

Java Assignment 2

This assignment is about making a particular Java class, called Bank, thread-safe.

You will need the following files:

- 1) Account.java
- 2) Operation.java
- 3) Transaction.java
- 4) Bank.java

The zip file JavaAssignment2Code.zip includes the files above, and can be downloaded from iLearn.

The class Account represents a bank account, the class Operation represents a single operation of changing the balance of a bank account, the class Transaction represents a transaction including a number of operations, and you are not allowed to modify any of these classes.

In a transaction, either all of its operations should succeed or none should succeed.

The class Bank is not thread-safe, and your task is to modify it to make it thread-safe but also to keep it performant. You should in your code write clear comments describing the modifications you have done.

Basic task (grade C/D/E/F)

Your task is to modify the Bank class, **excluding** method runTransaction, in such a way that:

- a) it (excluding method runTransaction) is thread safe by using locks;
- b) it is performant (has good performance), when accessed from multiple concurrent threads, by only locking the account which is accessed in an operation;
- c) there is no risk for deadlock.

Advanced task (grade A/B/C/F)

Your task is to modify the Bank class, **including** method runTransaction, in such a way that:

- a) it is thread safe by using locks;
- b) it is performant (has good performance), when accessed from multiple concurrent threads, by only locking the accounts which are accessed in an operation or transaction;
- c) there is no risk for deadlock.

To be able to get grade A or B you should submit your solution before the first deadline.

Submission

Your submission should be a **single file** called **Bank.java** including your modified version of the given file Bank.java, and it should be submitted to the appropriate place in iLearn2.

The first line in the file should include the name of the author.

Good luck!