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Java 5: Arrays

2024/25 – Sascha Stojanovic

Agenda

- What is an array?
- Loop throw an array
- Multidimensional array
- Exercise normal array
- Exercise multidimensional array

What is an array?

- It is used to store multible values or objects in a single variable
- Example
  - String [] cars = { ”VW”, “BMW”, “Audi” }
  - Int[] myNums = { 1, 2, 3, 4, 5 }
- To access one value our of the array, you add the index into “[]”
  - The index starts at 0 in every array
  - Example: cars[0] = “VW” Or myNums[4] = “5”
- You can also overwrite values of certain indexes
  - Old => “String [] cars = { ”VW”, “BMW”, “Audi” }”
  - cars[0] = “Mercedes”
  - New => “cars = { ”Mercedes”, “BMW”, “Audi” }”
- The length methods gives you the size of an array
  - cars.length = 5

Loop throw an array

- You can use our known ”for”- loop for that

```
String[] cars = { "VW", "BMW", "Audi" };
for (int i = 0; i < cars.length; i++) {
    System.out.println(cars[i]);
}
```

- You can also use a ”for each” – loop for that (commonly used in

```
for (String i : cars) {
    System.out.println(i);
}
```

Multidimensional array

- A multidimensional array is an array in an array

```
String[][] mulitdimensionalCars = { { "VW", "BMW", "Audi" }, { "Mercedes", "Bentley", "Renault" } };
int [][] mulitdimensionalNumbers = { { 1, 2, 3 }, { 4, 5, 6 } };

mulitdimensionalCars[0][2] =
mulitdimensionalNumbers[1][1] =
```

- Also .length is possible with multidimensional arrays

```
mulitdimensionalCars.length = 2
mulitdimensionalCars[0].length = 3
mulitdimensionalCars[1].length = 3
```

- And loops as well

```
int[][] myNumbers = { {1, 2, 3, 4}, {5, 6, 7} };
for (int i = 0; i < myNumbers.length; ++i) {
  for (int j = 0; j < myNumbers[i].length; ++j) {
    System.out.println(myNumbers[i][j]);
  }
}
```

Exercise normal array

Professor “Funtastic” is teaching Java in the university. His students recently had an exam. This are there grades:

```
int[] grades = {85, 92, 78, 90, 88, 76, 95, 89};
```

Help professor Funtastic to figure out the following things:

- What is the average grade? => sum of grades/number of grades
- What is the highest grade?
- What is the lowest grade?
- List all grades above the average grade
- Create therefore the class “ArrayExercise” in your ”Homework”-folder

Exercise multidimensional array

- The following loop is listing all numbers from 1 to 7

```
int[][] myNumbers = { {1, 2, 3, 4}, {5, 6, 7} };
for (int i = 0; i < myNumbers.length; ++i) {
  for (int j = 0; j < myNumbers[i].length; ++j) {
    System.out.println(myNumbers[i][j]);
  }
}
```

- Instead of this loop use the ”for each” loop to get the same result
- Create therefore the java-file “MulitArrayExercise.java” in your "homework”-folder