Assignment 1: Software Modelling

UML Use Case and UML Class diagrams

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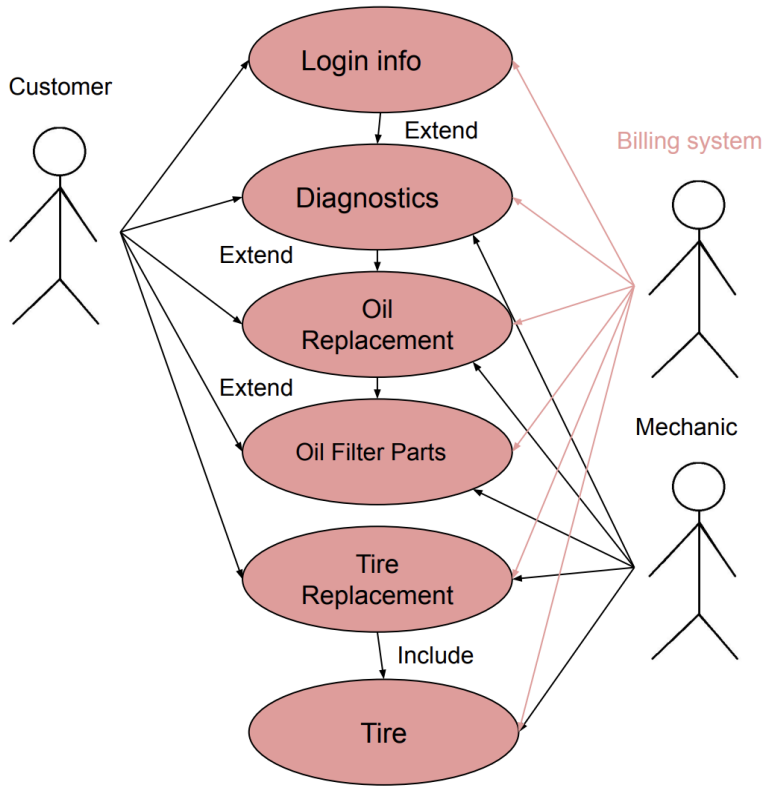
1. Identify the use-cases for the software. Draw the **UML use-case diagram **and include supporting use-case descriptions. At-least 3 scenarios must be identified.
2. Identify the objects and their respective classes. Draw the **UML class diagrams **and include supporting descriptions to explain the relationships. At-least 4 classes and respective relationships must be identified.
3. For all the identified classes create **Python classes **with the constructor, attributes, and appropriate setter/getter methods. Each class must include at-least 5 attributes. Create objects of all the identified classes and use the object's functions to populate and display the details.

Use-case diagram of the billing system software:



Use-case description:

Use Case	Login info
Trigger	The user wants to enter the system of the garage, to set up a date with the mechanic for their checkup/fixation
Preconditions	The user needs their car checked up or fixed
Main Scenarios	
1	The user specifies their detailed information to log into the system (first name, last name, cell phone number, gender, email, payment method, address, and the date they want for the appointment)
2	The user signals to the system the treatments they want to be done to their car, or if they want a diagnostics test
3	The mechanic verifies that the car could be diagnosed at the given time
4	The car is being tested for the specification of the user
5	The user takes the receipt with the changes that needed to be done on the car

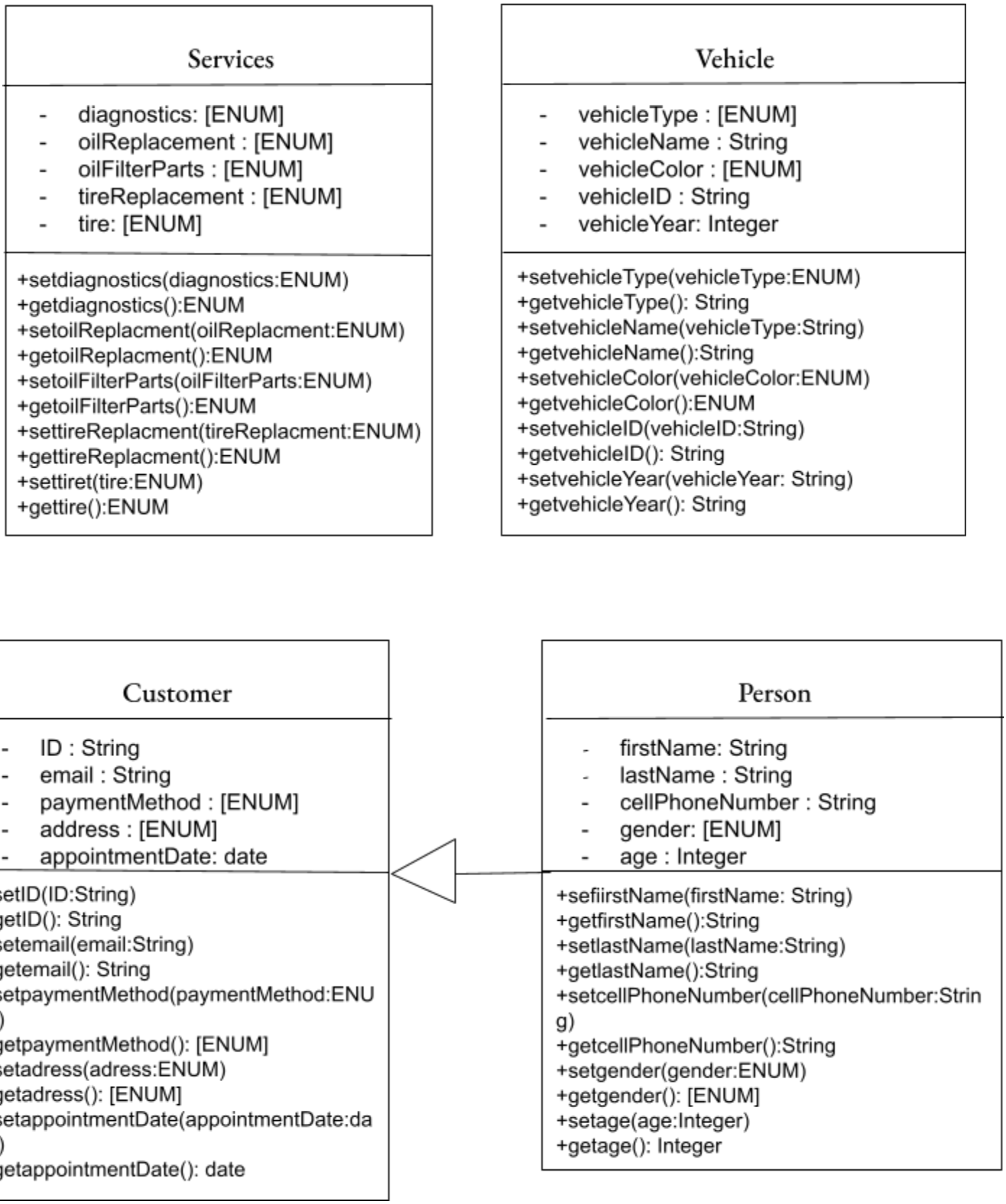
Use Case	Diagnostics
Trigger	The user wants to diagnose their car to check various components such as the engine, transmission, oil tank, throttle, and more.
Preconditions	The user needs their yearly diagnosis check-up
Main Scenarios	
1	The user specifies that they want to diagnose their car
2	The user signals to the system that they want to diagnose the specific car they have
3	The mechanic verifies that the car could be diagnosed at the given time
4	The system diagnoses the car, and the mechanic checks it
5	The user takes the receipt with the changes that needed to be done on the car

Use Case	Oil Replacement
Trigger	The user wants to replace the oil in their car
Preconditions	The user needs to replace the oil because rapid movement breaks down the oil over time, making it less effective at absorbing heat and lubricating the engine.
Main Scenarios	
1	The user specifies what is wrong with the car in detail
2	The user signals to the system that they want to replace the oil
3	The mechanic verifies that the oil needs replacement
4	The system provides the specified amount to the user using the receipt
5	The user takes the receipt

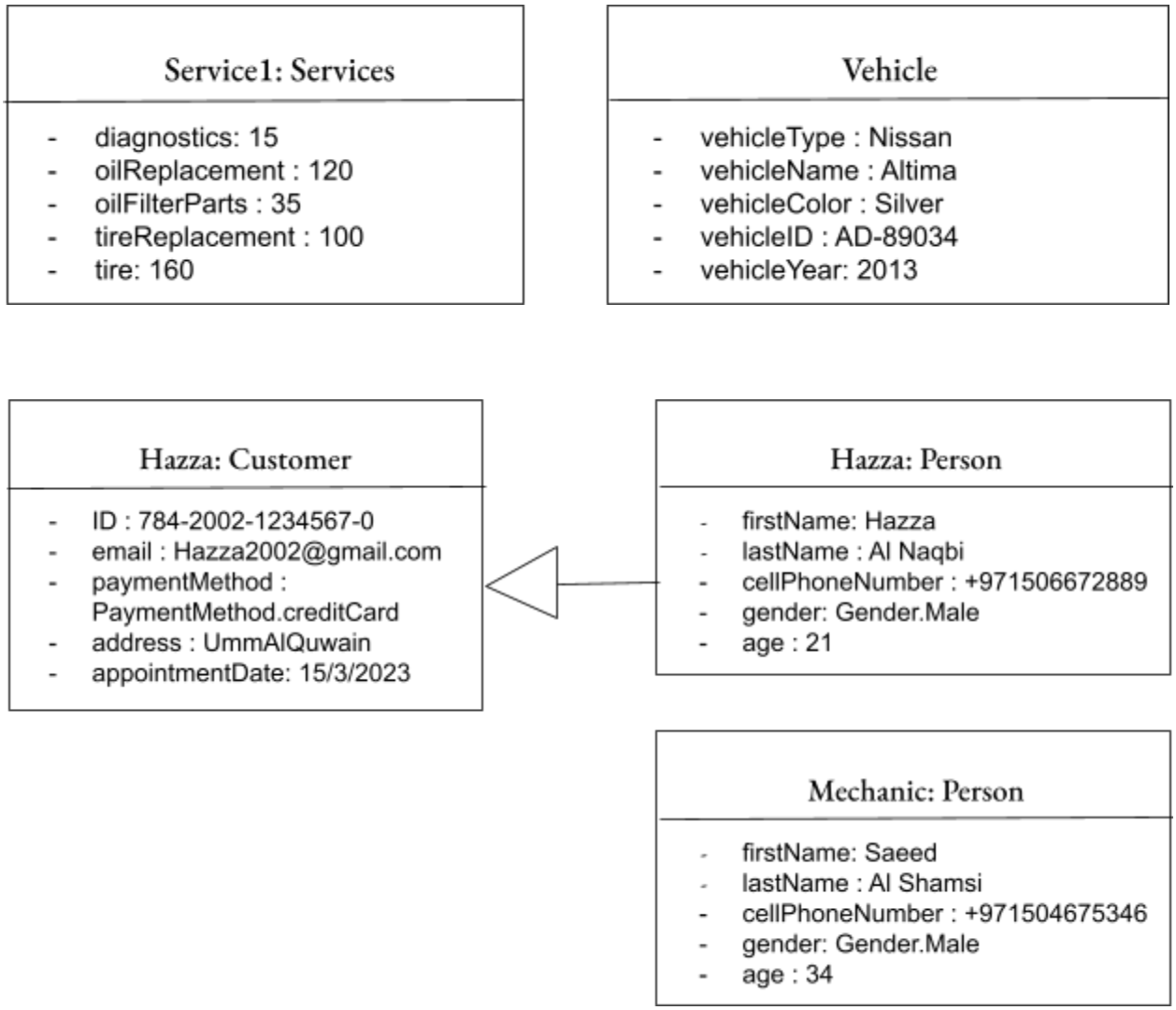
Use Case	Oil Filter Parts
Trigger	The user wants to keep their oil clean because if it isn't clean it affects the performance of the car
Preconditions	The user needs their oil clean because the oil filter cleans the engine oil as consistent engine performance depends on clean oil.
Main Scenarios	
1	The user specifies that they want the parts for the oil filter check for specific reasons
2	The user signals to the system that they want to add the filter for the oil
3	The system verifies that the filter works with the car
4	The mechanic provides the filter parts for the user and installs it
5	The user takes the receipt of the car from the system

Use Case	Tire Replacement
Trigger	The user wants to replace one or more tires in their car
Preconditions	The user needs their tires changed it's damaged
Main Scenarios	
1	The user specifies the issue with the tires that need to be replaced
2	The user signals to the system the specific number of tires and the placement
3	The mechanic verifies that the amount and placement are valid
4	The system provides the specified total to the user
5	The user takes the receipt of the car
Include	The number of tires used in the process

UML Class diagram:



Objects:


Service1: Services
- diagnostics: 15
- oilReplacement : 120
- oilFilterParts : 35
- tireReplacement : 100
- tire: 160
Vehicle
- vehicleType : Nissan
- vehicleName : Altima
- vehicleColor : Silver
- vehicleID : AD-89034
- vehicleYear: 2013
Hazza: Customer
- ID : 784-2002-1234567-0
- email : Hazza2002@gmail.com
- paymentMethod : PaymentMethod.creditCard
- address : UmmAlQuwain
- appointmentDate: 15/3/2023
Hazza: Person
- firstName: Hazza
- lastName : Al Naqbi
- cellPhoneNumber : +971506672889
- gender: Gender.Male
- age : 21
Mechanic: Person
- firstName: Saeed
- lastName : Al Shamsi
- cellPhoneNumber : +971504675346
- gender: Gender.Male
- age : 34