**Core content homework assignment 6 (CC6)**

Qu 1. (40 points) Fill in the changeOrders() method of the provided CC6skeleton.java file. Note that you can use the TransactionDemo.java file as a useful model.

Qu 2. The following table represents two transactions running in a database system, with operations interleaved over time. The two transactions interact with values stored at three locations in the database, named , and . The transactions also use local variables .

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| time | transaction 1 | transaction 2 | location | location | location |
| 1 | begin transaction |  | 50 | 20 | 80 |
| 2 |  |  |  |  |  |
| 3 |  |  |  |  |  |
| 4 |  |  |  |  |  |
| 5 |  | begin transaction |  |  |  |
| 6 |  |  |  |  |  |
| 7 |  |  |  |  |  |
| 8 |  |  |  |  |  |
| 9 |  |  |  |  |  |
| 10 |  |  |  |  |  |
| 11 |  |  |  |  |  |
| 12 |  |  |  |  |  |
| 13 |  |  |  |  |  |
| 14 |  |  |  |  |  |
| 15 | commit |  |  |  |  |
| 16 |  |  |  |  |  |
| 17 |  | commit |  |  |  |

(a) (5 points) Assume the database is using no concurrency control. Under this assumption, what are the final values stored in locations , and ?

(b) (10 points) What type of concurrency problem occurred in part (a)? Use terminology from section 14.4.1 of the textbook, and briefly explain how and why the problem occurred.

(c) (5 points) Now assume the database is using the *rigorous two-phase locking* protocol, as defined in the textbook. (This is the default setting in MySQL.) Also assume that the transaction manager eliminates deadlocks as follows: if two transactions are deadlocked, the transaction that began most recently is canceled. Under these assumptions, what are the final values stored in locations , and ?

(d) (10 points) Explain your answer to part (c). Make sure to explain how and why it differs from part (a). Mention which transactions commit successfully and which need to be rolled back.

Total points on assignment: xx points