Übungsblatt 3

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Aufgabe 1

(a)
- `42, Hello!`
- `Hello!`

(b)
- Zeile 5 zu: `fun(a, new String[] { "" });`

Aufgabe 2

Listing 1: AnagramDetector.java

```
1 package me.adrian.ha3;
2
3 import java.util.HashMap;
4
5 public class AnagramDetector
6 {
7    static public boolean check(String lhs, String rhs)
8    {
9       String lhsLc = lhs.toLowerCase();
10      String rhsLc = rhs.toLowerCase();
11
12      if (lhsLc.length() != rhsLc.length())
13         return false;
14
15      HashMap<Character, Integer> lc = new HashMap<>(), rc = new HashMap<>();
16      for (int i = 0; i < lhsLc.length(); i++) {
17         char cl = lhsLc.charAt(i);
18         char cr = rhsLc.charAt(i);
19
20         if (lc.containsKey(cl))
21            lc.put(cl, 1 + lc.get(cl));
22         else
23            lc.put(cl, 1);
```

```java

            if (rc.containsKey(cr))
                rc.put(cr, 1 + rc.get(cr));
            else
                rc.put(cr, 1);
        }

        for (Character c : lc.keySet()) {
            if (!rc.containsKey(c))
                return false;

            if (lc.get(c).intValue() != rc.get(c).intValue())
                return false;
        }

        return true;
    }

    static public void main(String[] args)
    {
        System.out.println("Eingaben sind" + (check(args[0], args[1]) ? "" : "
            keine") + " Anagramme");
    }
}
```

Aufgabe 3

Listing 2: MultiDimSearch.java

```java
    public static void find1(char[][] a, char[][] m)
    {
        int curX, curY;
        boolean possibleMatch = false;
        for (int i = 0; i < a.length; i++) // Zeilen a
        {
            for (int j = 0; j < a[i].length; j++) // Spalten a
            {
                if (a[i][j] != m[0][0])
                    continue;

                possibleMatch = true;
                curX = i;
                curY = j;
                try {
                    for (int k = 0; k < m.length; k++) // Zeilen m
                    {
                        for (int l = 0; l < m[k].length; l++) // Spalten m
                        {
                            if (possibleMatch && a[i + k][j + l] != m[k][l])
                                possibleMatch = false;
```

```
                    }
                }
            } catch (ArrayIndexOutOfBoundsException e) {
                possibleMatch = false;
            }

            if (possibleMatch) {
                System.out.println("(" + curX + ", " + curY + ")");
                return;
            }
        }
    }
    System.out.println("(-1, -1)");
}

public static void find2(char[][] a, char[][] m)
{
    int curX, curY;
    boolean possibleMatch = false;
    for (int i = 0; i < a.length; i++) // Zeilen a
    {
        for (int j = 0; j < a[i].length; j++) // Spalten a
        {
            if (!matchOrWildcard(a[i][j], m[0][0]))
                continue;

            possibleMatch = true;
            curX = i;
            curY = j;
            try {
                for (int k = 0; k < m.length; k++) // Zeilen m
                {
                    for (int l = 0; l < m[k].length; l++) // Spalten m
                    {
                        if (possibleMatch && !matchOrWildcard(a[i + k][j + l],
                            m[k][l]))
                            possibleMatch = false;
                    }
                }
            } catch (ArrayIndexOutOfBoundsException e) {
                possibleMatch = false;
            }

            if (possibleMatch) {
                System.out.println("(" + curX + ", " + curY + ")");
                return;
            }
        }
    }
```

```
        System.out.println("(-1, -1)");
    }

    public static boolean matchOrWildcard(char lhs, char rhs)
    {
        if (rhs == '*')
            return true;
        else
            return lhs == rhs;
    }
```

Ausgabe:

(25, 34)

(-1, -1)

(30, 34)

Aufgabe 4

$\text{bin}(n,\ k) =$
if $n < k$ **then** 0
else
    if $n = k \vee k = 0$ **then** 1
    else
        $\text{bin}(n-1,\ k-1) + \text{bin}(n-1,\ k)$
    end if
end if

Aufgabe 5

$\text{fib}(n) =$
if $n = 0 \vee n = 1$ **then**
    1
else
    $\text{h}(n,\ 1,\ 1,\ 1)$
end if
$\text{h}(n,\ i,\ e,\ f) =$
if $i = n$ **then**
    f
else
    $\text{h}(n,\ i+1,\ f,\ e+f)$
end if