Indian Institute of Technology Kharagpur
Department of Computer Science and Engineering
Software Engineering Lab (Section 1) (CS29006)
Instructor: Prof. Sudip Misra
Test: Java Programming

Time: 2:00 pm - 4:00 pm **Date : 03/04/2019**

Instructions

- Give meaningful comments to explain the functionality of each class and function used in your program. Comments and proper indentation carry credits.
- Complete the basic implementation as stated in each question. You can add extra features, if you feel so.
- You should compile all the files successfully.
- Make a zip file with and give the name of the zip file as **Test_ < YourRollNo >**.
- The zip file should contain all the source codes for the test.
- Submit the zip file to the Moodle system.
- Your submission will be evaluated after 4:00 pm. Please do not leave the lab, until you are told to do so.

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1. Create a file **BoxPolymorf.java** which has a class **BoxPolymorf** and following four overloaded methods:
   (a) Method 1: Accepts two integer parameters and calculates the area of a rectangle.
   (b) Method 2: Accepts two double parameters and calculates the area of a rectangle.
   (c) Method 3: Accepts an integer and a double parameter and calculates the area of a rectangle.
   (d) Method 4: Accepts an integer parameter and calculates the area of a square.
   (e) Method 5: Accepts a double parameter and calculates the area of a square.
2. Pass following parameters and print **area** for the 5 methods created in **BoxPolymorf.java**.

Method	Parameters
1	5, 10
2	5.5, 10.5
3	5, 10.5
4	10
5	10.5

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3. Consider the following description:

   Dog is an animal. Dog eats 'meat'. Cat is an animal. Cat eats 'mouse'. Elephant is an animal. Elephant eats 'grass'. Create 4 classes — **Animal**, **Dog**, **Cat**, and **Elephant**.

   Translate the above description into Java code. Each class should have an eat() method that returns what that animal eats. Do not use method/constructor overloading.

4. Create a file **ViewAnimals.java** to print what each animal eats.

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5. Create a file **Attendance.java** which has a class **Attendance**. **Attendance** class should have a double variable **percent** and a method **check()**. Create 3 objects of the **Attendance** class. For each object, initialize the **percent** variable with a value between 0 and 100. Call the **check()** method for each object. The **check()** method throws an **AttendanceException** (User Defined Exception) whenever **percent** < 40. Handle the exception and print "Low Attendance" whenever an exception is caught.

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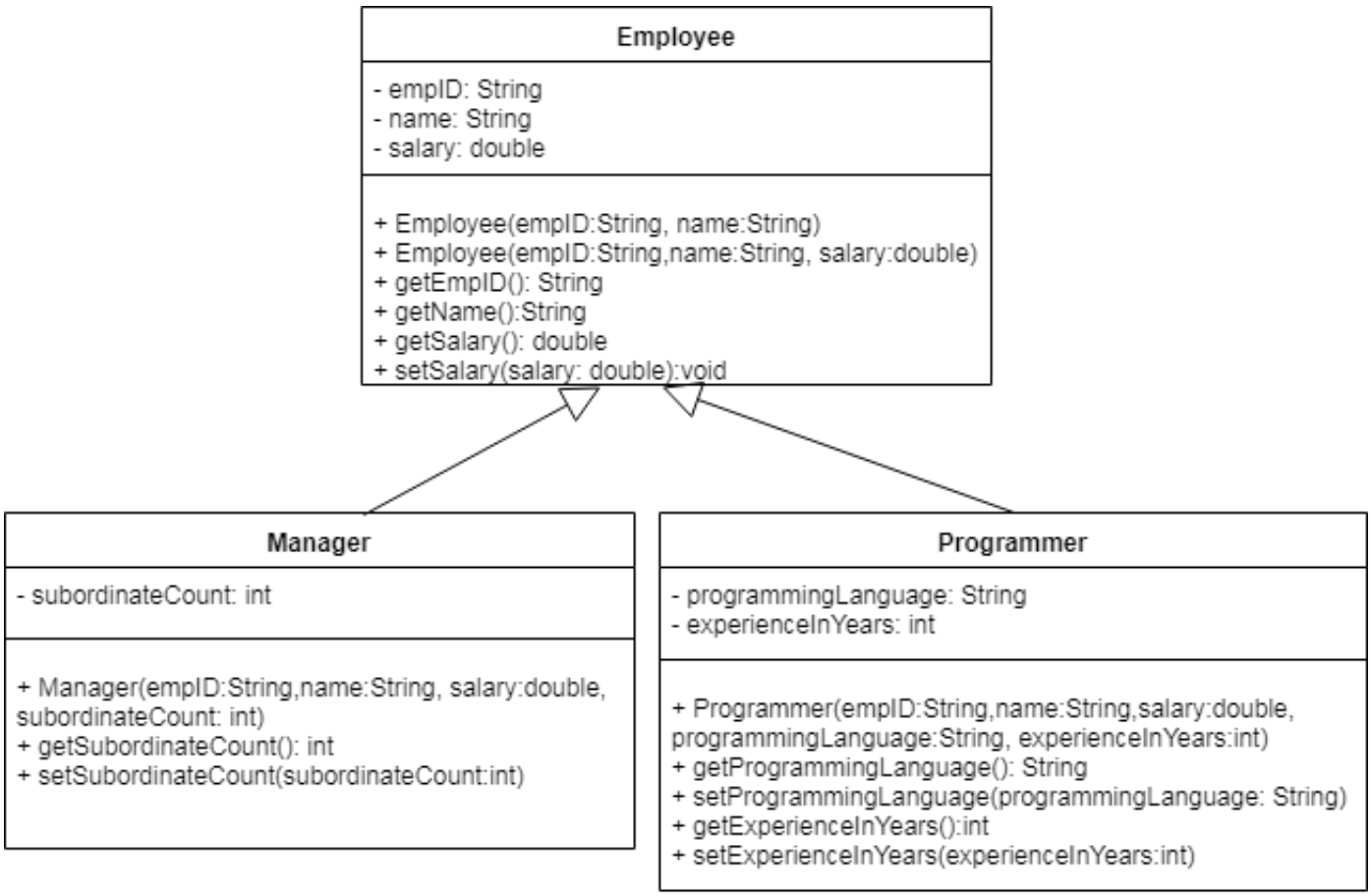
6. Translate the following class diagram into Java code.



7. Create a file **DataEntry.java**. Create 5 objects of type **Manager** and 5 objects of type **Programmer**. For a **Programmer**, the programming languages should be either Java, C, or Python. Each manager should have different number of subordinates. The salary of each programmer is fixed at Rs 30000. A manager's salary is determined by using the following formula:

$$salary = \log(2 + subordinateCount) \times 100000$$

Hint: Use Math.log for logarithm.

8. Add a method **storeEmpRecord()** in **DataEntry.java** and store the 10 objects in an ArrayList **EmpList**.

9. Add a method **displayEmpRecord()** in **DataEntry.java**. Read the objects stored in **EmpList** and print **empID**, **name**, and **salary** of each employee.

10. Create a copy of **DataEntry.java** and name it **DataEntryNew.java**. Add a method **incrementSalary()** in **DataEntryNew.java** and increment the salary of Java programmers by Rs 5000. Print **empID**, **name**, and **salary** of each employee.