Software Engineering and Programming Basics - WS2021/22
Exercise 1: Data Types, Methods & User Input

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Task 1 - Data Types

In Java, a variable always needs to be a specified data type. There are eight primitive data types in Java. What are they, what are the differences between them? Which data type would you use for the following data? Think of pros and cons.

1. The tank level of a car.
2. If the car is running or not.
3. A phone number.
4. The abstract of an article.
5. The amount of money in a bank account.

The following data is more complex. Which data types could it be composed of?

1. An Address.
2. A Bank Account.
3. A Student.

Task 2 - Methods

A method in Java is composed of two parts: The head and the body. Being able to extract the information from a task and translate it to a fitting method head is a crucial skill that you should take away from this course. To start practising, write a fitting method head for the following tasks:

1. Return the square root of a given whole number.
2. Return the power of a given whole number base with a given whole number exponent.
3. Check if a given bank account has any money. The bank account is identified by an account number.
4. Print the name of a bank account owner and the balance on his account. The bank account is identified by an account number.

For the next tasks, write the whole method. First, figure out the necessary method head and then write the method body:

1. Of two whole numbers given as parameters, return whether the first number is greater than the second number.
2. Return the opposite of a given boolean value.
3. Calculate the polynomial x^2+3x-7 of a given integer x. Return the result.

Task 3 - User Input

In this course, we will usually not work with user input but use parameters to give necessary data to the methods. However, there might be some tasks where we specifically ask for user input or you might just want to learn about it for yourself. You can learn how user input works here: `https://www.w3schools.com/java/java_user_input.asp`

Input vs Parameters

It is important to understand when a task asks for user input and when it asks for a parameter. For example, if a task reads "write a program, that reads a number from the console line" or "write a program, that asks the user for a number", it is asking for user input. If data is just 'given' to a method, it is asking for a parameter. For the scope of this course, we will always state explicitly if we are asking for user input.

Printing vs Returning

To work with data, we not only need to be able to input it into a method, but also to get it back. Here it is important to distinguish between returning data and printing data. We can print data to the console to show it to the user. However, data that is only printed can not be further processed by the program. To process data with more than one method, methods need to return the data. So always read closely, what a task wants you to do and watch out for the words 'print' and 'return'.

To practise user input, write a program that asks the user to input information. For example, the user should input their name, age and matriculation number. Then print the information to the console.