Q1. Consider the following UML:

```
┌─────────────────────────────┐
│           Student           │
├─────────────────────────────┤
│ #Id: int                    │
│ name: String                │
├─────────────────────────────┤
│ Student ()                  │
│ Student ( int, String)      │
└─────────────────────────────┘
```

```
┌─────────────────────────────┐      ┌─────────────────────────────┐
│           Grade             │      │          Payment            │
├─────────────────────────────┤      ├─────────────────────────────┤
│ -coursename: String         │      │ -costpercredit: double      │
│ -marks: double              │      │ -credithour: double         │
├─────────────────────────────┤      ├─────────────────────────────┤
│ Grade ( int , String, String│      │ Payment( int , String, double│
│ ,  double)                  │      │ ,  double)                  │
│ +displayGrade()             │      │ displayPayment()            │
└─────────────────────────────┘      └─────────────────────────────┘
```
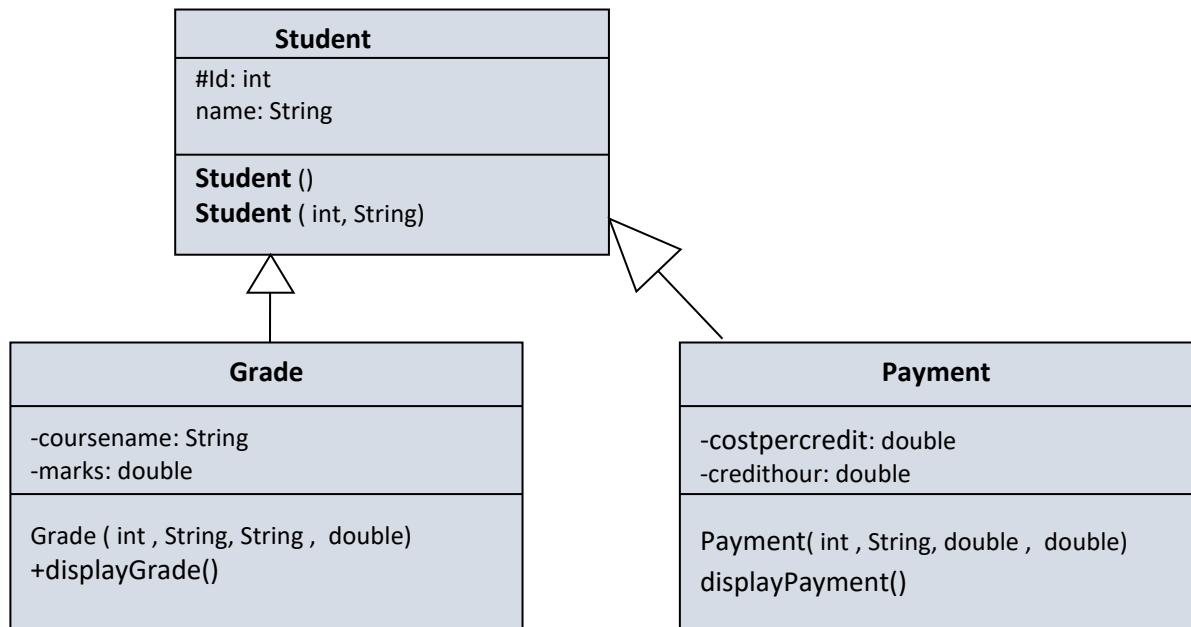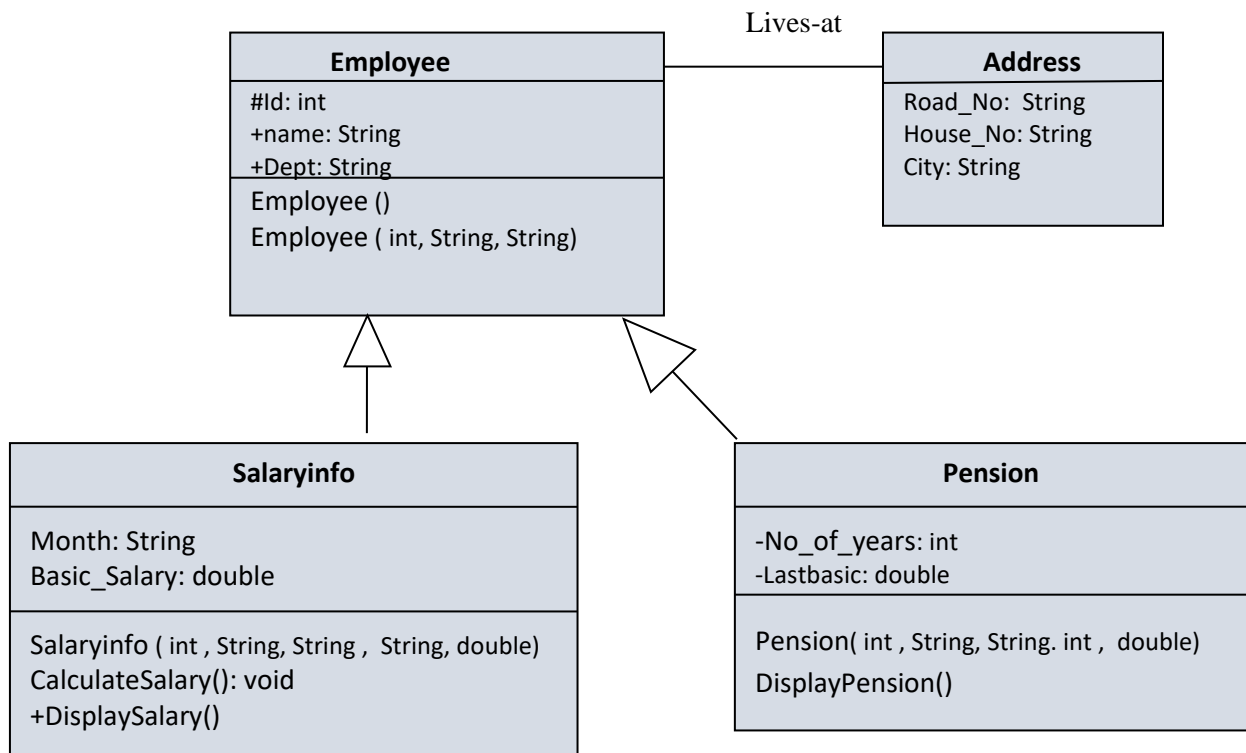
Write a program in Java for the UML above. Follow the grading system of your University.

Q2. Consider the following UML:

Lives-at

```
┌─────────────────────────────┐      ┌─────────────────────────────┐
│          Employee           │      │          Address            │
├─────────────────────────────┤      ├─────────────────────────────┤
│ #Id: int                    │      │ Road_No:  String            │
│ +name: String               │      │ House_No: String            │
│ +Dept: String               │      │ City: String                │
├─────────────────────────────┤      └─────────────────────────────┘
│ Employee ()                 │
│ Employee ( int, String, Stri│
│ ng)                         │
└─────────────────────────────┘
```

```
┌─────────────────────────────┐      ┌─────────────────────────────┐
│         Salaryinfo          │      │          Pension            │
├─────────────────────────────┤      ├─────────────────────────────┤
│ Month: String               │      │ -No_of_years: int           │
│ Basic_Salary: double        │      │ -Lastbasic: double          │
├─────────────────────────────┤      ├─────────────────────────────┤
│ Salaryinfo ( int , String,  │      │ Pension( int , String, Strin│
│ String ,  String, double)   │      │ g. int ,  double)           │
│ CalculateSalary(): void     │      │ DisplayPension()            │
│ +DisplaySalary()            │      └─────────────────────────────┘
└─────────────────────────────┘
```

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.

Q3.   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 create a UML diagram and 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**.