

# CSE 112 2. Midterm

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## I. QUESTION (14 POINTS)

Draw the UML diagram of vehicles sold by a person who wants to know the total price of her vehicles. Each **Person** has a name and a group of vehicles she can sell. Each **Vehicle** has a brand name such as 'Audi' or 'Ducati', a model name, the year produced and number of km's used. The types of vehicles sold by a person are **MotorCycle** and **Car**. Each **MotorCycle** has a type such as 'Cup', 'Moped', etc. Each **Car** has number of seats. Each **SUV**, a type of **Car** has a traction type such as '4x2', '4x4'. Each **LuxuryCar**, a type of **Car** will have one more luxuries such as tv, minibar or refrigerator in it. Define attributes and constructors for these classes. Since these vehicles need to be sold, we need methods to calculate the price of each vehicle. There are also two more methods which calculate the number of cars and motorcycles she owns. **Do not define any setter or getter methods.**

## II. QUESTION (44 POINTS)

Implement the classes **Person**, **Vehicle**, **MotorCycle**, **Car**, **SUV**, **LuxuryCar** according to your UML diagram. The price of each car is calculated as follows:

- The price of a **Vehicle** depends on the year produced ( $y$ ) and number of km's used ( $k$ ) and given by the formula

$$price = (y - 1900) * 100 - k$$

- The price of the **Motorcycle** increases by 10 percent with respect to a **Vehicle** if it is a 'Cup', 20 percent if it is a 'Moped'. Otherwise it remains the same.
- The price of a **Car** increases by  $(numberOfSeats - 4) * 10$  percent with respect to a **Vehicle**.
- The price of a **SUV** increases by 50000 TL with respect to a **Car** if it is a '4x4', otherwise it remains the same.
- The price of a **LuxuryCar** increases 10 percent for each type of luxury it has with respect to a **Car**.

## III. QUESTION (12 POINTS)

Declare a test class **Test** to do the following. **Aysel** has three **Vehicles** with the following info.

- (MotorCycle) Brand: Ducati, Model: Monster, Production Year: 2014, km: 2000, Type: Moped
- (SUV) Brand: Kia, Model: Sportage, Production Year: 2012, km: 10000, numberOfSeats: 5, traction type: 4x2
- (LuxuryCar) Brand: Lincoln, Model: Boss, Production Year: 2006, km: 3000, numberOfSeats: 8, tv: Ok, minibar: Ok, refrigerator: No.

Print the total price of vehicles of **Aysel**.

## IV. QUESTION (15 POINTS)

Write another constructor for **Person(String fileName)**, which reads all information of a person from a file. The file format is as follows:

```
Aysel 3
M Ducati Monster 2014 2000 Moped
S Kia Sportage 2012 10000 5 4x2
L Lincoln Boss 2006 3000 8 true true false
```

## V. QUESTION (15 POINTS)

Add a function **printToFile(String fileName)** to **Person**, which prints all information of a person to a file. The file format is the same as above.