SOFE 2710U
Object Oriented Programming and Design
Fall 2019

Assignment-3

Marking Rubric

1. Program design correctness: [40%].
2. Proper comments and documentation: [10%]

    a) Your code is required to be properly commented and necessary to have a header section that shows the author, date, and the assignment number that it belongs to. It further describes the purpose of the program.

    b) In your code, use comments to explain the purpose of the declared variables and the lines of your code.

3. Compilation: [20%] your code compiles without error.
4. Execution and output: [10%] your code is required to be executed without any crashes and the program must produce the correct output.
5. Code appearance and appropriate indentation: [20%] your code must be properly formatted. Matching pairs of {} are required to be in the same column with proper indentation. Lines in the program are required to be uniformly indented and/or separated to enhance the readability.

Submission

- The deadline for submitting the assignment is 23 November 2019 11.59EST
- All three problems need to be completed
- Each problem is worth 10 points
- The assignment should be submitted by the due date using the Blackboard Dropbox.

Question 1:

Consider the following class:

```
public class MergeSequence
      {
            private ArrayList<Integer> values;
            public MergeSequence () { values = new ArrayList<Integer>(); }
            public void add(int n) { values.add(n); }
            public String toString() { return values.toString(); }
      }
```

Add a method

```
public MergeSequence append (MergeSequence other)
```

that creates a new sequence, appending this and the other sequence, without modifying either sequence.

For example, if sequence (a) is: 1 4 9 16
and b is the sequence 9 7 4 9 11

then the call a.append(b) returns the sequence

1 4 9 16 9 7 4 9 11

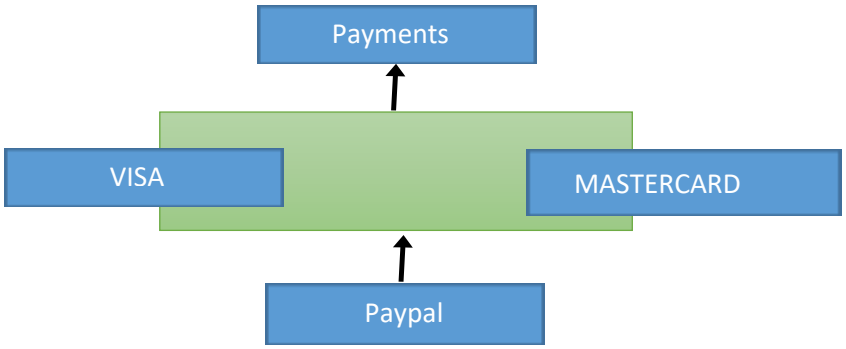
without modifying a or b.

Question 2:

Implement a superclass Adult. Make two classes, Worker and Manager, that inherit from Adult. Each adult has a name and a year of birth. Each worker has a job title of “engineer” and each manager has a job title of “supervisor”. Write the class declarations, the constructors, and the methods toString for all classes. Supply a driver class that creates an array of Worker objects and sort them by the birth years. Moreover, create an array of Manager objects but sort them by the name.

Question 3:

The payment transaction scenario could be represented by the following hierarchy:



- Create Payments as a superclass and VISA, MASTERCARD, PAYPAL as subclasses
- Create an interface `PaymentsInterface` with one method called `paymentInfo`.
- Create classes VISA, MASTERCARD, DEBIT that implement `Payments`
- For each of the three classes (VISA, MASTERCARD, PAYPAL), create one constructor
- Constructors are used to create objects with initial balance with US dollars (USD).
- The interface class method "paymentInfo" should be overridden in the three classes (VISA, MASTERCARD, PAYPAL) to display the initial amount of each object. The USD to CAD conversion rate is 1 USD = 1.35 CAD and the extra processing fee for VISA payment is 2%, MASTERCARD payment is 2.5%, and PayPal is 1%.
- paymentInfo method is used to display information on the screen about the current amount in CAD.
- You should use polymorphism (e.g., Payments pay1 = new VISA (100));

Create a driver class with at least three different types (VISA, MASTERCARD, PAYPAL) of payments, and display the payments information in USD and the corresponding converted amount with processing fees in CAD. Also, show the total amount of money spent in CAD for all types of payments.