Introduction to Programming

Assignment 3

10.11.2008

1. Array side-effects

Create an array of random integer values by using the `Rand.class` from the previous assignment. Define the two methods **void** swap(**int** [] array, **int** index1, **int** index2) and **void** reverseArray (**int** [] array). swap should swap the array-elements at the indices index1 and index2 in the array array. reverseArray should reverse the order of the elements in array.

Both methods must not return any value, but only use side-effects for reversing the order. The following method calls should be possible in the main method of your application:

```
println ("Original array");
println (arr);
swap(arr, 1, 3);
println ("After swapping...");
println (arr);
reverseArray (arr);
println ("After reversing");
println (arr);
```

Example output:

```
Original array
[84, 51, 42, 28]
After swapping...
[84, 28, 42, 51]
After reversing
[51, 42, 28, 84]
```

Hint: For a description on how to work with arrays refer to the lecture, chapter 2, slide 29 - 33.

2. Creating and working with objects

Define the two classes Car and Tire. For each class, define a few attributes (e.g. maxSpeed, model, etc.). Take care to define the car in a way so that it always has four tires.

To test your classes instantiate and use them by creating an array of of different cars. Find the fastest car in your fleet and output its model and type of tires.

3. More working with objects

Define a class Money which allows you to enter a certain amount of money and switch between EUR and USD. It should be possible to set and get the amount in either currency and further to set the exchange rate.

Extend your class so that you can add subtract two amounts with each other. The following calls should be possible with your class.

```
Money firstAmount = new Money ();
firstAmount . setEuros (50);
```

```
Money.setExchangeRate(1.5);
print("Current amount in EUR: ");
println(firstAmount.getEuros());
print("Current amount in USD: ");
println(firstAmount.getDollars());

Money secondAmount = new Money();
secondAmount.setDollars(100);
print("This does also work... ");
println(secondAmount);
println("Changing the output currency and outputting the amount again");
Money.setOutputEuros(false);
println(secondAmount);
println("Let's add the amounts...");
firstAmount.add(secondAmount);
println(firstAmount);

println("Switching back to EUR");
Money.setOutputEuros(true);
println("The exchange rate has changed again...");
Money.setExchangeRate(1.8);
print("Current amount in EUR: ");
println(firstAmount.getEuros());
print("Current amount in USD: ");
println(firstAmount.getDollars());
println("I owe you some money...");
firstAmount.subtract(secondAmount);
println(firstAmount);
```

And the output could look like this:

```
Current amount in EUR: 50.00
Current amount in USD: 75.00
This does also work... EUR 66.66666666666667
Changing the output currency and outputting the amount again
USD 100.0
Let's add the amounts...
USD 175.0
Switching back to EUR
The exchange rate has changed again...
Current amount in EUR: 116.67
Current amount in USD: 210.00
I owe you some money...
EUR 50.0
```