Programmieren in JAVA – https://www.iai.kit.edu/~javavorlesung W. Geiger, T. Schlachter, C. Schmitt, W. Süß



Bereich: Arrays (eindimensional)

Mittelwert und Standardabweichung Musterlösung

```
Klasse: StandardDeviation
Package: de.dhbwka.java.exercise.arrays
package de.dhbwka.java.exercise.arrays;
import java.util.Random;
 * @author DHBW lecturer
 * @version 1.0
 * Part of lectures on 'Programming in Java'.
 * Baden-Wuerttemberg Cooperative State University.
 * (C) 2015 by W. Geiger, T. Schlachter, C. Schmitt, W. Süß
public class StandardDeviation {
      public static void main(String[] args) {
             int n = 100;
             Random rnd = new Random();
             int[] x = new int[n];
             // generate random numbers and calculate average
             int sum = 0;
             for (int i = 0; i < x.length; i++) {</pre>
                    x[i] = rnd.nextInt(11); // 0..10
                    sum += x[i]; // sum up the x[i]
             }
             double average = 1. * sum / n;
             System.out.println("Mittelwert: "+average);
             // calculate standard deviation
             double devSum = 0;
             for (int i = 0; i < x.length; i++) {</pre>
                    devSum += Math.pow(x[i] - average, 2);
             double deviation = Math.sqrt(devSum / (n - 1));
             System.out.println("Standardabweichung: "+deviation);
      }
}
```

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Bereich: Arrays (eindimensional)

Fibonacci-Folge Musterlösung

```
Klasse: Fibonacci
Package: de.dhbwka.java.exercise.arrays
package de.dhbwka.java.exercise.arrays;
 * @author DHBW lecturer
 * @version 1.0
 * Part of lectures on 'Programming in Java'.
 * Baden-Wuerttemberg Cooperative State University.
 * (C) 2015 by W. Geiger, T. Schlachter, C. Schmitt, W. Süß
public class Fibonacci {
      public static void main(String[] args) {
             int n = 20; // or 50
             int[] fib = new int[n];
             fib[0] = fib[1] = 1;
             for (int i = 2; i < fib.length; i++) {</pre>
                    fib[i] = fib[i - 1] + fib[i - 2];
             }
             // output
             for (int i = 0; i < fib.length; i++) {</pre>
                    System.out.printf("%2d.: %d",i,fib[i]);
                    System.out.println();
             }
      }
}
```

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Bereich: Arrays (eindimensional)

Sieb des Eratostenes* Musterlösung

```
Klasse: Eratostenes
Package: de.dhbwka.java.exercise.arrays
package de.dhbwka.java.exercise.arrays;
 * @author DHBW lecturer
 * @version 1.0
 * Part of lectures on 'Programming in Java'.
 * Baden-Wuerttemberg Cooperative State University.
 * (C) 2015 by W. Geiger, T. Schlachter, C. Schmitt, W. Süß
public class Eratostenes {
      public static void main(String[] args) {
             int max = 100;
             boolean[] prim = new boolean[max];
             // initialize array with true
             for (int i = 2; i < prim.length; i++)</pre>
                    prim[i] = true;
             // eratostenes' sieve
             for (int i = 2; i < prim.length; i++)</pre>
                    if (prim[i])
                           for (int j = i*2; j < prim.length; j+=i)</pre>
                                 prim[j] = false;
             // output
             for (int i = 0; i < prim.length; i++)</pre>
                    if (prim[i])
                           System.out.println(i);
      }
}
```

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Bereich: Arrays (eindimensional)

}

Betrag eines Vektors Package: de.dhbwka.java.exercise.arrays package de.dhbwka.java.exercise.arrays; import java.util.Scanner; /** * @author DHBW lecturer * @version 1.01

```
* Part of lectures on 'Programming in Java'.
* Baden-Wuerttemberg Cooperative State University.
 * (C) 2015-2016 by W. Geiger, T. Schlachter, C. Schmitt, W. Süß
public class Norm {
      public static void main(String[] args) {
             Scanner scan = new Scanner(System.in);
             System.out.print("Bitte Anzahl der Elemente n eingeben: ");
             int n = scan.nextInt();
             int[] x = new int[n];
             int norm = 0;
             for (int i = 0; i < x.length; i++) {</pre>
                   System.out.print("Bitte x_" + i + " eingeben: ");
                   x[i] = scan.nextInt();
             }
             // this loop could be integrated with the preceding one
             for (int i = 0; i < x.length; i++)
                   norm += x[i] * x[i];
             System.out.println("Der Betrag von x ist " + Math.sqrt(norm));
             scan.close();
      }
```

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Bereich: Arrays (eindimensional)

Skalarprodukt zweier Vektoren Musterlösung Package: de.dhbwka.java.exercise.arrays Klasse: DotProduct package de.dhbwka.java.exercise.arrays; import java.util.Scanner;

```
* @author DHBW lecturer
* @version 1.0
* Part of lectures on 'Programming in Java'.
* Baden-Wuerttemberg Cooperative State University.
 * (C) 2015 by W. Geiger, T. Schlachter, C. Schmitt, W. Süß
public class DotProduct {
      public static void main(String[] args) {
             Scanner scan = new Scanner(System.in);
             System.out.print("Bitte Anzahl der Elemente n eingeben: ");
             int n = scan.nextInt();
             int[] x = new int[n];
             int[] y = new int[n];
             int dotProduct = 0;
             for (int i = 0; i < x.length; i++) {</pre>
                    System.out.print("Bitte x_" + i + " eingeben: ");
                    x[i] = scan.nextInt();
             }
             for (int i = 0; i < y.length; i++) {</pre>
                    System.out.print("Bitte y_" + i + " eingeben: ");
                    y[i] = scan.nextInt();
             }
             // this loop could be integrated with the preceding one
             for (int i = 0; i < x.length; i++)</pre>
                    dotProduct += x[i] * y[i];
             System.out.println("Das Skalarprodukt von x und y ist "
                          +dotProduct);
             scan.close();
      }
}
```

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Bereich: Arrays (eindimensional)

Sortieren mit Bubblesort Musterlösung

```
Package: de.dhbwka.java.exercise.arrays
                                                          Klasse: BubbleSort
package de.dhbwka.java.exercise.arrays;
import java.util.Scanner;
 * @author DHBW lecturer
 * @version 1.0
 * Part of lectures on 'Programming in Java'.
 * Baden-Wuerttemberg Cooperative State University.
 * (C) 2015 by W. Geiger, T. Schlachter, C. Schmitt, W. Süß
public class BubbleSort {
       public static void main(String[] args) {
              Scanner scan = new Scanner(System.in);
              System.out.print("Bitte Anzahl der Elemente n eingeben: ");
              int n = scan.nextInt();
              int[] x = new int[n];
             for (int i = 0; i < x.length; i++) {
         System.out.print("Zahl " + i + " eingeben: ");</pre>
                     x[i] = scan.nextInt();
              boolean swapped;
              do {
                     swapped = false;
                     for (int i = 1; i < x.length; i++) {</pre>
                            if (x[i-1]>x[i]) {
                                  int tmp = x[i-1];
                                  x[i-1] = x[i];
                                  x[i] = tmp;
                                   swapped = true;
                            }
              } while (swapped);
              System.out.print("Sortiert: ");
              for (int i : x) {
                     System.out.print(i + " ");
              scan.close();
       }
}
```