Concurrent and Parallel Programming

MSCBD-CPP

Assignment 3

Question 1

A car sales company requires a server to store all its car data and share it between its sales personnel. For the purposes of this assignment each car has the following attributes: registration, make, price, mileage and forSale (use a boolean- true for forSale and false for sold). Clients can do the following:

-A sales person can add a new car to the system.
-Sell a car
-Request information from the system.
Sample requests would be cars for sale, cars of a given make, total value of all sales.

All cars added to the system should be stored in a shared data structure on the server. Your task is to build a working model of this system.
Notes
1. No log on/off required for users.
2. For this assignment you should add approximately 15 cars to the system.
3. Server should use thread pool and semaphores to limit users to 50
4. All requests to server must be objects
5. Cars added on server must be thread safe as many clients have conflicting requests

Sample output on moodle.

Question 2

Use the class MyArrayList to implement the interface MyList listed below using parallel streams and write a test program to test the methods. The class should be thread safe.

```
interface MyList<E>{
    public void add(E x);
    public void add(List<E> lst);
    public boolean forAll(Predicate<E> pr);
    public boolean exists(Predicate<E> pr);
    public long count(Predicate<E> pr);
```

```
    public List<E> map(Function<E,E> fn);
    public List<E> filter(Predicate<E> pr);
    public List<E> mapFilter(Function<E,E> fn, Predicate<E> pr);
}

class MyArrayList<E> implements MyList<E>{
    private ArrayList<E> data = new ArrayList<>();
    …
}
```