Lab 03: Factory Pattern

Name: Muhammad Kamran Janjua
Class: BSCS-6B
Reg #: 182599

Task # 01: Non Recursive Class

```
public class NonRecursive extends SortFactory{
	@Override
	public SortingAlgorithm getAlgorithm(){
		if(algorithm == "Insertion")
			return new Insertion();
		else if(algorithm == "SelectionSort")
			return new SelectionSort();
		return null;
	}
}
```

We implement Non-Recursive class which overrides the function getAlgorithm() of SortFactory class. Based on input, it returns that algorithm.

Task # 02: Insertion Sort

```
/**
 * An implementation of the insertion sort algorithm.
 */

public class Insertion implements SortingAlgorithm {
	public void sort(Object[] items) {
		int _j;
		for(int p = 1; p < items.length; p++){
			Object temp = items[p];
		for(_j = p; _j > 0 && ((Comparable) items[_j-1]).compareTo(temp) > 0; _j--){
			items[_j] = items[_j-1];
			}
		items[_j] = temp;
		}
	}
}
```

Similar to the selection sort, we implement the insertion sort algorithm in this class.

Task # 03: Main (Sorting Manager)

```
public class SortingManager {
	public static void main(String[] args) {
		String elems_selection[] = {"beta", "chi", "alpha", "zeta", "nu", "mu"};
		String elems_insertion[] = {"kamran", "raja", "ali", "boja", "steve"};
		SortFactory factory = new NonRecursive();
		factory.setFactory("SelectionSort");
		SortingAlgorithm algorithm = factory.getAlgorithm();
		algorithm.sort(elems_insertion);
		System.out.println("The elements sorted by insertion sort are: ");
		for(int i = 0; i < elems_insertion.length; i++)
			System.out.println(elems_insertion[i]);
```

```
                System.out.println();
                factory.setFactory("Insertion");
                SortingAlgorithm algorithm_ = factory.getAlgorithm();
                algorithm_.sort(elems_selection);
                System.out.println("The elements sorted by selection sort are: ");
                for(int i = 0; i < elems_selection.length; i++)
                        System.out.println(elems_selection[i]);
        }

}
```

This is the main test driver which is used to test both the implementations.
Output:

```
The elements sorted by insertion sort are:
ali
boja
kamran
raja
steve

The elements sorted by selection sort are:
alpha
beta
chi
mu
nu
zeta
```