JACOBS UNIVERSITY

Software Engineering (320212)

Final Exam Spring 2021

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Logistics

- You have 60 minutes for the test.
- Take "concrete" serious! Often answers are detailed insufficiently. More details allows us to find more nuggets.

Name:

(To be used for correcting, do not write into box below)

Task	1	2	3	4	5	6	7	8	9	10	11	Total
Total	3	4	4	4	3	3	5.5	5	6	4	4	45.5
Reached												

1 Software Engineering in General

Task 1 (3 pts): Break down the high-level, abstract term "Quality" to concrete product features and give one concrete and detailed (!) example of bad quality , including the negative effect that can occur.

2 Socio-Technical Systems

Task 2 (4 pts): Name two key issues <u>not</u> arising in purely technical systems (as compared to socio-technical systems), and describe how software developers can counter them.

3 Requirements Engineering

Task 3 (2+2 pts): At MemLeak GmbH you are tasked with writing a brief how-to on requirements specifications. Write down the section about "functional requirements" and "non-functional requirements" (including an explanation of their difference), using a suitable scenario (for example, a Web interface for network printers).

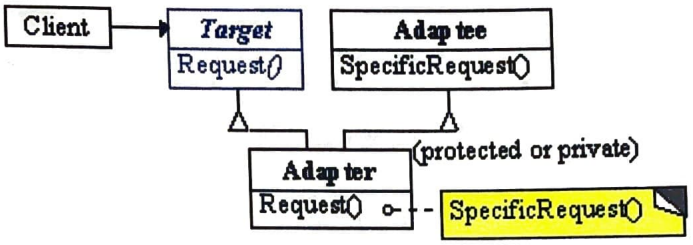
4 UML

Task 4 (4 pts): Draw a UML swimlane activity diagram describing how you book a cinema ticket online.

Hint: Consider you (customer), service application, and database backend as the actors involved.

5 Design Patterns

Task 5 (3 pts): Below find a UML description of the Adapter pattern. Explain how it works by walking through a complete request path explaining interaction with each class based on their methods.



6 Defensive Programming

Task 6 (3 pts): Your team mate at CodeWreckers GmbH has never studied Computer Science and writes horrible code which you routinely need to debug and clean up. After one month you get fed up and start introducing our colleague to the concept of "spaghetti code", and how to avoid it so as to produce less shaky and better understandable code. Gentle as you are you start with 3 (out of many) principles which you name and explain.

Hint: do not describe the intended effect ("to better understand code") but the approach ("add more sauce to the spaghetti").

7 Testing

Task 7 (5.5 pts): Consider function **string seconds2time(int s)** which converts seconds within a day to a date string, example: 3660 -> "01:01:00". Allowed input range is between 0 and 86400.
Devise a set of test cases for the input value based on Equivalence Class Testing following the specific approach explained in class.

Hints:

- *Ignore the output string structure, it is not relevant – concentrate on the input.*
- *Proceed in 2 steps: first, state the equivalence classes. Then, for each class devise an adequate number of tests.*

8 Code Management

Task 8 (5 pt): In your startup, Opcodes Unlimited, you have the task of setting up the software management infrastructure. Write a glossary for your colleagues explaining "version", "variant", "revision", "configuration", and "release".

9 GUI

Task 9 (6 pts): Insane Pixels Ltd has a Web app that their customers hate, and so they hire you as a consultant for making it more accepted by users. At the kickoff meeting you start with Pressman's Golden Rules. State them all, and for each one give a realistic concrete (!) example where it is violated and explain why it is in violation.

10 Project Management

Task 10 (4 pts): Explain the Gantt chart terms work package, milestone, and deliverable, and how they relate.

11 General

Task 11 (4 pts): Two scenarios have been presented in the course where the Ada construct "pragma suppress" has caused a catastrophe. What are the technical reasons in each case? Based on this, explain how both cases differ and what they have in common.

- *make me proud!* -