WELCOME BACK
&
THANK YOU

Advance Java
Crash Course

For TD Bank

MEET YOUR CRASH COURSE TEAM

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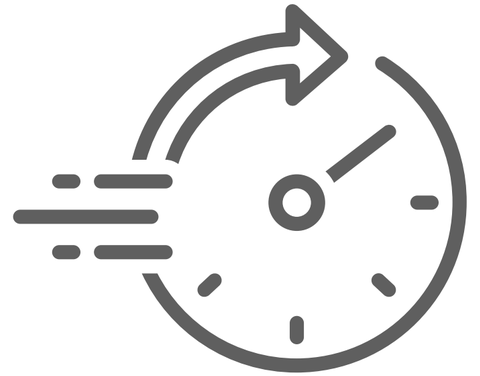
Rapid Review

TRIVIA



Rapid Trivia

Which company developed the java language

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TRAINING DAY 4

TODAY'S AGENDA

1. Yesterday's Coding Exercise to Go Rapid Review
2. Design Patterns. The Bridge Pattern
3. Wildcards
4. Iterator Design Pattern
5. Garbage Collections

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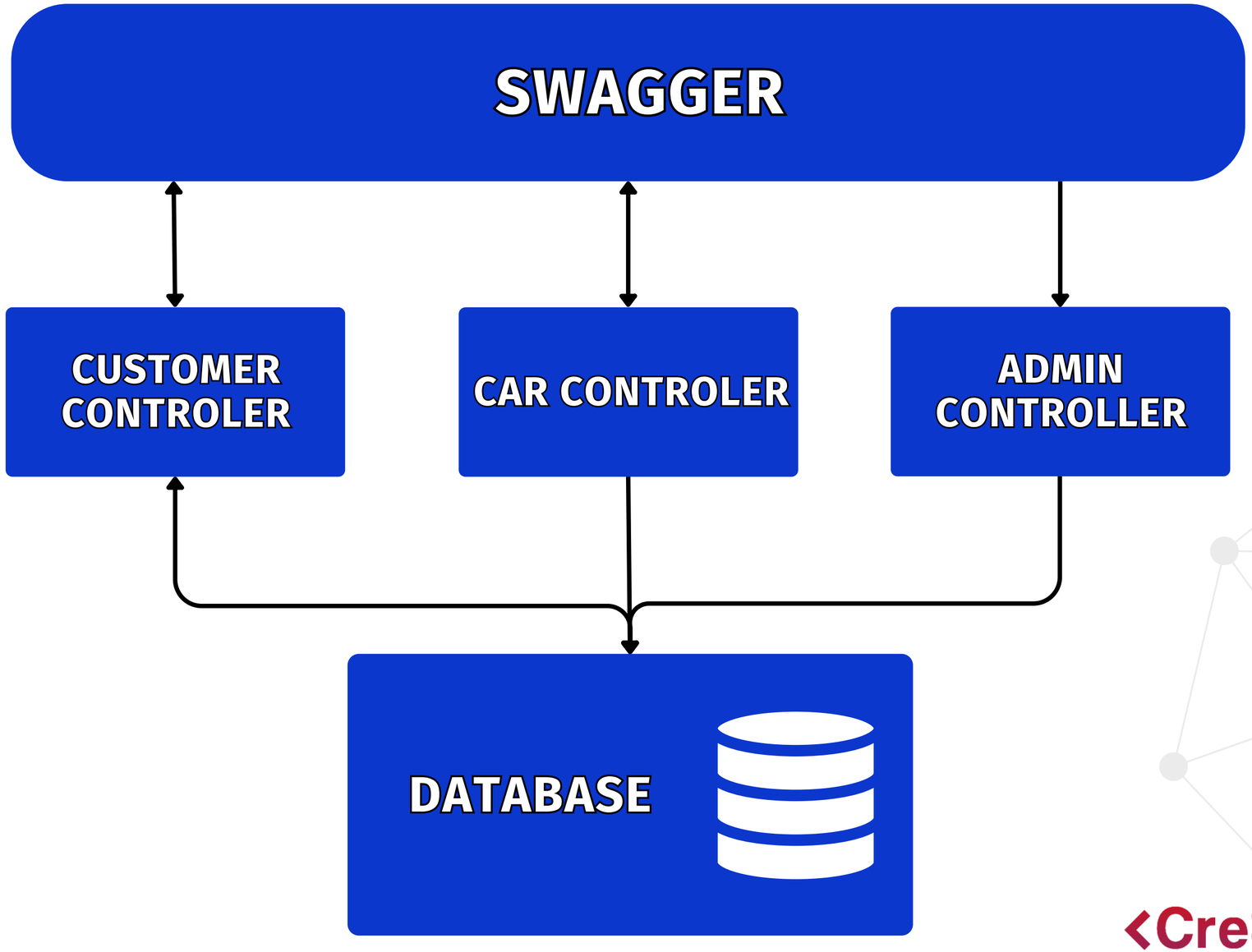
BITE SIZE
CAR RENTAL APP

WE ARE BUILDING



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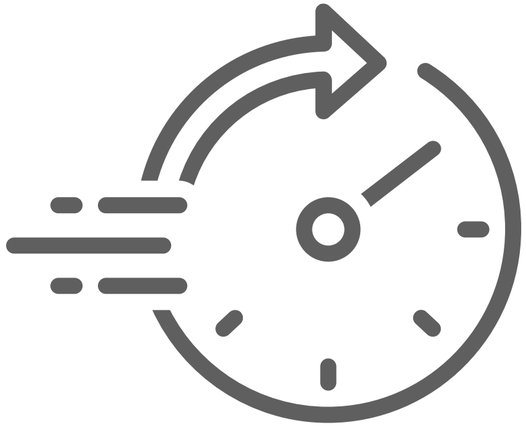
Rapid Review
Lesson 1



Rapid Review

Add circuit breaker to unregister car

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YERSTERDAYS CODING EXERCISE TO GO

Create an UnregisterCircuitBreaker class that extends HystrixCommand<ResponseEntity<String>>. Use this class to add a circuit breaker to **unregister** API. You can use SampleBreaker bellow left as guide.

Use breakpoints to test and you should receive a return like the one bellow

```java
package com.mains.CircuitBraker;
import com.netflix.hystrix.HystrixCommand;
import com.netflix.hystrix.HystrixCommandGroupKey;

class SampleBreaker extends HystrixCommand<String> {
    SampleBreaker() {
        super(HystrixCommandGroupKey.Factory.asKey(name:"SampleGroup"));
    }

    @Override
    protected String run() {
        return "Service response";
    }

    @Override
    protected String getFallback() {
        return "Fallback response";
    }
}
```

500
Undocumented

Error: response status is 500

Response body

```
Fallback Response
```

YESTERDAY'S CODING TO GO REVIEW

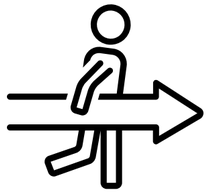
src > main > java > com > carrental > autohire > service > UnregisterCircuitBreaker.java > UnregisterCircuitBreaker > run()

```java
package com.carrental.autohire.service;
import com.netflix.hystrix.HystrixCommand;
import com.netflix.hystrix.HystrixCommandGroupKey;
import org.springframework.http.HttpStatus;
import org.springframework.http.ResponseEntity;

public class UnregisterCircuitBreaker extends HystrixCommand<ResponseEntity<String>> {
    private CarService carService;
    private Long carId;
    public UnregisterCircuitBreaker(CarService carService, Long carId) {
        super(HystrixCommandGroupKey.Factory.asKey(name:"CarGroup"));
        this.carService = carService;
        this.carId = carId;
    }

    @Override
    protected ResponseEntity<String> run() {
        // execute potentially risky situation
        return new ResponseEntity<>(carService.unregisterCarById(carId), HttpStatus.OK);
    }

    @Override
    protected ResponseEntity<String> getFallback() {
        // Fallback response in case of failure
        return new ResponseEntity<>(body:"Fallback Response", HttpStatus.INTERNAL_SERVER_ERROR);
    }
}
```



Let's see it running.

```java
@PostMapping("unregister/{carId}")
public ResponseEntity<String> unregisterCar(@PathVariable Long carId) {
    return new UnregisterCircuitBreaker(carService, carId).execute();
   //return new ResponseEntity<>(carService.unregisterCarById(carId), HttpStatus.OK);
}
```

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DAY 4
LESSON 2

Design Patterns
The Bridge Pattern

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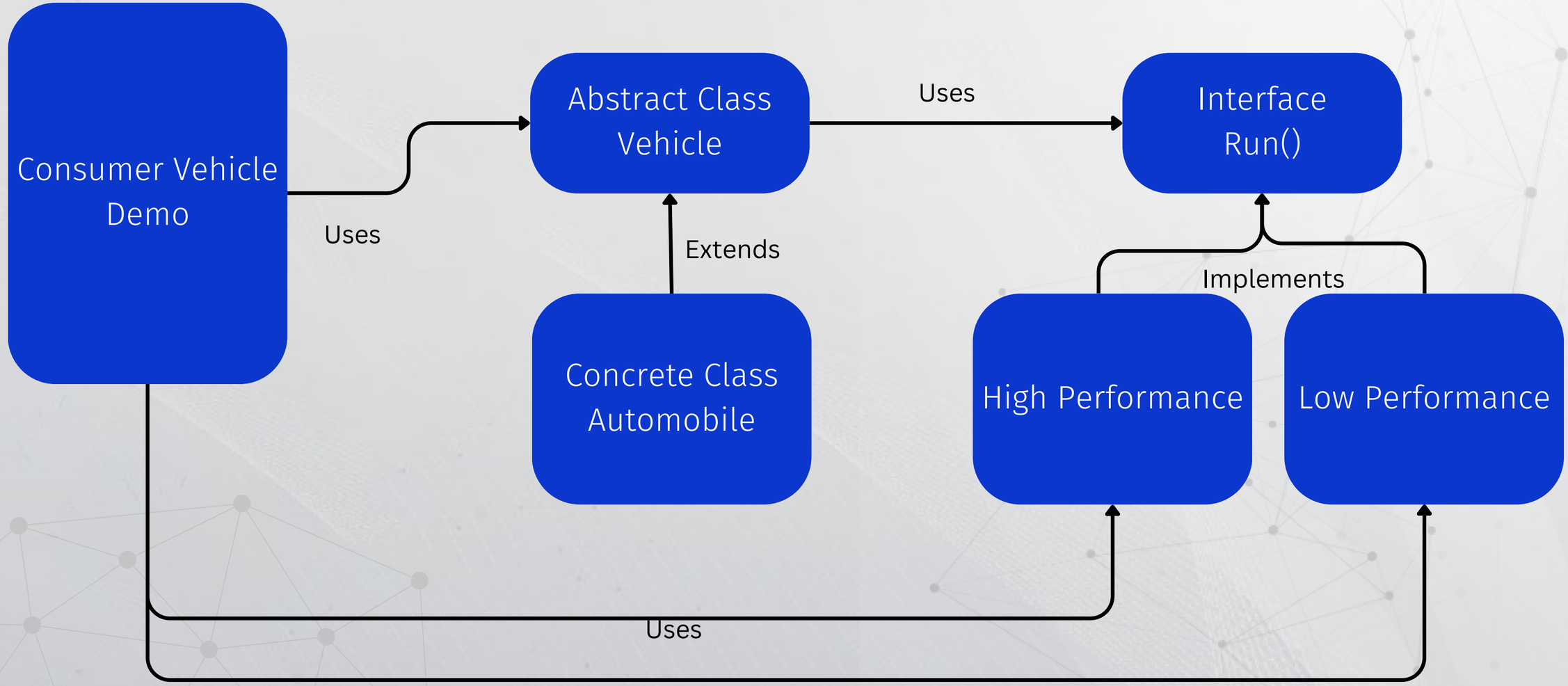
UNDERSTANDING DESIGN PATTERNS

Bridge Pattern



UNDERSTANDING DESIGN PATTERNS

Bridge Pattern High Level Abstraction

```java
package com.carrental.BridgePattern;
public abstract class Vehicle {
    protected RunAPI runAPI;

    protected Vehicle(RunAPI runAPI){
        this.runAPI = runAPI;
    }
    public abstract void run();
}
```

```java
package com.carrental.BridgePattern;
public class Car extends Vehicle {

    public Car(RunAPI runAPI) {
        super(runAPI);
    }

    public void run() {  // implement high level logic here
        runAPI.runVehicle(vehicleType:"Car");
    }
}
```

UNDERSTANDING DESIGN PATTERNS

Bridge Pattern Low Level Implementation

```java
package com.carrental.BridgePattern;
public interface RunAPI {
    public void runVehicle(String vehicleType);
}
```

```java
package com.carrental.BridgePattern;
public class HighPerformance implements RunAPI {
    @Override
    public void runVehicle(String vehicleType) { // Implement specific logic here
        System.out.println(vehicleType + " is High Performance");
    }
}
```

```java
package com.carrental.BridgePattern;
public class LowPerformance implements RunAPI {
    @Override
    public void runVehicle(String vehicleType) { // Implement specific logic here
        System.out.println(vehicleType + " is Low Performance");
    }
}
```

UNDERSTANDING DESIGN PATTERNS

Bridge Pattern Consumer Class.

```java
package com.carrental.BridgePattern;

import java.util.ArrayList;

public class VehicleDemo {
    Run | Debug
    public static void main(String[] args) {

        ArrayList <Vehicle> vehicleList = new ArrayList<>();
        vehicleList.add(new Car(new HighPerformance()));
        vehicleList.add(new Car(new LowPerformance()));

        for (Vehicle vList : vehicleList) {
            vList.run();
        }
    }
}
```

Let's see it running.

DAY 4
LESSON 3

Wildcards

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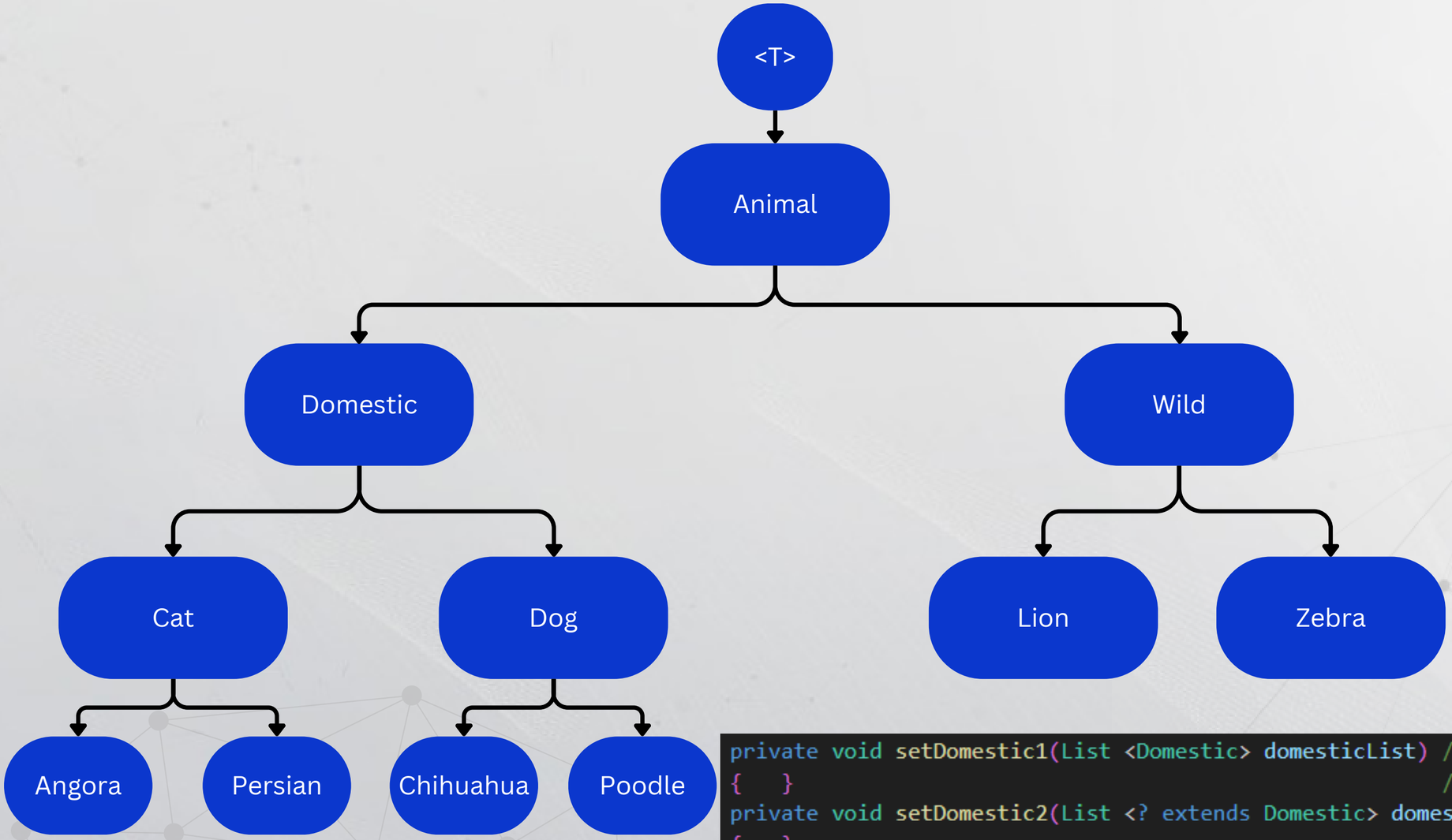
GENERICS AND WILDCARDS



Let's see the code.

```
private void setDomestic1(List <Domestic> domesticList) // Generics
{   }                                                   // List with Domestic
private void setDomestic2(List <? extends Domestic> domesticList) // Generecs & lower bound wildcards
{   }                                                             // List with Domestic or lower classes
private void setDomestic3(List <? super Domestic> domesticList) // Generics & upper bound wildcards
{   }                                                           // List with Domestic or upper classes
```

DAY 4
LESSON 4

Iterator Design Pattern

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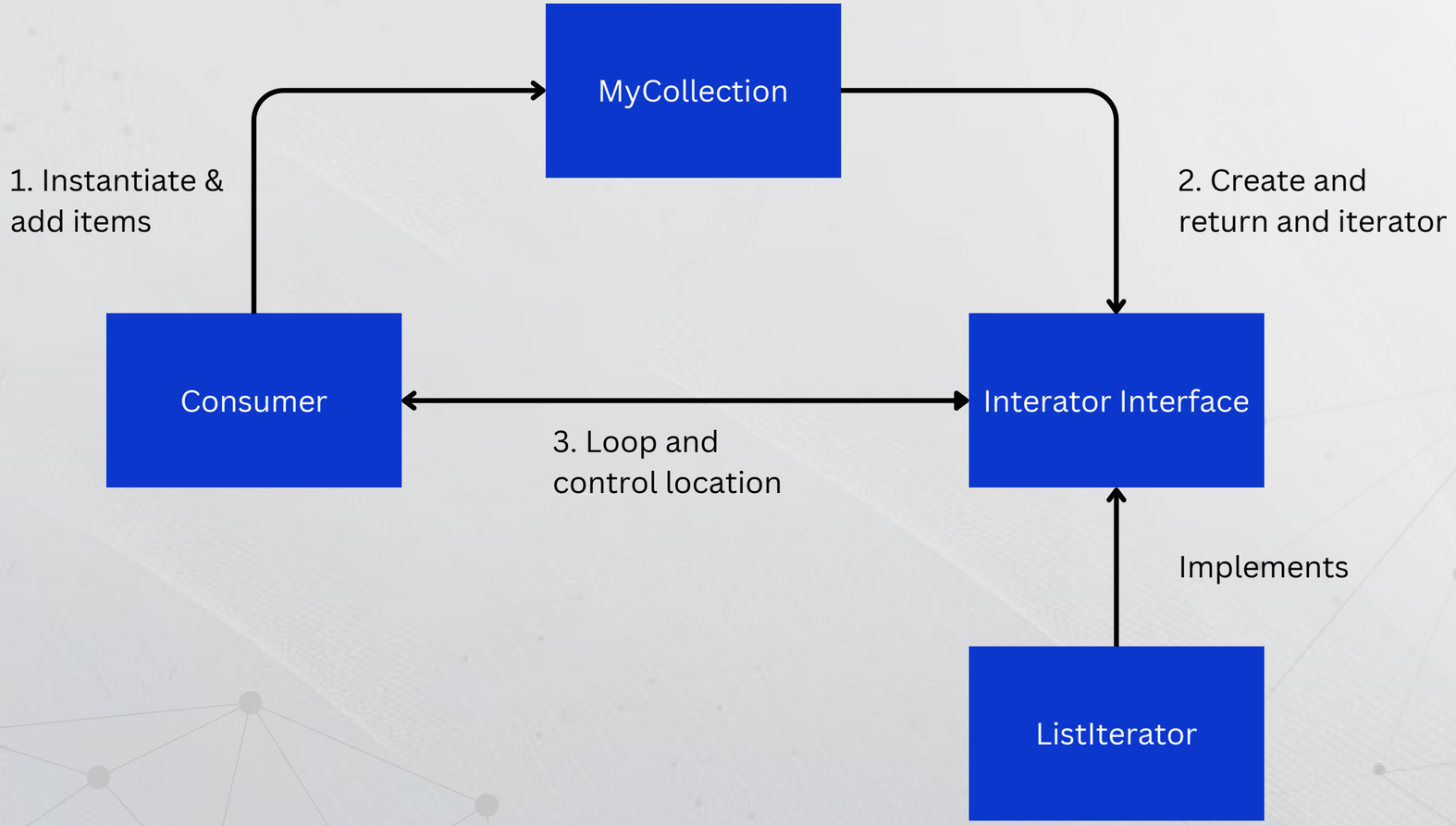
UNDERSTANDING DESIGN PATTERNS

Iterator Pattern



Let's Take a Look.

DAY 4
LESSON 5

Garbage Collection

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GARBAGE COLLECTION

Release objects you no longer need;

```
object = null;
```

Propose JVM perform garbage collection

```
System.gc();
```

Use appropriate memory management patterns

- **Weak references**
- Soft references
- Phantom references

```
Map<String, WeakReference<Image>> weakRefObject = new WeakHashMap<>();
```

```
Object strongRefObject = new Object();
WeakReference<Object> weakRef = new WeakReference<>(strongRefObject);
```

Let's see the code.

CODING TRIVA QUESTION

Change items type from String to Boolean and make it display;

How is now

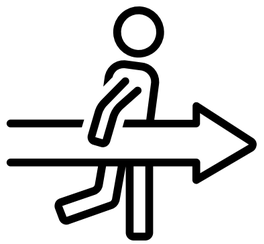
```
Item: Item 1
Item: Item 2
Item: Item 3
```

How it should be

```
Item: true
Item: true
Item: false
```

CODING TRIVA ANSWER

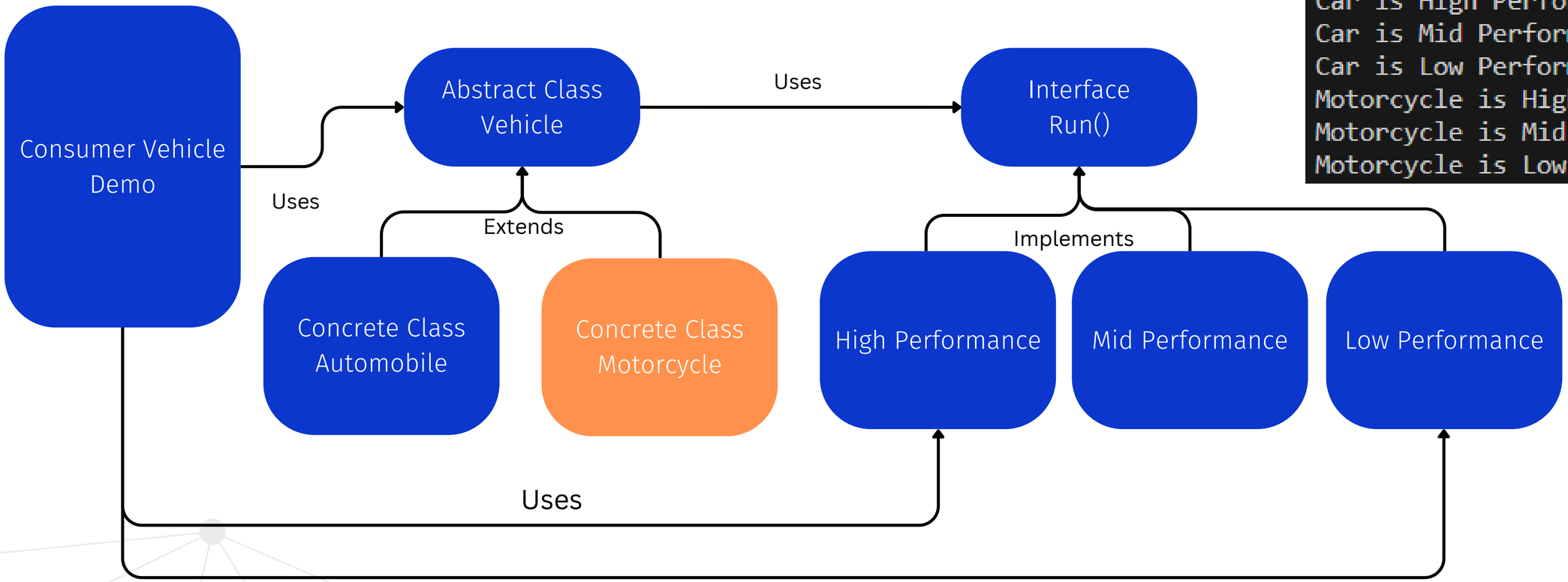
```java
package com.mains.Iterator;


public class IteratorPatternExample {
    Run | Debug
    public static void main(String[] args) {
        MyCollection<Boolean> collection = new MyCollection<>();
        collection.addItem(item:true);
        collection.addItem(item:true);
        collection.addItem(item:false);

        Iterator<Boolean> iterator = collection.createIterator();
        while (iterator.hasNext()) {
            Boolean item = iterator.next();
            System.out.println("Item: " + item);
        }
    }
}
```



Let's Take a Look.

CODING EXERCISE TO GO

Remember this, we added mid performance, now add Motorcycle Vehicle type in order to print what's shown on the right.




```
Car is High Performance
Car is Mid Performance
Car is Low Performance
Motorcycle is High Performance
Motorcycle is Mid Performance
Motorcycle is Low Performance
```

THANK YOU

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We will see you tomorrow