Assignment -1

1. Write a program to find the grade for a given mark according to the grading rule of your university.
2. Write a program to test a year if it is leap year or not.
3. Write a program to evaluate the following series $1^2+3^2+5^2+$…….. Up to n terms
4. Write a program to evaluate the following series 1-2+3-4+……. Up to n terms
5. Write a program to find the factorial of a number.
6. Write a program to find the power for a given base and exponent.
7. Write a program to find the Bangla season form a given month using if/switch.
8. Write a program to find the largest number in a list of Array.
9. Write a program to sort some number in ascending order.
10. Write a program to take input to two matrix, multiply and display the result.
11. Write a program to find frequency of a number with highest occurrence.

Assignment -2

Write a program in Java that uses a class **Student**. Include the following members:

Data members

- Student identification number
- Student name
- Department name
- Course Number
- Marks obtained

Constructor

- Initialize all the variables

Methods

- Take input for all the variables
- Check if the student is passed or not (pass marks 40%)
- To display all the variables

Assignment -3

Design a class **Account** that represents a bank account. Include the following members:

Data members

- Account holders name
- Account number
- Type of account
- Balance amount in the account

Constructor

- To assign initial values(i.e., account holders name, account no, account type and initial deposit)

Methods

- To deposit an amount
- To withdraw an amount after checking balance
- To display the name and balance

Assignment -4

Write a program in Java that uses a class **Employees**. Include the following members:

Data members

- Id
- Name
- Basic Salary
- House rent

Constructor

- Initialize all the variables (use parameters as arguments)

Methods

- To Take input for an employee.
- Compute the house rent of the employee . House rent is 50% of the basic salary if the basic salary is more than 20000 otherwise 60%
- Display the employee information showing the total monthly salary

Assignment -5

An organization keeps the following information for customers.

- Data members
  id, name, bill
- Constructor
  1. To assign initial values(i.e., id, name, bill)
- Methods

  1. Take input for a customer.
  2. Compute the discount.
     Customers get 10% discount if purchase Tk2000 or more.
  3. Display the information showing the total bill after discount

Write a program in java using class.

Assignment -6

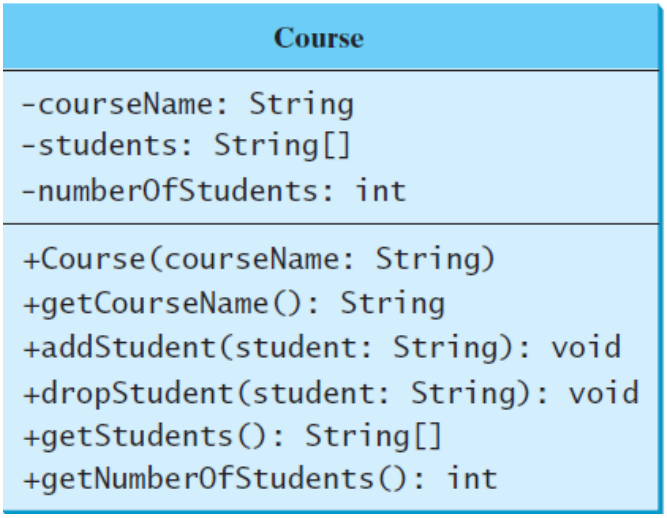
Implement the following UML Diagram using Java:

Circle
-radius: double
+Circle() +Circle(radius: double) +getRadius() double +setRadius(radius: double) void +getArea():double +dispayArea(): void

Implement the Circle UML diagram also write a main program **TestCircle** that uses the **Circle** class to create a circle object with the radius 5 and then modifies the radius to 10 using the *setRadius* method of the circle class. Call all the methods used on your written Java code. Display the area using *displayArea* method.

Assignment -7

Suppose you need to process course information. Each course has a name and has students enrolled. You should be able to add/drop a student to/from the course. You can use a class to
model the courses, as shown in the following UML Diagram:

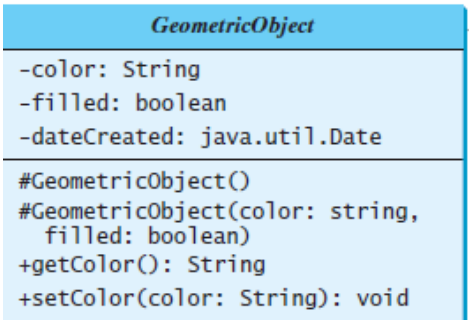


Course object can be created using the constructor *Course(String name)* by passing a course *name*. You can add students to the course using the *addStudent(String student)* method, drop a student from the course using the *dropStudent(String student)* method, and return all the students for the course using the *getStudents()* method.

Write a Java program named *TestCourse.java* where the Course class is implemented and it shows the name of the course and enrolled students of that course from main *[i.e. public static void main (String []args)]*.

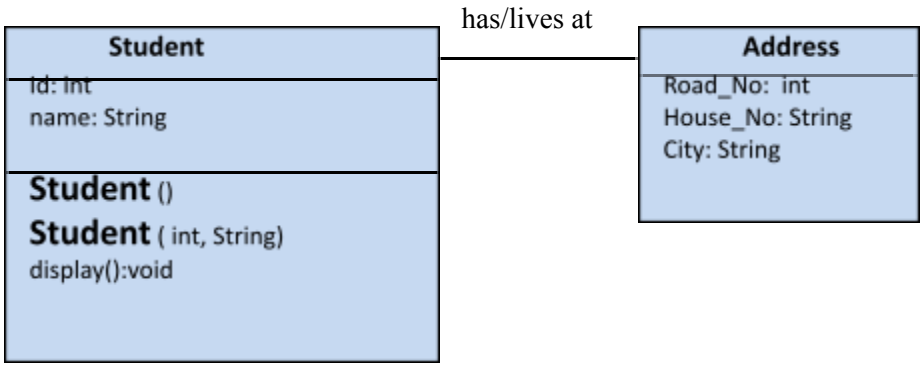
Assignment -8

Convert the following UML into JAVA code also explain why the constructor's modifiers are protected?



Assignment -9

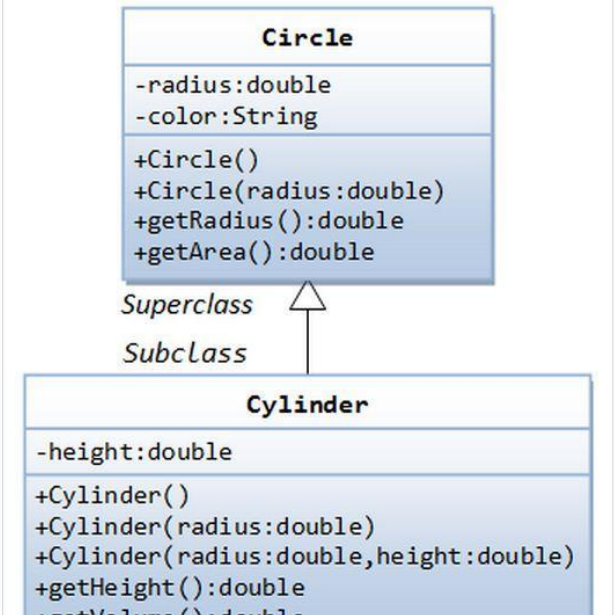
Consider the following UML



Write a program in Java for the UML above. Implement all the constructors and methods. Follow the grading system of your University.

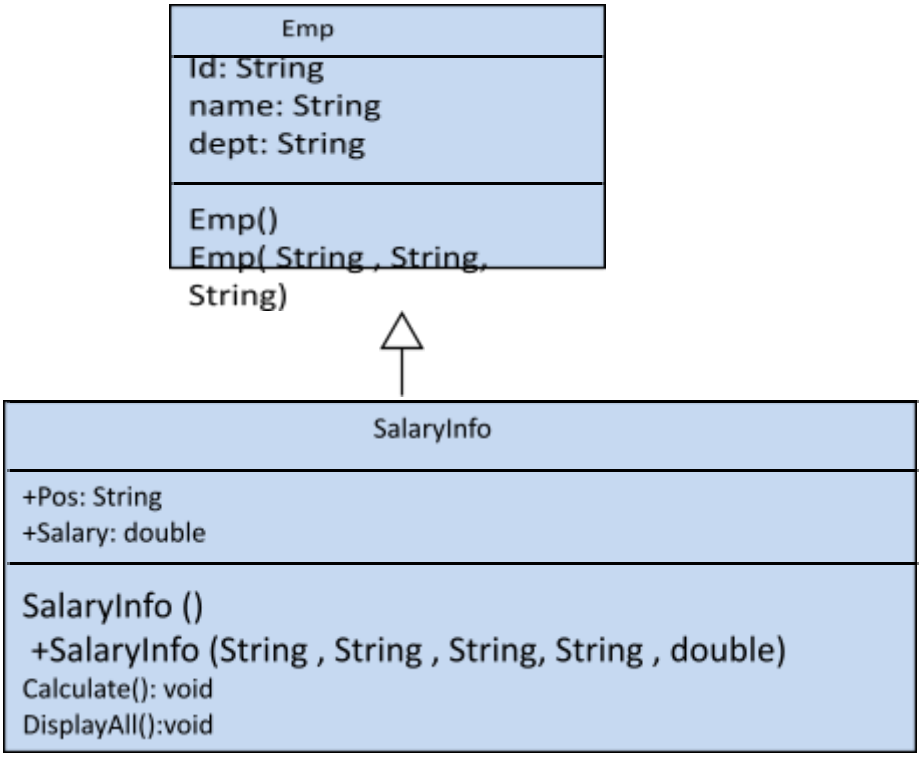
Assignment -10

Convert the following UML into Java code.



Assignment -11

Consider the following UML:

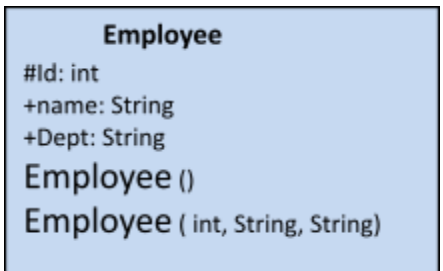


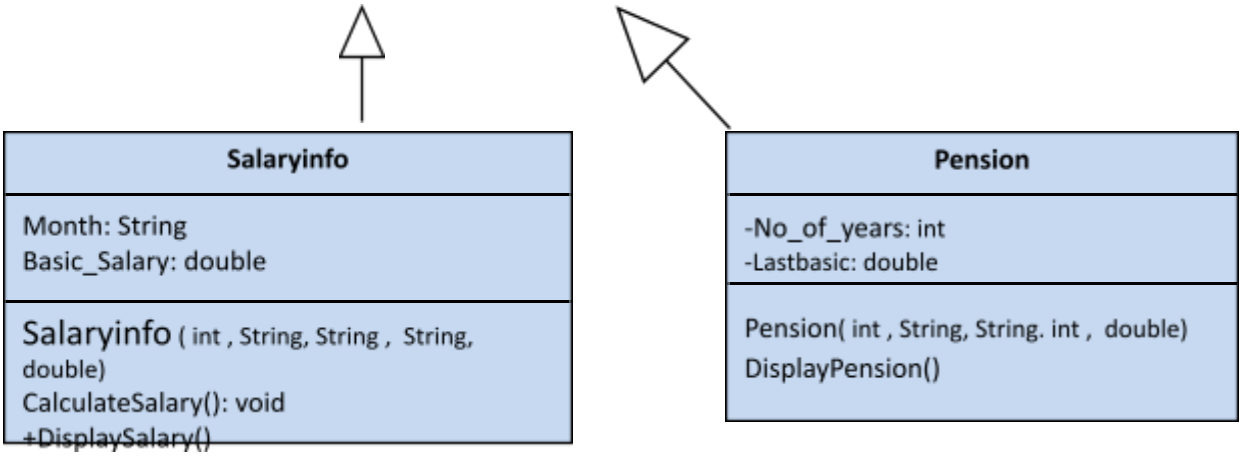
Write a program for the UML above. Implement both the constructors. Calculate House rent from the salary in Calculate() method. Display all the information of the employee in DisplayAll() method. House rent(HR) is calculated as follows:

HR = 60% of the basic salary if the basic salary>=Tk20000
50% otherwise

Assignment -12a

Consider the following UML:





Write a program in Java for the UML above. Implement all the constructors. Calculate House rent from the salary in CalculateSalary() method. Display all the information of the employee in DisplaySalary() method. House rent(HR) is calculated as follows:

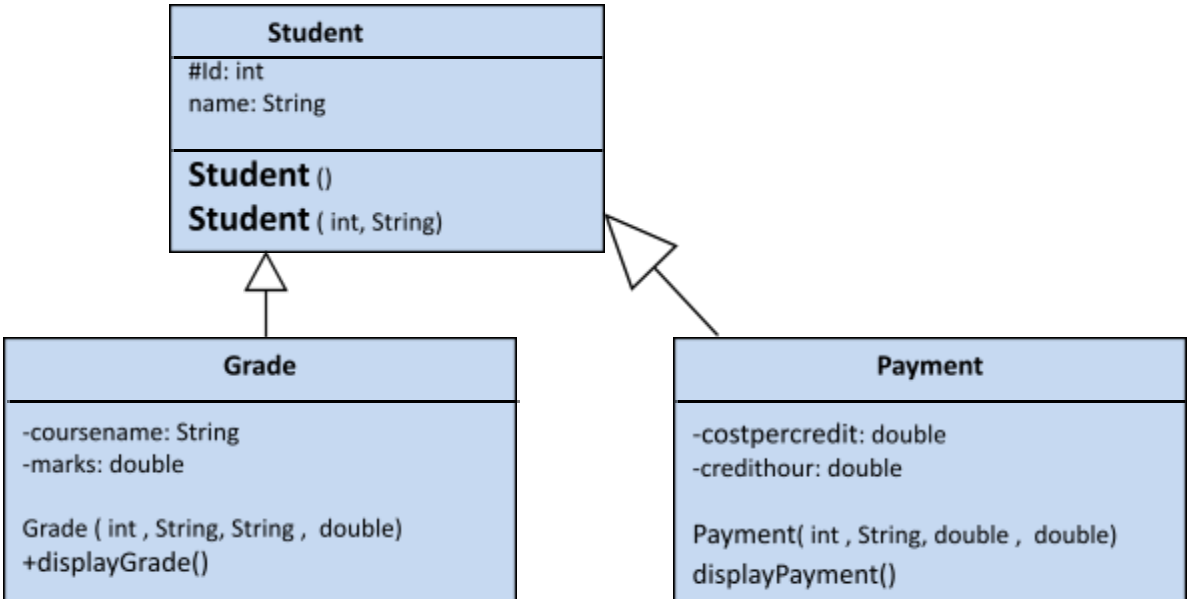
HR = 60% of the basic salary if the basic salary>=Tk30000
50% otherwise

Pension is calculated as follows:

Total Pension = (length of service in years) × 10 × (70% of Last Basic salary)

Assignment -12b

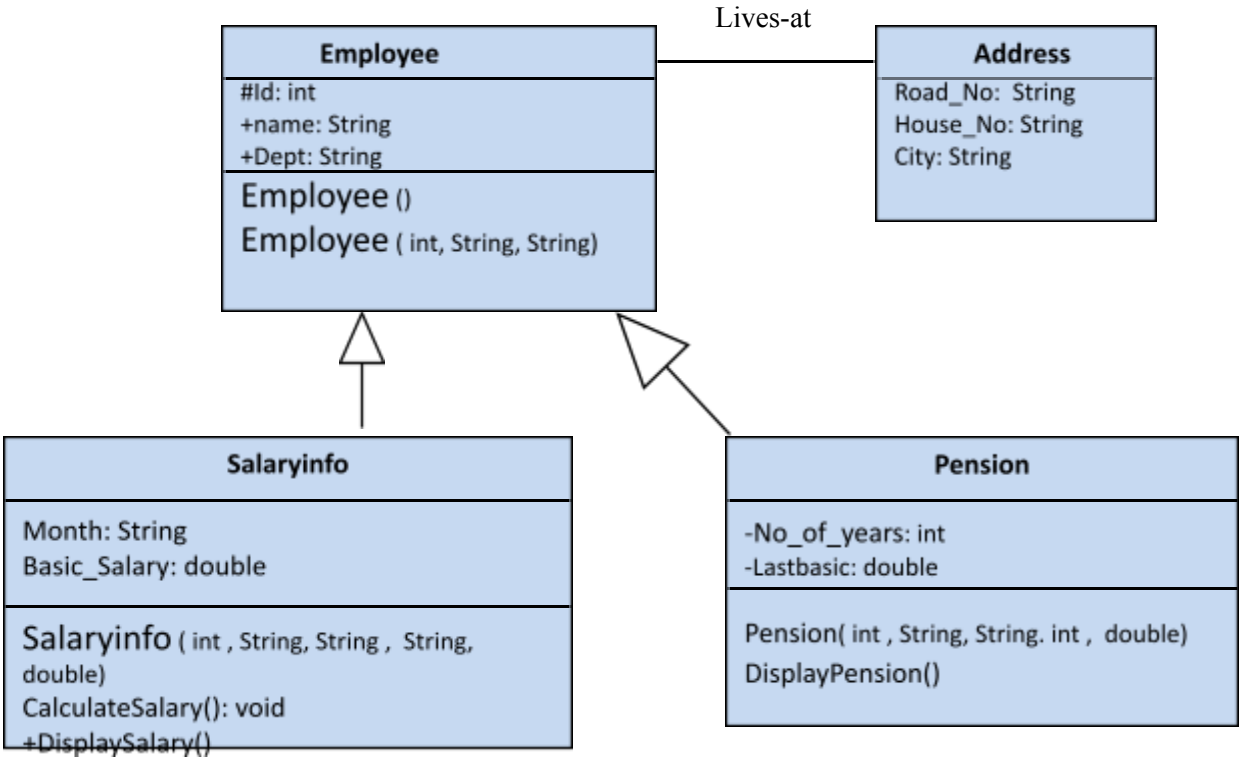
Consider the following UML:



Write a program in Java for the UML above. Follow the grading system of your University.

Assignment -12c

Consider the following UML:



Write a program in Java for the UML above. Implement all the constructors. Calculate House rent from the salary in CalculateSalary() method. Display all the information of the employee in DisplaySalary() method. House rent(HR) is calculated as follows:

HR = 60% of the basic salary if the basic salary>=Tk30000
50% otherwise

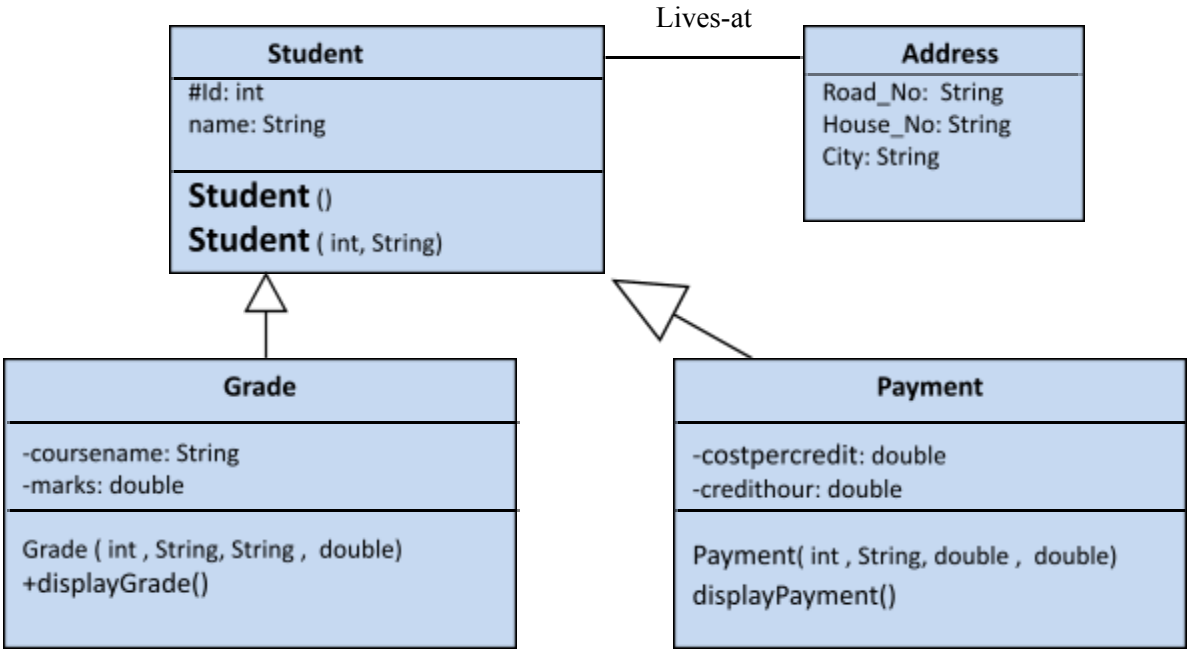
Pension is calculated as follows:

Total Pension = (length of service in years) × 10 × (70% of Last Basic salary)

Display the pension information in DisplayPension() method.

Assignment -12d

Consider the following UML:



Write a program in Java for the UML above. Follow the grading system of your University.

Assignment -13

i)

Alex is an entrepreneur who is an enthusiast for developing new games and he is planning on expanding his horizons. His previous title "**Angry Goose**" is very popular amongst his fans and now since he hired new developers for his company he is planning to develop two new games with the title "**Soldiers of the War**" and "**Rocket Car**" since the popularity of esports has gone up with the introduction of Call of Duty: Warzone. For keeping track of his user base, he uses the following properties for all his games: **playerID, playerName & playerEmail** to maintain consistency in his coding style. In addition to that, he uses some functionalities which are also common in all of his games: **playerMovementSpreed** (uses ***movementSpeed*** *attribute can have two values, 0 represents slow and 1 represents*

fast) **& playerHealthPoint** (*uses **playerHP** attribute for showing the status of the player's health*).
a. By using the concept of Inheritance in Object-Oriented Programming, create a UML diagram with proper notation of the entire scenario by establishing a parent-child relationship by keeping the functions of the parent class abstract. Also in the child class, add a constructor which will set the values of **playerID(***autogenerated***), playerName & playerEmail** from the user. You can establish any name of your choice for the parent class.
b. Write down Java Code with the inclusion of the main method for the above UML diagram that you have drawn.

ii) A class named **GeometricStructure** has elements **dimension** as member element and get and set method for this element. Two classes named **Sphere** and **Rectangle** extends **GeometricStructure**. **Sphere** has **radius** as member element, get and set methods for **radius** and another two methods **area** and **volume**. **Rectangle** has **length** and **breadth** as member elements, get and set methods for **length** and **breadth** and another two methods **area** and **circumference**. There is a main class named **Structure** from where all the input and output activity is operated. Now write a java code in your script from the described scenario. **area** of a sphere is 4 times pi times squared of **radius** and **volume** of a sphere is 4 times pi times cubed of the **radius** divided by 3. **area** of a rectangle is **length** times **breadth** and **circumference** of a rectangle is 2 times of added **length** and **breadth**.

iii)
A Car Company has two types of cars, a **Sedan** and an **SUV**. All the cars that are manufactured from
within that company's factory have three similar attributes **carName**, **carColour**, **carEngineNumber** also
all the manufactured cars have two similar functionalities **remoteStart** (*User can turn on their car from*
their mobile application, carStart=1 will turn on the car) and **remoteMusic** (*User can turn on the music of*
their car remotely from their mobile application, carMusic=1 will turn on the music).
This car contains most of the modern features of an electric car and the company also hires a tech

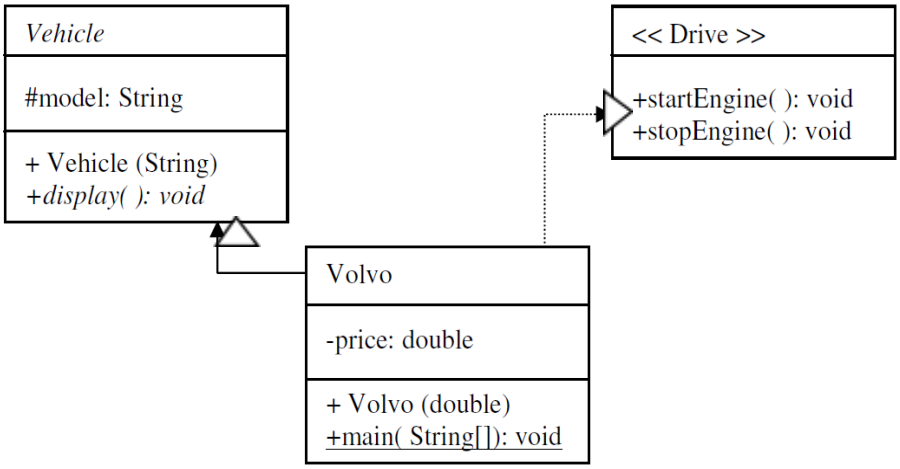
company to make their software run smoothly and efficiently. Now your task is to accommodate the
things that the company is asking for.

a. Your boss is planning to introduce a new **Car** class and which will contain all the attributes and
the functionalities in the same place(with no implementation/definition) and once a new **Sedan**
or an **SUV** is created they will acquire the properties from the proposed **Car** class. Now, your
job is to accommodate this change that your boss has proposed. You have to restructure the
entire scenario and write down the new set of JAVA codes to accommodate these operations.

b. After the changes are made, there was a meeting between your boss and the Company's Board
of Directors in which the Partners informed your boss that they are planning to bring some
additional changes in their SUV lineup. With the release of the Ford-150 EV, the Company thinks
that they need to include some new features to sustain itself in the market. Therefore, for only
the SUV lineup, there are planning to include a new and improved battery that will work as a
generator and can provide power to an entire house for three straight days also they will add
auto tire pressure sensors as this is an essential feature for the user who does off-roading. With
all these requirements in mind, your boss is planning to make some modifications to the **SUV**
class. He is planning to add a method that will always run when an object of that class is created
and that method will only display the attribute **batteryPercentage**. Your boss is also planning to
add a regular function named **tirePressure**(*displays the attribute carTirePressure*) and this will
display out the tire pressure of all four tires of the class. Now, you have to submit your boss the
updated SUV class so that it can be later integrated with the entire system.

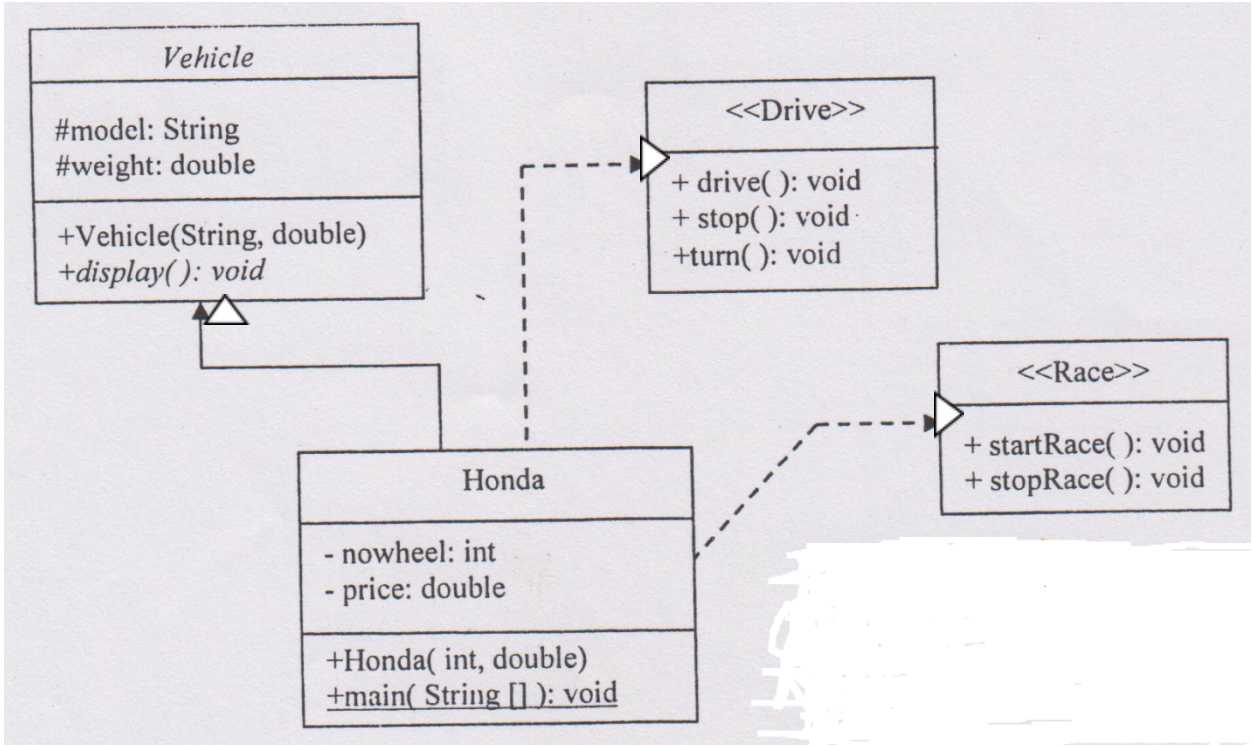
Assignment -14

Implement the following UML object model using Java:



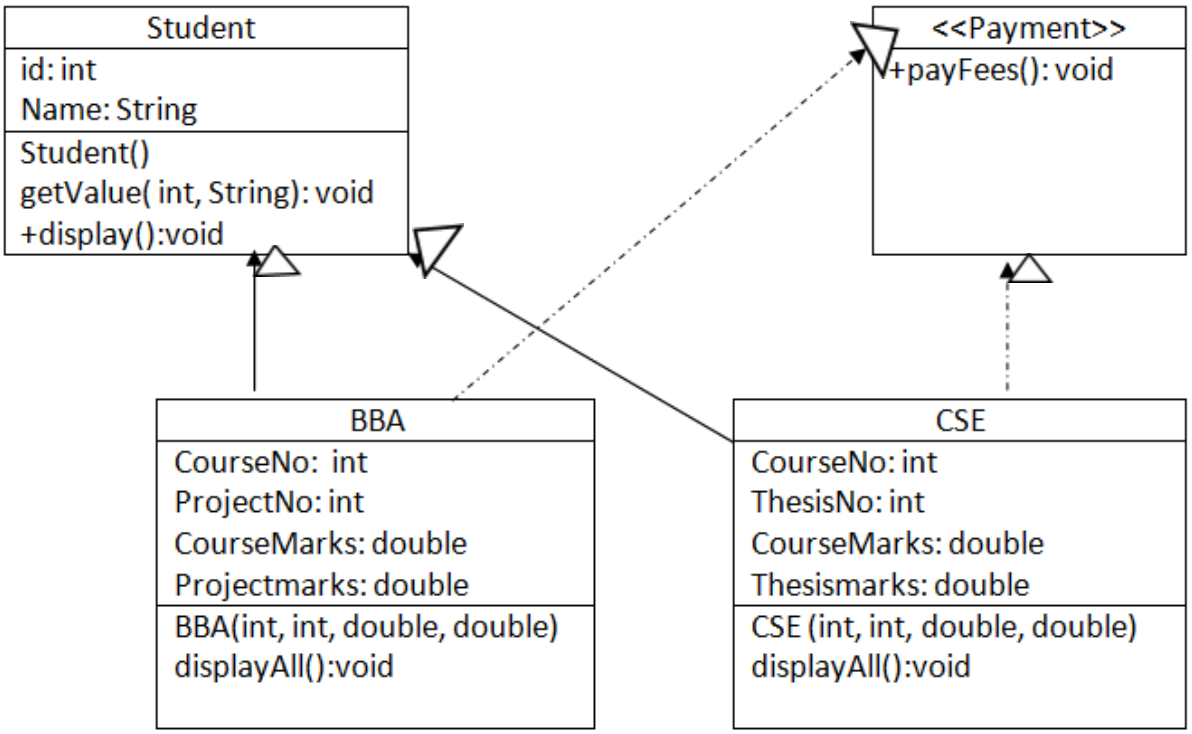
Assignment -14

Implement the following UML object model using Java:



Assignment -15

Implement the UML in Java. There is course and its marks in each department. Take all the inputs from the keyboard in getValue() method. Show the grades with all the information in displayAll() method.



Assignment -16

We have a "MS Access" database "STUDENT" which contains a table called "***RESULT***", with 4 columns, as shown below:

Id: int
Name: varchar(30)
Dept: varchar(20)
Marks: float

Write a Java program with necessary code that connect with this database and show all the information from the ***RESULT*** table. Also find the Grade from marks. Assume any grading system.

Project-1. Student Information Systems

A department keeps the following information for students
ROLL, NAME, DEPT, MARKS. Write a program for the following tasks:

Do the project for one semester

Take input for 10 students.
Find the average marks of the students.
Find the highest marks and display the student information.
Sort the students in order of ID
Sort the students in order of marks
Display the student list with grade. (Assume any Grading system)
Search a student by ROLL and display grade.
Display the information of the information who failed in any course.
Display the information of the information who obtained grade A+ in any course.