PDP Lab 1.

Rad George-Rares 926/2

I chose problem 1, the shop one.

1. Supermarket inventory:

There are several types of products, each having a known, constant, unit price. In the beginning, we know the quantity of each product.

We must keep track of the quantity of each product, the amount of money (initially zero), and the list of bills, corresponding to sales. Each bill is a list of items and quantities sold in a single operation, and their total price.

We have sale operations running concurrently, on several threads. Each sale decreases the amounts of available products (corresponding to the sold items), increases the amount of money, and adds a bill to a record of all sales.

From time to time, as well as at the end, an inventory check operation shall be run. It shall check that all the sold products and all the money are justified by the recorded bills.

Hardware:

I5 Quadcore 2.8ghz

8GB RAM

Tests:

1. Datasize: 3000 + 2 threads => 0.34 sec
2. Datasize :3000 + 10 threads => 1.03 sec
3. Datasize :3000 + 100 threads => 5.8 sec

I used Java as a language. For the synchronization part I used the ReentrantLock class in order to lock the critical resource, in this case, each product when it is sold. I use as many threads as Orders I have, and after each order is complete I run a consistency check that verifies if the value on the Bill is the same as the one that it was actually sold from the shop. I also have a flag in each Order that is used to point if the order has been completed or not, this way the program can be optimized by at each thread run the thread should filter out from the global order list the ones that are completed already.