



Tutorials for “Formal methods for Java” Exercise sheet 1

Exercise 1: Java semantics

Consider the following Java program:

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

What goes wrong? Explain.

Exercise 2: JML specifications

Consider the following Java method:

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

Exercise 3: Greatest common divisor

- (a) Write a method `static int gcd(int a, int b)` that computes the greatest common divisor of two non-zero integers `a` and `b`.
- (b) Give a JML specification stating that your method correctly implements the *gcd*.