

# Fundamentals of Software Testing

(A.Y. 2023/2024) – Duration: 1h30m

February 27th, 2025

## Exercise 1.

The ACME company has been asked to develop a software system according to the following specification.

“The system to develop takes in input 6 different parameters each one can take different values as specified in the following table: You have been appointed as responsible for the testing of the system and a small budget has been

Parameter	Values
p1	a1, a2
p2	b1, b2
p3	c1, c2, c3, c4
p4	d1, d2, d3
p5	e1, e2, e3, e4, e5
p6	f1, f2, f3, f4, f5

assigned to you.

- How many tests are possible in case you would like to cover all the possible combinations?
- You decide to generate a test suites according to a pairwise design, not necessarily balanced. So you select a test reduction strategy, and you derive a test suite for testing the system.

16 points

## Exercise 2.

Consider the following program:

```
1  enum Discount {nodisc, normal, high}
2  enum Course {antipasto, primo, secondo}
3
4  public double computeBill(Course[] order, Discount disc) {
5      int i = 0;
6      double total = 0.0;
7      double discount = 0.0;
8      while (i < order.length) {
9          if (order[i] == Course.antipasto) total = total + 10;
10         if (order[i] == Course.primo) total = total + 15;
11         if (order[i] == Course.secondo) total = total + 30;
12         i = i + 1;
13     }
14     if (disc == Discount.high) discount = 0.15;
15     else if (disc == Discount.normal) discount = 0.05;
16     total = total * (1 - discount);
17     return total;
18 }
19
```

- Provide a minimal test suite that fully satisfy the MC/DC coverage criterion.
- Derive a data-flow graph for the program above and discuss if the test suite derived at the previous step satisfies any data-flow adequacy criteria.<sup>1</sup>
- Compute the all-uses coverage for the test suite derived at the previous step, and in case it is not equal to 1 discuss why and how a test suite satisfying the all-uses criterion should be derived.

16 points

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<sup>1</sup>Use line numbers to define the blocks in the data flow