LECTURER: JOHN DOE

DATA STRUCTURES AND JAVA CLASS LIBRARY

Who are you?

- Name
- Employer
- Position/responsibilities
- Fun Fact
- Previous knowledge? Expectations?

TOPIC OUTLINE

UNIT 1

PROGRAMMING STYLE

STUDY GOALS

- Learn to use comments to document code.
- Learn to use **Javadoc** to automatically generate code documentation.
- Learn to use **Java** annotations for providing the compiler with useful additional code information.
- Understand guidelines and best practices for structuring, formatting and naming classes, methods and attributes.

EXPLAIN SIMPLY

1. How can comments and Javadoc be used to document and describe Java code?
2. Describe the most common Javadoc tags and their purpose of use.
3. Why are code conventions important?

WHY COMMENT AND DOCUMENT THE CODE?

READABILITY
Commented code is easier to read.

COMPREHENSABILITY
Commented code can be understood by others.

WHY
document the code?

COLLABORATION
Well-documented code facilitates fruitful collaboration .

REUSABILITY
Well-documented code can be effectively used by others.

WRITE DOCUMENTATION IN COMMENTS

Use comments to provide explanations directly in the source code.

USE JAVADOC

Use standardized commenting for automatic generation code documentation.

PROVIDE CODE ANNOTATIONS

Add programatically useful additional information through code annotations .

USE CODE CONVENTIONS EFFECTIVELY

Rely on best practices to structure and format the code effectively.

- **Comments** are used to describe and document source code.
- They are special characters informing the compiler that the following words should not be interpreted as code.
- Java allows for different ways to denote comments.

Single-line comments denoted by a double slash (“//”).

Multi-line comments start with a forward slash and an asterisk (“**/***”) and end with an asterisk and forward slash (“***/**”).

Bracketed comments (**[...]**) allow longer explanations directly in the code (often used to document classes, methods and attributes).

An example of single and multi-line comments describing a class, its attributes and methods:

```
[...]
/*
 * This class is the introduction point to the program.
 * It contains the <code>main/code> method, which is used for
 * starting the program. The <code>main</code> method creates
 * automatically all necessary objects and executes all tasks.
 */

public class Main {
  /* The used Online Shop. */
  public OnlineShop onlineShop = null;

  /*
   * Creates a new book with author, title, manufacturer
   * and stock, informs the administration
   * objects and returns the created book.
   */
  public Book newBook(String author, String title,
                      String manufacturer, int stock)
  {
    [...]
}
```

Class comments describe classes

Attribute comments describe attributes

Method comments describe methods

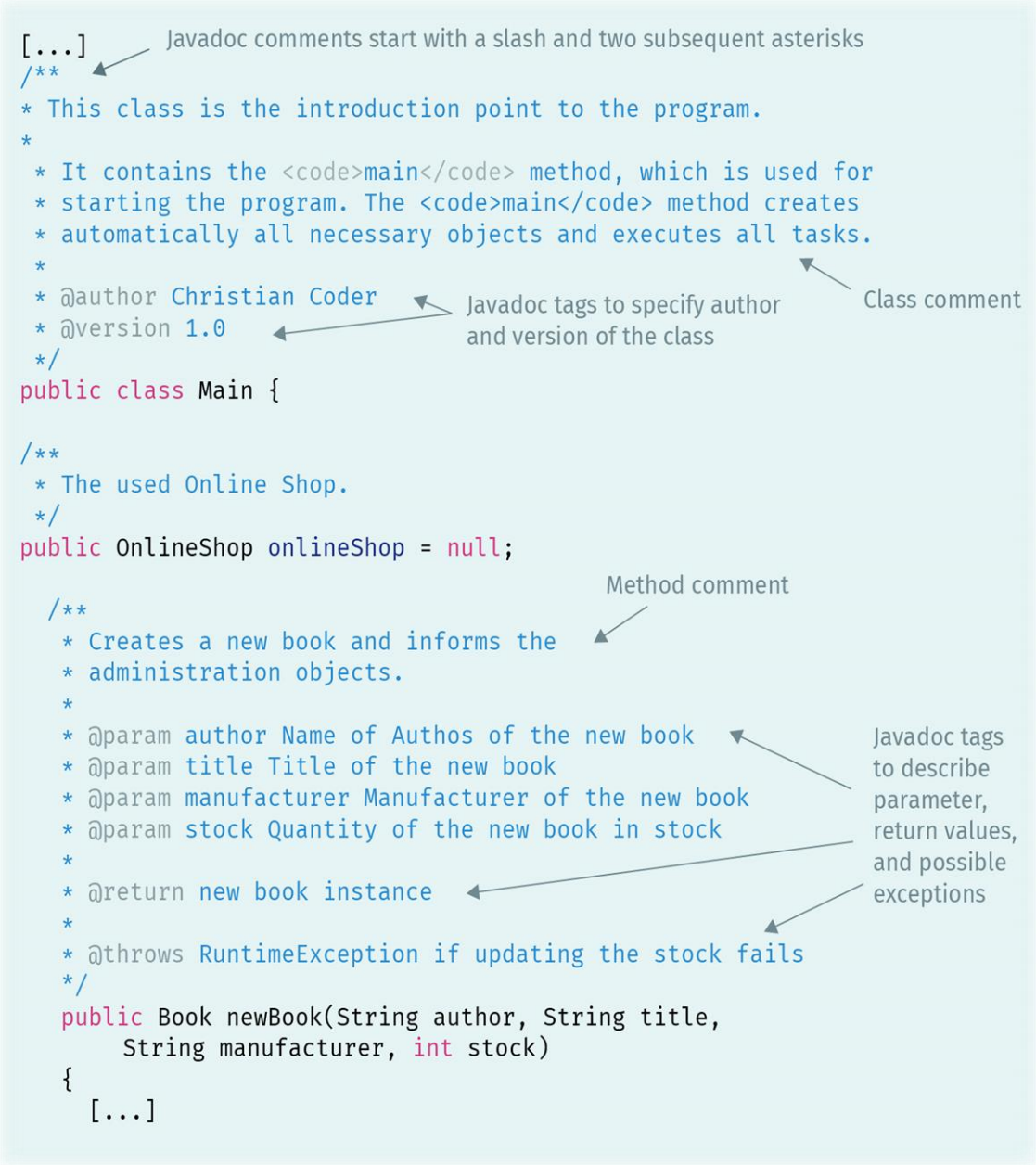
Source of the image: Course Book DLBCDSJCL01, p. 13

- **Javadoc** allows to automatically generate documentation from code that is commented following some standard notation.
- Comments must be introduced with a slash and two subsequent asterisks (“**/****”). Javadoc uses special tags (starting with ‘**@**’) to generate HTML documentation pages.

1. **@author** denotes the author of a file
2. **@param** describes a method’s parameter
3. **@return** describes what the method returns
4. **@throws** lists possible error sources and thrown exceptions

DOCUMENTING CODE USING JAVADOX

- An example of Javadoc-style commenting which leads to automatic code documentation as HTML pages:
- Javadoc commenting and documentation can be done inside the programming environment.



Source of the image: Course Book DLBCSDSJCL01, p. 15

CODE ANNOTATIONS

- Code **annotations** allow to add additional information to Java source code which can be programmatically useful.
- Annotations start with the **@** sign and can be used to annotate classes, methods and attributes.
  - **@Override** is a common annotation used to mark methods that override the methods of a superclass.
  - **@Deprecated** allows to mark classes, methods and attributes that are obsolete, thus, should not be used in new code.
- Annotations help developers to recognize errors more quickly.

- Inherited method getDescription() is overridden, as denoted by the respective annotation.
- Method setPages() is replaced by method setNumberOfPages(), thus becoming obsolete.

Source of the image: Course Book DLBCSDSJCL01, p. 19

- Code **conventions** provide a standardized way of structuring and formatting the code, thus increasing its readability.
- Common Java code conventions include:

writing package names in lowercase letters

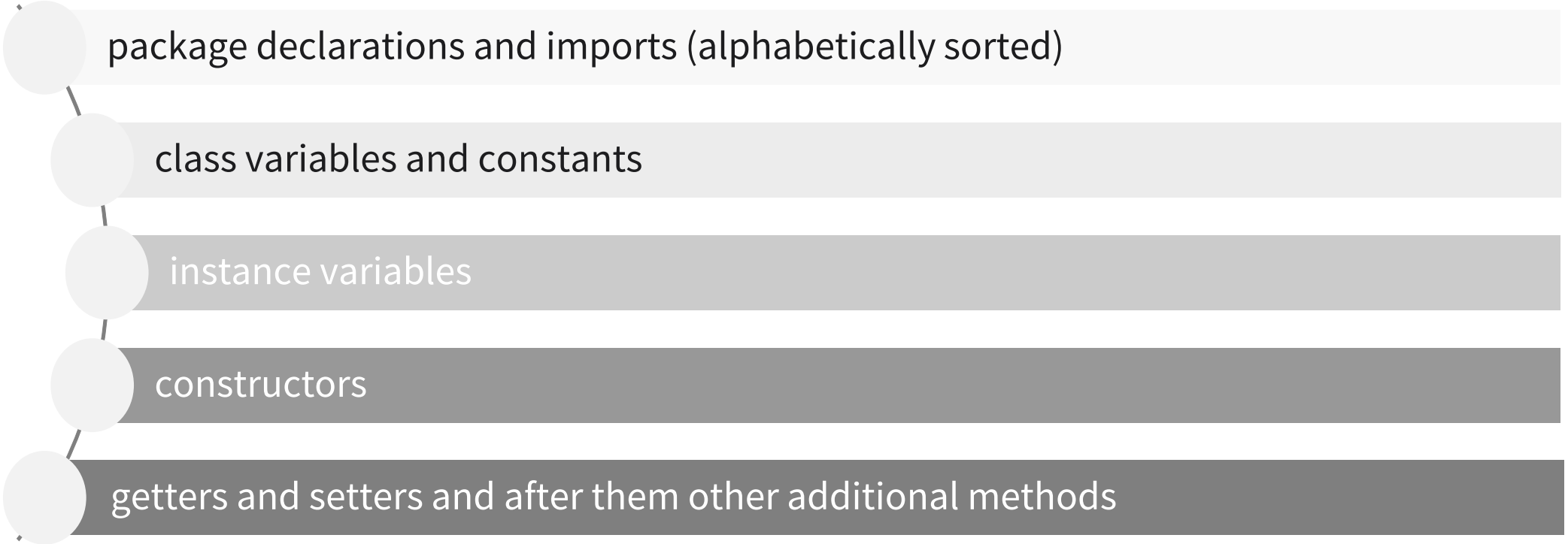
Name classes and interfaces as nouns starting with a capital letter.

Use **camel case** when the name consists of multiple words.

When possible, name methods as verbs. Write them in lowercase or camel case.

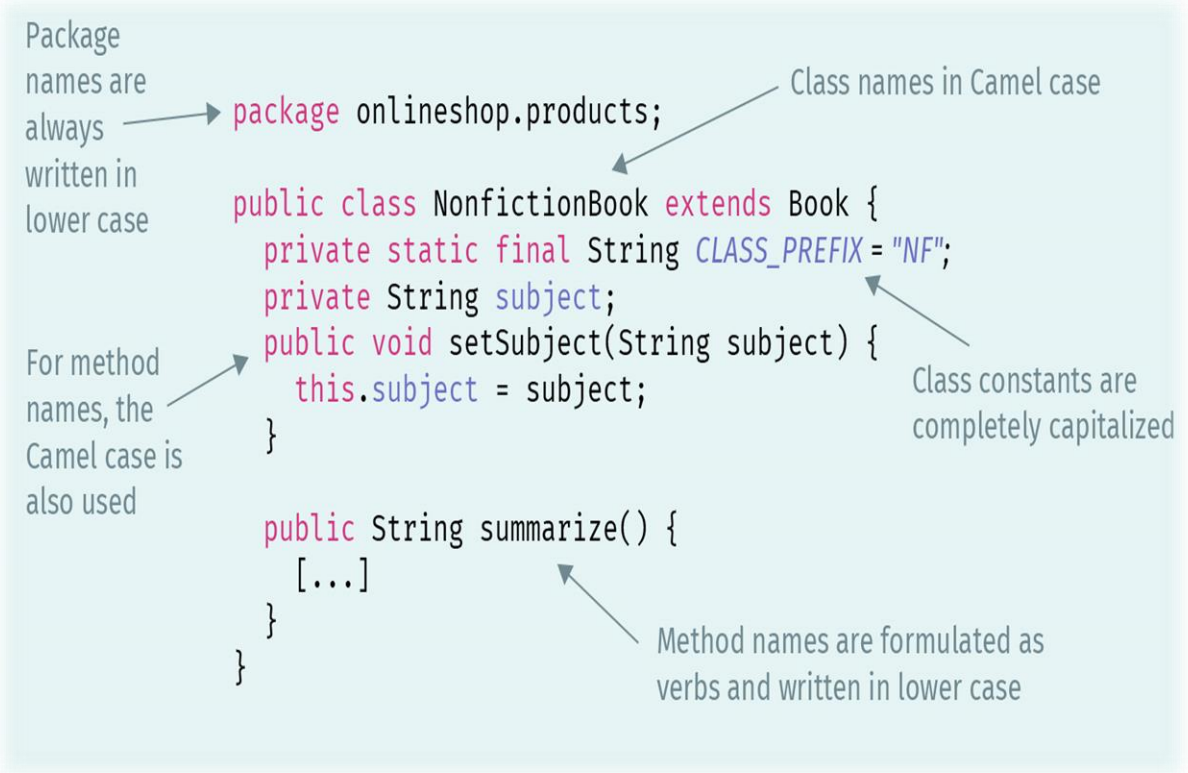
Fully capitalize constants. Name attributes and variables meaningfully.

– When structuring code, items that belong together should also appear together. A common order includes:



CODE CONVENTIONS

- Separating code blocks from one another increases readability.
- Other conventions include:
  - Declaring variables at the beginning of a code block.
  - Write each declaration on a separate line.
  - Use blank lines to group semantically relevant sections.
  - Indent the code properly through the usage of curly brackets ({ }).



Source of the image: Course Book DLBCSDSJCL01, p. 20

REVIEW STUDY GOALS

- Learn to use comments to document code.
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SESSION 1

TRANSFER TASK

1) Consider the provided code defining an Employee class containing.
   Comment the class accordingly using Javadoc style and using special tags such as `@author, @param, @return` and others.
2) **Literature research:** review literature to identify a set of the most used Javadoc tags. Discuss your findings with a classmate.

TRANSFER TASK
PRESENTATION OF RESULTS

Please present your results.

The results will be discussed in plenary.

1. What is the purpose of comments?
   a) Comments document the requirements for the system to be developed.
   b) Comments summarize the meaning and purpose of lines of code and facilitate understanding of the program code.
   c) Comments control the execution of a program.
   d) Comments give the compiler additional information for the compilation process.

2. Javadoc is…

a) … the online documentation of the Java class library.
b) … used to describe maintenance work on the source code.
c) … a program and commenting convention.
d) … a debugging tool that automatically detects errors in the source code.

3. In which order are the elements of a class typically arranged?
   a) static variables and methods, instance variables, constructors, getters and setters, instance methods
   b) static variables and methods, instance variables, instance methods, constructors, getters and setters
   c) getters and setters, static variables and methods, instance variables, instance methods, constructors
   d) instance variables, getters and setters, constructors, instance methods, static variables and methods

LIST OF SOURCES

Oracle. (2019a). *How to write doc comments for the Javadoc tool*. Oracle. Retrieved from https://www.oracle.com/technetwork/java/javase/tech/ index-137868.html