



# Software Maintenance & Evolution

Test Exam

## Disclaimer:

- This is a translation of a german test–exam handed out last year (FS'12).
- This english version—as well as the german text exam—comes without any warranty.
- The solutions we discuss today come without any warranty.
- Since the content of the lectures may change from previous years the questions are examples but not necessarily representative for this years exam. Therefore, you must not totally rely on this test exam.

**Hereby, I confirm that:**

- I have read and understood these guidelines.
- I have written the exam in reasonable conditions.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Points
/XXX

## 1 Aperitivi

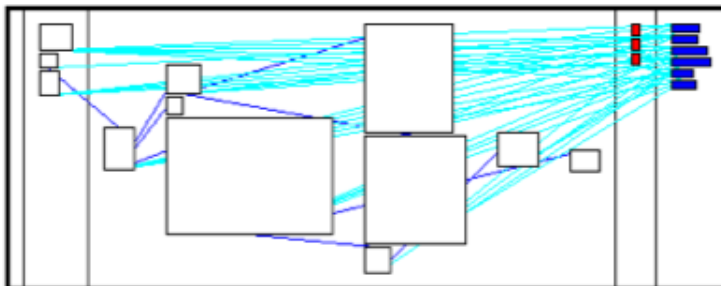
- a) What is software maintenance and what types of software maintenance exist?
- b) What is refactoring? What are the benefits of refactoring? List two examples of refactorings. Is refactoring related to reverse engineering, reengineering, or restructuring?
- c) What are Lehman's Laws of Software Evolution? Describe the Law of Increasing Entropy and possible "cures". List two other laws.

## 2 Antipasti misti

- a) What are the pre- and postconditions of the "Rename Method" refactoring?
- b) Why is lines of code (LOC) not suitable to measure the complexity of a class? List 2 better metrics.
- c) Why is high coupling between entities bad with respect to software evolution?
- d) Assign the following maintenance activities to their efforts (5%, 10%, 25%, 50%): source code comprehension, change planning, change documentation, and change testing.
- e) What is the difference between a source configuration management tool and a defect tracking tool?
- f) What is the purpose of a domain model in the reengineering process.
- g) Why must evolution metrics of different systems be normalized before actually comparing them.
- h) Why does it make sense to analyze bug reports in the context of software evolution?

## 3 Primo e Secondo con carne / Piatto vegetariano

- a) Interpret the following class blueprint.



- b) – d) Not relevant this year

e) Interpret the evolution history of classes A through E.

		ENOM	LENOM	EENOM					
<b>A</b>	<table border="1"><tr><td>2</td><td>4</td><td>3</td><td>5</td><td>7</td></tr></table>	2	4	3	5	7	7	3.37	3.25
2	4	3	5	7					
<b>B</b>	<table border="1"><tr><td>2</td><td>2</td><td>3</td><td>4</td><td>9</td></tr></table>	2	2	3	4	9	7	5.75	1.37
2	2	3	4	9					
<b>C</b>	<table border="1"><tr><td>2</td><td>2</td><td>1</td><td>2</td><td>3</td></tr></table>	2	2	1	2	3	3	1	2
2	2	1	2	3					
<b>D</b>	<table border="1"><tr><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td></tr></table>	2	2	2	2	2	0	0	0
2	2	2	2	2					
<b>E</b>	<table border="1"><tr><td>1</td><td>5</td><td>3</td><td>4</td><td>4</td></tr></table>	1	5	3	4	4	7	1	5.12
1	5	3	4	4					

## 4 Caffe'

Why are code clones—despite their reputation—not necessarily a problem with respect to software maintenance?