COMPTE RENDU LAB4

Car

```java
public class Car {
    private int speed;
    private int reg_year;

    public Car(int ry) {
        reg_year = ry;
        speed = 0;
    }

    /**
     * @return the speed
     */
    public int getSpeed() {
        return speed;
    }

    /**
     * @return the reg_year
     */
    public int getReg_year() {
        return reg_year;
    }

    /**
     * @param speed the speed to set
     */
    public void setSpeed(int speed) {
        this.speed = speed;
    }
}
```

CarDriver

```java
public class CarDriver {
    private Car car;
    private int nb_month;
    private int points;

    public CarDriver(Car c, int nm, int p) {
        car = c;
        nb_month = nm;
        points = p;
    }
    /**
     * @return the nb_month
     */
    public int getNb_month() {
        return nb_month;
    }
    /**
     * @return the points
     */
    public int getPoints() {
        return points;
    }
    /**
     * @return the car
     */
    public Car getCar() {
        return car;
    }
    /**
     * @param points the points to set
     */
    public void setPoints(int points) {
        this.points = points;
    }
}
```

RadarSpeedMonitor

```java
public class RadarSpeedMonitor {
    private int speed_limit;

    public RadarSpeedMonitor(int sl) {
        speed_limit = sl;
    }
    public boolean speedLimitExceeded(Car car) {
        if (car.getSpeed()>speed_limit)
            return true;
        return false;
    }
    /**
     * @return the speed_limit
     */
    public int getSpeed_limit() {
        return speed_limit;
    }
    public int getLostPoints(CarDriver driver) {
        int diff_speed = driver.getCar().getSpeed() - speed_limit;

        if(diff_speed > 0) {
            if(diff_speed < 11) return 1;
            if(diff_speed < 21) return 2;
            if(diff_speed < 31) return 4;
            if(diff_speed < 41) return 6;
            else return 12;
        }
        return 0;
    }
    public int getSpeedingTicketCost(int ptsLost) {
        switch(ptsLost) {
        case 1: return 50;
        case 2: return 100;
        case 3: return 130;
        case 4: case 5: case 6: return 300;
        case 7: case 8: case 9: return 400;
        case 10: case 11: case 12: return 500;
        default: return 0;
        }
    }
}
```

“if-then” & “if-then-else” statements

```
//Create a RadarSpeedMonitor with speed
//limit set to 130 km/h
RadarSpeedMonitor radar = new RadarSpeedMonitor(130);
//Create a car registered in 2001
Car car = new Car(2001);
//The car speed reaches 100 km/h
car.setSpeed(100);
//Does this car exceed the speed limit?
if(radar.speedLimitExceeded(car)) {
    System.out.println("Speed limit exceeded!!!");
    car.setSpeed(radar.getSpeed_limit());
} else {
    System.out.println("Speed Ok");
}
System.out.println();
//The car speed reaches 140 km/h
car.setSpeed(140);
//Does this car exceed the speed limit?
if(radar.speedLimitExceeded(car)) {
    System.out.println("Speed limit exceeded!!!");
    car.setSpeed(radar.getSpeed_limit());
} else {
    System.out.println("Speed Ok");
}
```

Output :

```
Speed Ok

Speed limit exceeded!!!
```

```
RadarSpeedMonitor radar = new RadarSpeedMonitor(130);
CarDriver driver = new CarDriver(new Car(2001), 18, 12);
driver.getCar().setSpeed(140);
System.out.println("driver has lost: "+radar.getLostPoints(driver)+" points");
driver.getCar().setSpeed(150);
System.out.println("driver has lost: "+radar.getLostPoints(driver)+" points");
driver.getCar().setSpeed(160);
System.out.println("driver has lost: "+radar.getLostPoints(driver)+" points");
driver.getCar().setSpeed(170);
System.out.println("driver has lost: "+radar.getLostPoints(driver)+" points");
driver.getCar().setSpeed(180);
System.out.println("driver has lost: "+radar.getLostPoints(driver)+" points");
driver.getCar().setSpeed(190);
System.out.println("driver has lost: "+radar.getLostPoints(driver)+" points");
```

Output :

```
driver has lost: 1 points
driver has lost: 2 points
driver has lost: 4 points
driver has lost: 6 points
driver has lost: 12 points
driver has lost: 12 points
```

```
RadarSpeedMonitor radar = new RadarSpeedMonitor(130);
CarDriver driver2 = new CarDriver(new Car(2001), 18, 12);
//This driver's car reaches speed = speed limit
//For loop
for (int currentSpeed = radar.getSpeed_limit(); currentSpeed < 180; currentSpeed += 10) {
    driver2.getCar().setSpeed(currentSpeed);
    System.out.println("Car speed is "+currentSpeed+" km/h");
    System.out.println("driver has lost "+radar.getLostPoints(driver2)+" points");
    driver2.setPoints(driver2.getPoints()-radar.getLostPoints(driver2));
    System.out.println("driver still has "+driver2.getPoints()+" points");
    if(driver2.getPoints() < 6)
        break;
}
```

Output :

```
Car speed is 130 km/h
driver has lost 0 points
driver still has 12 points
Car speed is 140 km/h
driver has lost 1 points
driver still has 11 points
Car speed is 150 km/h
driver has lost 2 points
driver still has 9 points
Car speed is 160 km/h
driver has lost 4 points
driver still has 5 points
```

```
RadarSpeedMonitor radar = new RadarSpeedMonitor(130);
CarDriver driver3 = new CarDriver(new Car(2002), 6, 12);
int carSpeed = driver3.getCar().getSpeed();
System.out.println("Before loop: car speed is "+ carSpeed);
while (driver3.getCar().getSpeed() < radar.getSpeed_limit()) {
    carSpeed+=1;
    driver3.getCar().setSpeed(carSpeed);
    if(driver3.getNb_month() < 12 && driver3.getCar().getSpeed() >= 0.8*radar.getSpeed_limit())
        break;
    if(driver3.getCar().getSpeed()%2 != 0)
        continue;
    System.out.println("In loop: car speed is "+ driver3.getCar().getSpeed());
}
System.out.println("After loop: car speed is "+ driver3.getCar().getSpeed());
```

Output :

```
Before loop: car speed is 0
In loop: car speed is 2
In loop: car speed is 4
In loop: car speed is 6
In loop: car speed is 8
In loop: car speed is 10
In loop: car speed is 12
In loop: car speed is 14
In loop: car speed is 16
In loop: car speed is 18
In loop: car speed is 20
In loop: car speed is 22
In loop: car speed is 24

In loop: car speed is 78
In loop: car speed is 80
In loop: car speed is 82
In loop: car speed is 84
In loop: car speed is 86
In loop: car speed is 88
In loop: car speed is 90
In loop: car speed is 92
In loop: car speed is 94
In loop: car speed is 96
In loop: car speed is 98
In loop: car speed is 100
In loop: car speed is 102
After loop: car speed is 104
```

```
CarDriver driver4 = new CarDriver(new Car(2002), 6, 12);
driver4.getCar().setSpeed(140);
int speed = driver4.getCar().getSpeed();
System.out.println("Before loop: car speed is "+ speed);
do {
    speed +=10;
    driver4.getCar().setSpeed(speed);
    System.out.println("car speed is:"+driver4.getCar().getSpeed());
} while(speed <= 130);
```

Output :

```
Before loop: car speed is 140
car speed is:150
```

On remarque ici que le *do-while* effectue le test de condition après la réalisation du code interne. On voit que avant de tester si la vitesse est supérieure à 130, on l'incrémente d'abord de 10. Si on avait utilisé le *while*, on ne serait pas rentré dans la boucle et il n'y aurait pas eu d'incrémentation sur la vitesse.

```
RadarSpeedMonitor radar = new RadarSpeedMonitor(130);
for(int nbPtsLost = 0; nbPtsLost <= 12; ++nbPtsLost) {
    int cost = radar.getSpeedingTicketCost(nbPtsLost);
    System.out.println("Points lost: "+ nbPtsLost+ " Speeding ticket cost: "+cost+"$");
}
```

Output :

```
Points lost: 0 Speeding ticket cost: 0$
Points lost: 1 Speeding ticket cost: 50$
Points lost: 2 Speeding ticket cost: 100$
Points lost: 3 Speeding ticket cost: 130$
Points lost: 4 Speeding ticket cost: 300$
Points lost: 5 Speeding ticket cost: 300$
Points lost: 6 Speeding ticket cost: 300$
Points lost: 7 Speeding ticket cost: 400$
Points lost: 8 Speeding ticket cost: 400$
Points lost: 9 Speeding ticket cost: 400$
Points lost: 10 Speeding ticket cost: 500$
Points lost: 11 Speeding ticket cost: 500$
Points lost: 12 Speeding ticket cost: 500$
```