Design patterns lab 1

Exercise 1

The interface MyList with methods add (adds at the end of the list) and get(int index) is implemented by three classes MyArrayList, MyLinkedList and MySynchronizedList. MyArrayList is backed by an array, MyLinkedList by a linkedlist and MySynchronizedList has synchronized add and remove methods. Interface MyList has a static method getList(enum ListType) which returns the appropriate implementation. For the exercise work only with integers.

Implement MyList, MyArrayList, MyLinkedList and MySynchronizedList and test the classes with the following code.

```
MyList arrayList = MyList.getList(ListType.Array);
arrayList.add(5);
System.out.print(arrayList.get(0));
MyList linkedList = MyList.getList(ListType.LinkedList);
linkedList.add(7);
System.out.print(linkedList.get(0));
MyList syncList = MyList.getList(ListType.SyncList);
syncList.add(9);
System.out.print(syncList.get(0));
```

End of exercise 1

Exercise 2

A car has the following features:
-brand (required)
-production year(required)
-engine power(required)
-fuel type(required)
-chassis number(required)
-sound system (optional, default is Sound.RadioCD)
-navigation (optional, default is Navigation.None)
-air conditioning (optional, default is Air.MANUAL)

Use a Builder pattern so that different combinations of parameters are used to construct car objects. The object has to be immutable.

eg.

```
Car fordTrend=new Car.Builder(“Ford”,2009,87,”diesel”,”XYZ”).build();


Car fordTitanium=new
Car.Builder(“Ford”,2018,125,”diesel”,”WWW”).sound(Sound.MP3).navigation(Navigation.SMALL).build();

Car fordEco = new Car.Builder(“Ford”,2019,100,”gas”,”YHD”).air(Air.AUTO).build();
```

End of exercise 2

Exercise 3

A decorator can be used to add additional behavior to objects at runtime. Reuse the MyList interface and classes from the first exercise. Implement a LoggingDecorator so that each time add method is called a message is displayed on the console detailing what element was added.

```
LoggingDecorator loggedList = new LoggingDecorator(MyList.getList(ListType.Array);
loggedList.add(5);
// Default output displays “5 was added to the list”
```

End of exercise 3