CSE231 Advanced Computer Programming

Lab 03

1) Modify the Vector class you wrote in **Lab02** so that the add and sub methods become static methods. Also add a non-static method read() that sets the Xcomp and Ycomp components of the current Vector based on user-provided values. Finally, write a driver program that tests all the functionalities provided by this class. **Hint:** The static arithmetic methods should take 2 Vector arguments instead of one.

2) Create a class that represents a 2D-Line. A 2D-Line is composed of a 2D-point that represents a position and a 2D-Vector that represents the direction. Your class should have a constructor that initializes the 2D-Point and the 2D-Vector based on passed objects and another constructor that creates/initializes the 2D-Point and the 2D-Vector based on passed information. The 2D-Line should also have a print method that prints the information as position and direction. Finally write a driver program to test your class. **Hint:** use your Vector class you wrote in **Lab02** to represent a 2D-Vector also use javafx.geometry.Point2D class to represent a 2D-Point.

3) Define and test your own **mutable** String class and call it MyStringBuffer. Internally, the class should have a private reference to an array of characters allocated at construction time (based on a passed String). Additionally, it should have all the following methods:
   - void print(): Prints the current String.
   - int indexOf(char c): Returns the index of the specified character in the current object or -1 if not found.
   - int length(): Returns the length of the string
   - void erase(int index, int length): Modifies the current object by erasing a substring whose position and length are specified by the passed values.
   - void insert(int index, String str): Modifies the current object by inserting the specified string at the specified position.

4) Define and test a new class MyString identical to the MyStringBuffer class you defined in exercise 3, except that is should be **immutable**. Modify the supported methods accordingly.