Java - Arrays

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https://github.com/wbombardellis/java-unterricht

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Organization

Array

Arrays allow you to store several values in one variable

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Array

Arrays allow you to store several values in one variable

- Write a program that reads the grades of ten students and print at the end the average (arithmetic mean) grade and how many students passed (*grade* $\geq$ 7).

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- Write a program that reads the grades of ten students and print at the end the average (arithmetic mean) grade and how many students passed ($grade \geq 7$).

```
double[] grades = new double[10];
for (int i = 0; i < 10; i++) {
    grades[i] = reader.nextDouble();
}
```

Exercises

1. Now you want your program to send the students' grades to the German Ministry of Education. The problem is that the German grading system is different from the one you use. So extend your program to print the students' grade according to the German system. The grades are translated according to the table below.

Mexican	German
0.0 - 5.9	4.0
6.0 - 6.9	3.0
7.0 - 8.9	2.0
9.0 - 10.0	1.0

Array Grammar Rules

Array Declaration:
$\langle Type \rangle [] \; \langle Varname \rangle \; = \; new \; \langle Type \rangle [SIZE];$

Array Assignment Statement:
$\langle Varname \rangle [POSITION] \; = \; \langle Expression \rangle;$
Where $POSITION \in [0, SIZE - 1]$.

Exercises

1. Write a program that reads a word from the keyboard and prints it reversed. Example: Notebook → koobetoN

2. Write a program that tells whether a word is a palindrome or not. A palindrome is a word that reads the same backward as forward. Example: level, radar.

Exercises

1. Write a program that reads the price of a product and the received money, and prints the amount of change detailed by how many bills of each value to give. Example:

Exercises

1 Write a program that reads the price of a product and the
   received money, and prints the amount of change detailed by
   how many bills of each value to give. Example:
   ```
   Price: $100
   Received: $299
   Change: $199
   Change Bills:
   1 bills of $100
   1 bills of $50
   2 bills of $20
   0 bills of $10
   1 bills of $5
   2 bills of $2
   0 bills of $1
   ```

Bidimensional Arrays

Bidimensional arrays allow you to store a table in one variable.

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Bidimensional arrays allow you to store a table in one variable.
int[][] *table* = *new int*[10][10];
table[0][0] = 23;
table[1][2] = 42;

Bidimensional Arrays

Bidimensional arrays allow you to store a table in one variable.

```java
int[][] table = new int[10][10];
table[0][0] = 23;
table[1][2] = 42;
for (int i = 0; i < 10; i++) {
    for (int j = 0; j < 10; j++) {
        System.out.println(table[i][j]);
    }
}
```

Image Processing - Filters

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Summary

- Arrays allow you to store several values in one single variable.
- Next Lesson: Assignment

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References

- W3C Tutorial:
    - https://www.w3schools.com/java/java_arrays.asp
- Exercises:
  https://www.w3schools.com/java/exercise.asp
    - Java Arrays