

Lucerne University of Applied Sciences and Arts

# Programming and Algorithms

Personal Documentation

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## 1 Preface

This is a personal documentation and notebook for the first course in programming at the Lucerne University of Applied Sciences and Arts. The goal of this document is to collect useful informations and nice snippets of code out of the course.

This document shall not be provided as a official or unofficial cheatsheet for the course exam or similar.

## 2 Objects and classes

### 2.1 Summary exercises

#### Exercise 1.31

*What are the types of the following values?*

0	short, char, byte, int, long
"hello"	String
101	short, char, byte, int, long
-1	int, char, byte, int, long
true	boolean
"33"	String
3.1415	float, double

#### Exercise 1.32

*What would you have to do to add a new filed, for example one called name, to a circle object?*

```
private String name;
```

#### Exercise 1.33

*Write the signature of a method named send that has one parameter of type String, and does not return a value.*

```
public void send(String foo)
```

#### Exercise 1.34

*Write a signature for a method named average that has two parameters, both of type int, and returns an int value.*

```
public int average(int foo, int bar)
```

#### Exercise 1.35

*Look at the book you are reading right now. Is it an object or class? If it is a class, name some objects. If it is an object, name its class.*

The book is definitely an object, because it's a specific thing and in no way generic. The class could have a name like SchoolBook, CodingBook or just Book.

#### Exercise 1.36

*Can an object have several different classes? Discuss.*

No it can't.

## 3 Understanding class definitions

### 3.1 Start with Eclipse

In the first chapter we've worked with the BlueJ IDE but now I want to check Java-Coding with a common and popular Java-IDE like Eclipse To get the BlueJ-Projects work with Eclipse there are some things that have to be done.

1. Create a new project in Eclipse.
2. Import the source (BlueJ example-code).
3. Add a package-name to the source.
4. Create a main (replaces all interaction which were invoked by hand).

Listing 1: TicketMachine

```
1
2 package foobar;
3
4 public class TicketMachine
5 {
6     // The price of a ticket from this machine.
7     private int price;
8     // The amount of money entered by a customer so far.
9     private int balance;
```

Listing 2: Main (TicketMachine)

```
1 package foobar;
2
3 public class Main
4 {
5     public static void main(String[] args)
6     {
7         TicketMachine tml;
8         tml = new TicketMachine(300);
9
10        tml.insertMoney(200);
11
12        System.out.println("Balance: "+tml.getBalance());
13
14        tml.insertMoney(100);
15
16        tml.printTicket();
17    }
18 }
```

### 3.2 Chapter Exercises

#### Exercise 2.21

Suppose that the class *Pet* has a field called *name* that is of type *String*. Write an assignment statement in the body of the following constructor so that the *name* field will be initialized with the value of the constructor's parameter.

```
1 public Pet(String petsName)
2 {
3     name = petsName;
4 }
```

#### Exercise 2.22 (challenge)

The following object creation will result in the constructor of the *Date* class being called. Can you write the constructor's header?

```
new Date("March", 23, 1861)
```

Try to give meaningful names to the parameters.

```
1 public Date(String month, int day, int year)
2 {
3     ...
4 }
```

### 3.3 Selfstudy-Questions OOP2

#### Exercise 4

*A class is build by three essential components. What are they?*

#### Exercise 5

*What is the order of the three components?*

#### Exercise 6

*What's their purpose?*

#### Exercise 8

*What is a variable?*

#### Exercise 9

*What are the synonyms to instance variables?*

#### Exercise 10

*What do you think where the term instance variable comes from?*

#### Exercise 11

*How can you put comments into a Java-Code?*

#### Exercise 12 (important)

*With which access-modification do you declare instance variables usually? Is it **private** or **public**? Do you have a reason for your answer?*

#### Exercise 13

*Explain the relation between a constructor and the state of an onject.*

#### Exercise 14

*How do we name constructors?*

#### Exercise 15

*How long are the variables of an object alive (reachable)?*

### Exercise 16

*Why should you (if possible) initialise instance variables explicit?*

### Exercise 17

*What's the default value which is given to a `int` variable by its initialisation?*

### Exercise 19

*What's the use of parameters?*

### Exercise 20

*What's the difference between a formal and a actual parameter?*

## 3.4 Summary exercises



## Glossary

### A

#### accessor

A accessor or accessor method is a method that provides access to information about an object's state (get-methods). 8

### C

#### class

A class describes the kind of an object. This is done by giving instance variables and methods. The objects represents individual instantiations of the class. 8

#### constructor

A constructor is a special method in a class which is responsible to initialize objects properly. In difference to usual methods it has no return value and is only used once. 8

### F

#### field

Fields store data for an object to use. Fields are also known as instance variables.. 8

### I

#### instance

An instance is a realisation of a class to a real object, so instance is a synonym to object. 8

### M

#### method

A method is a action (function) of a specific class that can be invoked on an object of the

given class. Objects usually do something when a method is invoked, so a good keyword to it would be *what*, as most methods are named by a verb. The methods give the objects their own particular and characteristic behavior. 8

### O

#### object

An object is a instance of a class. 8

### P

#### parameter

Addition information (data) given to a method or object is called parameter. 8

### S

#### signature

The signature of a method is the part that identifies it to the compiler. For example the signature of `public setSpeed(int newSpeed, int newTolerance)` is not the whole head of the method but the name `setSpeed` and the list of parameter-types `int ..., int ....` 8

#### state

A object or its status is represented by his state. The state is represented by the values in the fields (instance variables). 8

### T

#### type

The type defines the kind of data or value (for example to a parameter, return value (see data types) or a variable. 8