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Tutorials for "Formal methods for Java"
Exercise sheet 1

Exercise 1: Java Semantics

Consider the following Java program:

```java
class Test {
  public static void main(String[] args) {
    Number[] a = new Byte[3];
    a[0] = new Integer(1);
  }
}
```

What goes wrong? Explain using the Java Language Specification.

Exercise 2: JML Installation

Download and install the "Common JML Tools" from `http://sourceforge.net/projects/jmlspecs/files/jmlspecs/5.6_rc4/`.

Exercise 3: JML Specifications

Consider the following Java method:

```java
static int f(int n){
  int i = 0;
  int s = 1;

  while (s < n) {
    i = i + 1;
    s = s + 2 * i + 1;
  }

  return i;
}
```

Write a JML specification for method `f` that precisely characterizes the method's return value for non-negative input values `n`. Test your specification with the JML runtime checker `jmlrac`. You might need a `main` method that calls `f` with various inputs.

Remember: You have to "JML compile" (using `jmlc`) your annotated Java code before you can use `jmlrac`.