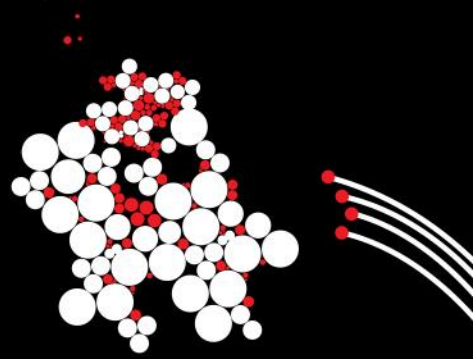
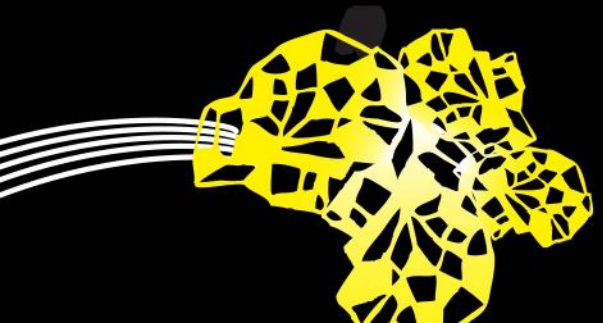
UNIVERSITY OF TWENTE.



Invariants

Topic of Software Systems (TCS module 2)

Lecturer: Marieke Huisman



DEFINITION OF CLASS INVARIANT

- A class invariant is defined in the scope of a class (not a method)
- General idea: a property that always holds
  - Allowed values for instance and static variables
- In practice: might be broken temporarily in the middle of a method (but has to be re-established)

invariant diameter = 2 * radius;

Two usage scenarios

1. Can refer to internal state of the object (useful for implementer)
2. Can also serve as documentation of the behaviour of a class (useful for caller)

COUNTER CLASS EXAMPLE

```
public class Counter {

  /*@
   *   invariant value >= 0;
   */

  private int value;

  public Counter() {
      value = 0;
  }

  public int getValue() {
       return value;
  }

  public void setValue(int value) {
       this.value = value;
  }

  public void increment() {
       value++;
  }
}
```

Private invariant: refers to internal state, not visible to caller

COUNTER CLASS EXAMPLE

```
public class Counter {

  /*@
   *   invariant getValue() >= 0;
   */

  private int value;

  public Counter() {
      value = 0;
  }

  public int getValue() {
       return value;
  }

  public void setValue(int value) {
       this.value = value;
  }

  public void increment() {
       value++;
  }
}
```

Public invariant: refers to publicly visible methods, documents class behaviour