• Lecture 6 (18.03) – Test Levels, Test Tools, Test Automation
• Lecture 7 (25.03) – BBT adv.: Exploratory Testing, Behaviour Testing
• Lecture 8 (01.04) – BBT adv.: GUI / Visual Testing, Usability Testing, A/B Testing
• Lecture 9 (08.04) – Data-Flow Testing / Test-Suite Effectiveness: Mutation Testing
• Lecture 10 (15.04) – WBT adv.: Symbolic Execution, Static Code Analysis, Review
• Lecture 11 (22.04) – Defect Estimation / Test Documentation, Organisation and Process Improvement (Test Maturity Model)
• Lectures 12+13 (29.04 + 06.05) – Industry Guest Lectures + Advanced Topics
• Lecture 14 (13.05) – Exam Preparation
Exam Dates

- Exam 1: Thu 20-May, 10:15-11:55, via Moodle – no limit
- Exam 2: Thu 27-May, 10:15-11:55, via Moodle – no limit

You must receive

… at least 33% of the max. possible points from the homework assignments to qualify for the exam and

… at least 10 marks in the exam to not fail the course.

In total, you need at least 50 marks to not fail the course.

- Retake Exam (resit): Mon 14-June, 16:15-17:55
  - Please note that you must register for the retake exam at the latest 3 days before the exam date
Exam Dates

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The “or” is exclusive → Exam 1 xor Exam 2
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Study Regulation: “If the student is not present at the exam, mark ‘F’ (fail) should be inserted into SIS. If the students was sick, he/she should present medical certificate to Ülle Holm who will cancel the result.”
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The exams will be done via Moodle
Status after HW9: All active students have qualified for the exam

Homeworks total (60 max)

111 registered for exam (status: May 13)

100% of HW 1-9 [54]

100% of HW 1-10 [60]

33% of HW 1-10 [20]

gap > 6

9 of 128 students not qualified

119 of 128 students not qualified
You must register in SIS

8 qualified students have not yet registered for any exam!

10:15 - 11:55
Important:

If you are a 3rd year student and plan to defend in June, please register for the exam on May 20 and send me a direct message in Slack.

I will grade your exams first


Exams in Moodle

Exam 1

This is the first exam option. Exam 1 takes place on Thursday, May 20, and starts at 10:15. You must be registered in SIS for exam 1 (any of the three rooms is ok) if you want to take this exam. This must have happened at the latest by May 18.

The exam lasts 100 min and consists of two parts.

After 100 min the exam closes automatically and whatever you have filled into the answers will be saved and used for marking.

The maximum number of points is 30.

Part 1 [22 points] will be marked automatically (multiple-choice).

Part 2 [8 points] will be marked manually.

NOTE: You do not need to submit. At the end of the exam time, Moodle will automatically close the exam and submit the data you have entered up to that point. However, if you are sure that you have finished before the end time, you may submit yourself. Just keep in mind that you cannot re-open the exam. You only have one attempt.

Exam1-Part1+Part2

Part1 (questions 1-22) of the exam resembles what you did in the quizzes. Each question has one correct answer. These questions will be graded automatically.

Part2 (questions 23+24) of the exam are open text question. Please answer each sub-question by writing in the open text field. Clearly state to which sub-question (a, b, c,...) your answer relates. These questions will be graded manually.

Restricted Not available unless: You belong to Exam1-Students
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Example exams:
- Exam 2019 (Duration: 100 min)
- Exam 2018 (Duration: 100 min)
- Exam 2017 (Duration: 100 min)
- Exam 2016 (Duration: 100 min)
- Exam 2015 (Duration: 100 min)
- Exam 2014 (Duration: 100 min)

In 2020, due to COVID-19, the exam was conducted in Moodle in a different set-up. In 2021, the same set-up as in 2020 will be used. More information will be provided in Lecture 14.
Questions ?
Final Exam – Content/Topics Overview

- Introduction to Software Testing
- Basic Black-Box Testing Techniques
- Advanced Black-Box Testing Techniques:
  - Combinatorial Testing, Random Testing, Metamorphic Testing
  - State-Transition Testing & Exploratory Testing
  - Security, Usability and A/B Testing
- Basic White-Box Testing Techniques
- Advanced White-Box Testing Techniques:
  - Data-Flow Testing / Mutation Testing
  - Symbolic Execution, Static Code Analysis, Document & Code Review
- Quality Estimation / Test Documentation, Organisation and Process Improvement (Test Maturity Model)
Final Exam – Content/Topics Overview

Introduction to Software Testing:
• Know the basic terminology
  – Software Testing & Software Quality
  – Verification & Validation
  – Error – Fault – Failure
    • NB: Two competing definitions of ’Error’
  – Test Case – Test Suite – Test Oracle ...
  – Test Levels
  – Debugging
Final Exam – Content/Topics Overview

Black-Box Testing Techniques:

• Difference between Black-Box and White-Box Testing
  – Strengths & Weaknesses of each

• Know various BBT Techniques:
  – Equivalence Class Partitioning
  – Boundary Value Testing
  – Combinatorial Testing & Random Testing
  – Metamorphic Testing
  – State-Transition-Testing
  – Exploratory Testing
  – Security, Usability, and A/B Testing
Final Exam – Content/Topics Overview

White-Box Testing Techniques:
• Difference between Black-Box and White-Box Testing
  – Strengths & Weaknesses of each
• Control-Flow Testing
  – Know how to construct a Control-Flow-Graph
  – Know different coverage criteria:
    • Statement/Block, Decision/Branch, Condition, Linearly Independent Paths, etc.
• Data-Flow Testing,
• Mutation Testing
Final Exam – Content/Topics Overview

Static Testing (Reviews & Inspections):

• Document Reviews (Inspections)
  – Why needed?
  – What variants exist?
• Static Code Analysis
  – What are false positives?
• Symbolic Execution
  – What is the main idea?
  – How does it work (→ example)?
Final Exam – Content/Topics Overview

Test Lifecycle:
• Agile Testing
• Specifics of Testing OO Code
  – Intra-Class Testing (‘Stack’ Example)
  – Inter-Class Testing
• System versus Unit Testing
• Regression Testing
• Behaviour Testing
  – Gherkin
Quality Estimation:

- Types of estimation models
- Capture-Recapture models
  - How does it work (→ examples)?
- Reliability Growth models
  - What is the main idea?
Final Exam –
Type of Questions in Part 2

• You will most probably see code examples (incl. test code)
• You might have to add a test to achieve a certain coverage criterion
• You might have to check whether a mutant is killed by an existing test
• You might have to calculate what is covered by a test
• You might have to add a test to kill a surviving mutant
• Etc.
Final Exam –
Type of Questions in Part 2

• You might have to detect a code smell
• You might have to discuss a warning from a static code analyzer
• You might have to predict remaining faults (or the total number of faults)
• Etc.
Questions ?
Thank You!

and

Good Luck in the Exam!