Computer Science and Mathematics
Summer term 2020

Computer Science, Exercises 3

1. Write Java expressions for the following mathematical expressions:

(a) $\dfrac{a}{b+\dfrac{1}{c}} + 2.5 \cdot 10^6$

(b) $e^{2k} \cdot \sqrt{x^2 - 2xy + 1}$

(c) $z = \begin{cases} 1 & \text{if } n \text{ is even} \\ 0 & \text{otherwise} \end{cases}$

(Remark: $\sqrt{x}$ is **`Math.sqrt(x)`**, e^x is **`Math.exp(x)`**,
`a % b` gives the rest when dividing **`a`** by **`b`**.)

2. The following Java method **`m`** gets an integer array **`x`** as its argument:

```
public int m(int x[])
   {
   int c, i;
   c = 0;
   for (i = 0; i < x.length; i++)
      if (x[i] % 2 == 1) c++;
   return c;
   }
```

What does this method calculate (or count) ?

3. (a) Which errors can possibly occur during runtime of the following Java program fragment?

```
int i;
float list[300];
float x, y;
...
/*  i, x and y are somehow calculated */
...
list[i] = 1.5 / (x + y);
...
```

(b) Which conditions (to be specified in Java syntax) should be checked to capture these errors before they can cause trouble?

4. Write an XL (or Java) program which prints all prime numbers between 1 and 1000 on the screen (and no other numbers).

Remark 1: An integer is a prime number if it is larger than 1 and if it is not divisible without rest by any other positive integer except 1 and itself.
Remark 2: **`a % b`** = rest of the division of integer **`a`** by integer **`b`** ($0 \le$ **`(a % b)`** $<$ **`b`**).