

## Lab10

### SENG102

Question01:

In this assignment, your program must have a Main class and Volvo class like in the below;

```
class Main {
    public static void main(String[] args) {

        S60B4 d1 = new S60B4(290);
        d1.engineStart();

        System.out.println("-----New Entrance-----");

        S60D2 d2 = new S60D2(175);
        d2.engineStart();

    }
}

class Volvo {

    public String name() {
        return "Volvo";
    }

}
```

You will have an abstract class name is "S60" which will be children of Volvo class.

- It will hold topSpeed variable which is the same for all Volvo S60 cars, it is equal to 180 kmh.
- It will hold two abstract methods which are;

```
abstract void engineStart();
abstract void showSpeed();
```

- There will be two S60 model classes which are "S60D2" and "S60B4". Both of these classes are created from S60 class.
- On each class you have to keep speed limit of the cars which is already defined before as 180 kmh. This information must be inherited from the S60 class.
- There is another variable you need will have to keep model name of the car which are "S60 B4" and "S60 D2".
- Also, you have to keep the user speed request on these model classes.
- In these model classes, you have to implement body of the **engineStart()** and **showSpeed()** methods.

- **showSpeed()** method will compare car speed limit with the user speed request. If the user requested speed is greater than the car speed limit, it will show the warning. Else, it will write an output that, it is safe to drive.
- **engineStart()** method will write the informations about the car and its model.
- You have to use “**Thread.sleep(x)**” commands between the messages while you showing.
- You can use between **1000-3000 ms** for these waiting time.
- Do not forget that, **showSpeed()** method must be implemented inside engineStart() Method.

### **Important Warning:**

- All of your car information must be taken from the inherited class except for model names.
- After completing your laboratory assignment, do not lose your works that you already made. You will have to use same project to complete the second phase of the laboratory assignment.

### **Expected Results:**

Engine is started!  
 Welcome to Volvo S60 B4  
 You want to achieve 290 kmh speed  
 Let's check your speed If It is safe...  
 Limited Top Speed is: 180 kmh.  
 It is not safe to drive at 290 speed!  
 -----New Entrance-----  
 Engine is started!  
 Welcome to Volvo S60 D2  
 You want to achieve 175 kmh speed  
 Let's check your speed If It is safe...  
 Limited Top Speed is: 180 kmh.  
 It is safe to drive at 175 speed!

## Question02:

In this assignment, you have to implement:

An adaptive cruise control system “**public void adaptiveCruiseControlSpeed(int topSpeed)**” on your previous project.

This system will keep people safe on the road by increasing and decreasing the speed automatically. The algorithm works as described below.

- If car speed > 40 then it will automatically work.
- If the car speed higher than the car speed limit, the car's max speed will be changed into this limit automatically.
- In this case our speed limit for the car has already been defined as 180 kmh.
- System will apply emergency brakes when the distance between cars is less than 20 meters and speed is higher than the front car.
- System will slow down car if the speed is higher than the other car and the distance is higher and equal than the 20 meters.

### Expected Results:

#### Sample Run 1:

Engine is started!  
Welcome to Volvo S60 B4  
You want to achieve 290 kmh speed  
Let's check your speed If It is safe...  
Limited Top Speed is: 180 kmh.  
It is not safe to drive at 290 kmh speed!  
Adaptive Cruise Control is active.  
The front car speed is 22  
The distance: 37. Car is slowing...

#### Sample Run 2:

Engine is started!  
Welcome to Volvo S60 B4  
You want to achieve 290 kmh speed  
Let's check your speed If It is safe...  
Limited Top Speed is: 180 kmh.  
It is not safe to drive at 290 kmh speed!  
Adaptive Cruise Control is active.  
The front car speed is 50  
The distance: 10. Emergency Braking is applying!

### Sample Run 3:

Engine is started!  
Welcome to Volvo S60 B4  
You want to achieve 39 kmh speed  
Let's check your speed If It is safe...  
Limited Top Speed is: 180 kmh.  
It is safe to drive at 39 kmh speed!  
Adaptive Cruise Control is not available.

### Sample Run 4:

Engine is started!  
Welcome to Volvo S60 B4  
You want to achieve 290 kmh speed  
Let's check your speed If It is safe...  
Limited Top Speed is: 180 kmh.  
It is safe to drive at 160 kmh speed!  
Adaptive Cruise Control is active.  
The front car speed is 170  
The distance: 30. Adaptive Cruise is secure and active...