Exercise 7 (10 points)

- The first lines of all source files must be comment containing your name & ID

- Put all files (source, input, output) in folder Ex7_xxx where xxx = your full ID. That is, your source files must be in package Ex7_xxx and input/output files (if there is any) must be read from/write to this folder

- Zip Ex7_xxx & submits it to Google Classroom. Email submission is not accepted

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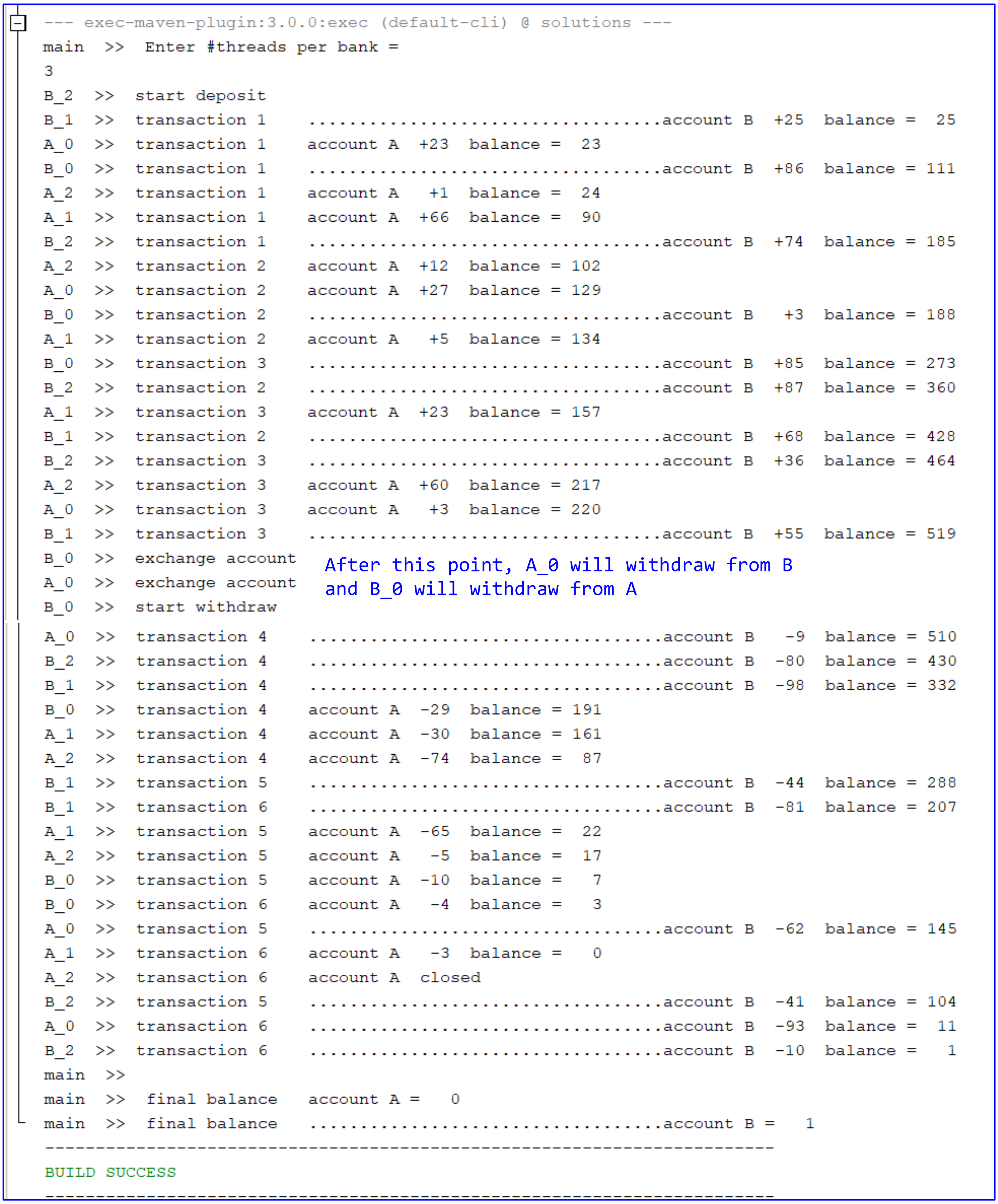
Complete the given source file to make the program work as follows:

1. Complete class BankThread. You can add more variables & methods, change method headers, but don’t change the visibility of existing ones
   - Use Exchanger to exchange Account between BankThreads
   - Use CyclicBarrier to make BankThreads start some tasks at the same time

2. Complete class Account. You can add more variables & methods, change method headers, but don’t change the visibility of existing ones
   - Use Semaphore or monitor to let only 1 thread update balance and print to System.out at a time. To get correct result, balance & System.out should be protected together

3. Complete method runSimulation for main thread’s activities
   - Use Join to make main thread wait until all BankThreads complete their works before printing final balances

4. Every output line must be labelled by the name of the thread who prints it. Don’t hard code thread name, but use Thread.currentThread() to get the printing thread



```
--- exec-maven-plugin:3.0.0:exec (default-cli) @ solutions ---
main  >>  Enter #threads per bank =
3
B_2  >>  start deposit
B_1  >>  transaction 1   .................................account B  +25  balance =  25
A_0  >>  transaction 1   account A  +23  balance =  23
B_0  >>  transaction 1   .................................account B  +86  balance = 111
A_2  >>  transaction 1   account A   +1  balance =  24
A_1  >>  transaction 1   account A  +66  balance =  90
B_2  >>  transaction 1   .................................account B  +74  balance = 185
A_2  >>  transaction 2   account A  +12  balance = 102
A_0  >>  transaction 2   account A  +27  balance = 129
B_0  >>  transaction 2   .................................account B   +3  balance = 188
A_1  >>  transaction 2   account A   +5  balance = 134
B_0  >>  transaction 3   .................................account B  +85  balance = 273
B_2  >>  transaction 2   .................................account B  +87  balance = 360
A_1  >>  transaction 3   account A  +23  balance = 157
B_1  >>  transaction 2   .................................account B  +68  balance = 428
B_2  >>  transaction 3   .................................account B  +36  balance = 464
A_2  >>  transaction 3   account A  +60  balance = 217
A_0  >>  transaction 3   account A   +3  balance = 220
B_1  >>  transaction 3   .................................account B  +55  balance = 519
B_0  >>  exchange account   After this point, A_0 will withdraw from B
A_0  >>  exchange account   and B_0 will withdraw from A
B_0  >>  start withdraw
A_0  >>  transaction 4   .................................account B   -9  balance = 510
B_2  >>  transaction 4   .................................account B  -80  balance = 430
B_1  >>  transaction 4   .................................account B  -98  balance = 332
B_0  >>  transaction 4   account A  -29  balance = 191
A_1  >>  transaction 4   account A  -30  balance = 161
A_2  >>  transaction 4   account A  -74  balance =  87
B_1  >>  transaction 5   .................................account B  -44  balance = 288
B_1  >>  transaction 6   .................................account B  -81  balance = 207
A_1  >>  transaction 5   account A  -65  balance =  22
A_2  >>  transaction 5   account A   -5  balance =  17
B_0  >>  transaction 5   account A  -10  balance =   7
B_0  >>  transaction 6   account A   -4  balance =   3
A_0  >>  transaction 5   .................................account B  -62  balance = 145
A_1  >>  transaction 6   account A   -3  balance =   0
A_2  >>  transaction 6   account A  closed
B_2  >>  transaction 5   .................................account B  -41  balance = 104
A_0  >>  transaction 6   .................................account B  -93  balance =  11
B_2  >>  transaction 6   .................................account B  -10  balance =   1
main  >>
main  >>  final balance   account A =   0
main  >>  final balance   .................................account B =    1
------------------------------------------------------------------------
BUILD SUCCESS
------------------------------------------------------------------------
```