Übungen 3

# Aufgabe 1

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| package ch.swaechter.fhnw.algd1.algorithms;  public class Algorithms {  public static void main(String[] args) {  System.out.println("Is 1 in {1,2,3}: " + hasElement(new int[]{1, 2, 3}, 1));  System.out.println("Is 1 in {2,1,3}: " + hasElement(new int[]{2, 1, 3}, 1));  System.out.println("Is 1 in {2,3,1}: " + hasElement(new int[]{2, 3, 1}, 1));  System.out.println("Is 1 in {2,3,2}: " + hasElement(new int[]{2, 3, 2}, 1));  System.out.println("All greater than 0 in {1,2,3}: " + areAllElementsGreater(new int[]{1, 2, 3}, 0));  System.out.println("All greater than 0 in {1,0,3}: " + areAllElementsGreater(new int[]{1, 0, 3}, 0));  System.out.println("All greater than 0 in {1,2,0}: " + areAllElementsGreater(new int[]{1, 2, 0}, 0));  System.out.println("Exponent of 2 that generates a number larger than 123456: " + getPowerOfTwo(123456));  }  // Suche den ersten Index i bei dem gilt array[i] == element. Ist i kleiner der Länge und ist array[i] == element, so existiert das Element im Array.  public static boolean hasElement(int[] array, int element) {  int i = 0;  while (i < array.length && array[i] != element) {  i++;  }  return i < array.length && array[i] == element;  }  // Suche nach Elementen array[i] > element. Ist i gleich der Länge des Arrays, so sind alle Werte grösser als das Element  public static boolean areAllElementsGreater(int[] array, int element) {  int i = 0;  while (i < array.length && array[i] > element) {  i++;  }  return i == array.length;  }  // Suche nach einem Wert grösser als Limit. Ist dieser grösser, ist der Exponent der gesuchte Wert  public static int getPowerOfTwo(int limit) {  int exponent = 1;  int value = 2;  while (value < limit) {  value \*= 2;  exponent++;  }  return exponent;  }  } |

# Aufgabe 2

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| package ch.swaechter.fhnw.algd1.search.prime;  public class Primality {  public static boolean isPrime(int x) {  if (x <= 1) {  return false;  }  int i = 2;  while (i <= x && x % i != 0) {  i++;  }  return i == x;  }  } |

# Aufgabe 3

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| package ch.swaechter.fhnw.algd1.search.sentinelsearch;  public class SentinelSearch {  public static boolean exists(int[] data, int value) {  if (data.length == 0) {  return false;  }  int tempval = data[data.length - 1];  data[data.length - 1] = value;  int i = 0;  while (data[i] != value) {  i++;  }  data[data.length - 1] = tempval;  if (i != data.length - 1) {  return true;  } else {  return tempval == value;  }  }  public static int firstIndex(int[] data, int value) {  if (data.length == 0) {  return -1;  }  int tempval = data[data.length - 1];  data[data.length - 1] = value;  int i = 0;  while (data[i] != value) {  i++;  }  data[data.length - 1] = tempval;  return (data[i] == value) ? i : -1;  }  } |