**CMPE 202 Code Refactoring**

Student Name: Raviteja Gannarapu

Student Id: 016650972

1. **Identify a code smell in the following Java code (2 points)**

In the given Java code, there exists a code smell duplicate code. Attributes bookTitle/movieTitle, rentDate, dueDate, rentalFee and methods isOverdue() and lateFee() are duplicated.

1. **Explain how you will refactor the code to get rid of the code smell (4 points)**

* Duplicated attributes and methods can be extracted out and abstracted into a class Rental. Both BookRental and MovieRental can extend Rental class.
* Since bookTitle and movieTitle signify same meaning, it can be renamed to a generic attribute title. rentDate and dueDate, rentalFee can be moved to parent Rental class.
* However, attributes author and classification are retained in its own classes as they are not duplicates.
* Similarly, rentalFee() method is also duplicated, can be moved to parent Rental class. But lateFee() method is not exactly same but similar apart from late fee factor(0.25/0.5).
* An attribute lateFeeFactor can be introduced whose value is different in both classes. Which can be initialized upon object creation or can be initialized with a default value in its own sub classes. Alternatively, lateFee() method can also be overridden in subclasses.

1. **Write the re-factored code (14 points)**

Rental.java

public class Rental {  
  
 private String title;  
 private Date rentDate;  
 private Date dueDate;  
 private double rentalFee;  
 private double lateFeeFactor;  
  
 Rental(double lateFeeFactor) {  
 this.lateFeeFactor = lateFeeFactor;  
 }  
  
 private boolean isOverdue() {  
 Date now = new Date();  
 return dueDate.before(now);  
 }  
  
 public double lateFee() {  
 if (isOverdue()) { return rentalFee \* lateFeeFactor;}  
 else return 0;  
 }  
  
}

BookRental.java

public class BookRental extends Rental {  
  
 private String author;  
  
 BookRental() {  
 super(0.25);  
 }  
  
}

MovieRental.java

public class MovieRental extends Rental {  
  
 private int classification;  
  
 MovieRental() {  
 super(0.5);  
 }  
  
}