Today’s Process

- If you haven’t completed the solution sheet for Worksheet B, please leave (and go finish it).
- Make sure your student ID (or name) is on your solution sheet.
- We’ll collect them all, shuffle them there, and hand them out — if you get your own, let us know ASAP, since grading your own is not allowed.
- Then use a post-it to put your student ID (and name) on the sheet you are grading — otherwise we cannot give you the extra credit you should earn.

True/False

3

- A UML class diagram can be executed (just like a Java program can be executed).
  - 2 points for true
  - 0 points for false

- Although some aspects of UML diagrams have great similarity to a programming language, it is not a programming language.

True/False

4

- Reducing the size of a test case is an important step in debugging.
  - 2 points for true
  - 0 points for false

- The objective of this step is to narrow the part of the program that must be considered — and the program is usually much bigger than the size of the test case that failed.

True/False

5

- A good practice is to treat all Java exceptions -- both checked and unchecked exceptions -- in the same way.
  - 2 points for false
  - 0 points for true

- Unchecked exceptions (like NullPointerException) can in principle occur anywhere; checked exceptions (defined for a given program) cannot
  - It’s essential to treat checked exceptions carefully, usually through exception chaining — but other approaches can be used for handling unchecked exceptions.

True/False

6

- An advantage of implementing repOK as a method instead of as an exception is that it allows the implementer of a class to re-establish a broken representation invariant.
  - 2 points for true
  - 0 points for false

- Doesn’t always happen, but it’s certainly feasible.

True/False

7

- The singleton pattern and the ability to define multiplicity in UML provide the same power to a design/programmer.
  - 2 points for false
  - 0 points for true

- Both relate to multiplicity, but UML allows much richer relationships than “precisely one instance.”
**True/False**

- Representation invariants would be more appropriate to apply to a UML class diagram than in a UML sequence diagram.
  - 2 points for true
  - 0 points for false

- Representation invariants address the question of “what are legal values of the representation” but do not directly address the question of the operations, their order of invocation, etc.

**True/False**

- Regression testing in principle addresses the removal of tests that no longer apply to a program.
  - 2 points for true
  - 0 points for false

- Regression testing can no longer run tests that apply to (for example) removed features
  - These tests are often not actually removed, but their failures are noted without concern

**True/False**

- Covariance/contravariance are concepts used to define the type system of a programming language.
  - 2 points for true
  - 0 points for false

- These terms refer to a relationship among types – they are used to define a languages notion of “stronger” and “weaker” types, allowing or disallowing substitution

**True/False**

- At run-time, you cannot determine the precise value of a parameter of a generic class.
  - 2 points for true
  - 0 points for false

**True/False**

- Consider the UML class diagram here of the adapter pattern. Does this diagram represent conventional call-return flow-of-control, or does it represent inversion-of-control? In one sentence, justify your answer.
  - 2 points for answering “inversion-of-control”
  - -1, -2, -3 points for missing, confusing or inaccurate justification.

Example: “This pattern uses standard flow-of-control: in each case, the caller explicitly knows the name of the class/interface that it is calling.”

**True/False**

- Sketch a UML class diagram that describes the relationships among parties, tables, and the waiting list from A3 (Restaurant)
  - Key points
    - Waiting list: 0 or more parties (ordered)
    - Table: 0 or more parties
    - Party: Size, name, seated or on waiting list
True or false: The primary objective of design patterns is to make it easier to ensure correctness of an implementation. In one sentence, justify your answer.

- 2 points for true
- 1 for a justification not mentioning “change”
- 1, 2 points for additional missing, confusing or inaccurate justification.

Example: “Although a few patterns (such as Singleton) constrain a program in a way that eases reasoning, most patterns (such as Visitor, MVC, etc.) provide ways to ease future program modifications.”

Famous philosopher and logician (1908-2000)

- Erdős number: 3
- Same as me: Notkin→Beame→Saks→Erdős

Two students famous for reasons other than philosophy or logic

Quine: A program that prints itself

```java
public class Quine {
    public static void main(String[] args) {
        String[] str = {
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