Java – Intro to Sorting

19.01 Bubble.java

Write a program that reads a list of words from a file, sorts them in alphabetical order, and outputs the results. Implement bubble sort – do not call Arrays.sort(). Make the sorting method generic with the following method signature:

```
public static <T extends Comparable<? super T>> void bubbleSort(List<T> list)
```

Sample Execution

```
Please enter list to sort: presidents.txt

Adams, John
Adams, John Quincy
Arthur, Chester
Biden, Joe
Buchanan, James
Buren, Martin Van
Bush, George
Bush, George W.
Carter, Jimmy
Cleveland, Grover
Clinton, Bill
Coolidge, Calvin
Eisenhower, Dwight
Fillmore, Millard
Ford, Gerald
Garfield, James
Grant, Ulysses S.
Harding, Warren G.
Harrison, Benjamin
Harrison, William Henry
Hayes, Rutherford B.
Hoover, Herbert
Jackson, Andrew
Jefferson, Thomas
Johnson, Andrew
Johnson, Lyndon B.
Kennedy, John F.
Lincoln, Abraham
```

```
Madison, James
McKinley, William
Monroe, James
Nixon, Richard
Obama, Barack
Pierce, Franklin
Polk, James K.
Reagan, Ronald
Roosevelt, Franklin D.
Roosevelt, Theodore
Taft, William Howard
Taylor, Zachary
Truman, Harry S.
Trump, Donald
Tyler, John
Washington, George
Wilson, Woodrow
```

19.02 Selection.java

Given an array of numbers, sort them in increasing order by implementing selection sort.

Sample Data

```
int[]ary = {-3, 5, 33, 77, 12, -22};
selectionSort(ary);
System.out.println(Arrays.toString(ary)):

ary = new int[]{9, 8, 7, 6, 5, 4, 3, 2, 1};
selectionSort(ary);
System.out.println(Arrays.toString(ary)):

ary = new int[]{-13, -7, 3, 4, 4, 11, 13};
selectionSort(ary);
System.out.println(Arrays.toString(ary)):
```

```
// add more test cases
```

Sample Execution

```
[-22, -3, 5, 12, 33, 77]
[1, 2, 3, 4, 5, 6, 7, 8, 9]
[-13, -7, 3, 4, 4, 11, 13]
```

19.03 Hard8.java

Write a method that takes an array of integers and moves all of the 8's to the front. Implement using a slight twist of insertion sort. The non 8's will remain in the same order.

```
int[]ary = {8, 5, 8, 77, 12, 8};
shift8s(ary);
System.out.println(Arrays.toString(ary)):

ary = new int[]{9, 8, 8, 6, 3, 8, 4, 2, 1};
shift8s(ary);
System.out.println(Arrays.toString(ary)):

ary = new int[]{-13, -7, 8, 8, 4, 8, 8};
shift8s(ary);
System.out.println(Arrays.toString(ary)):

// add more test cases
```

Sample Execution

```
[8, 8, 8, 5, 77, 12]
[8, 8, 8, 9, 6, 3, 4, 2, 1]
[8, 8, 8, 8, -13, -7, 4]
```

19.04 GoofySort.java

Write a program that reads a line of words and sorts them in a goofy manner as shown below.

Sample Execution

```
Enter a sentence :: Bubble Sort has lots of swaps
sfsste
potarl
a ohob
w l Sb
s    u
     B
```

```
Enter a sentence :: Selection Sort is always quadratic
csstn
iyiro
ta oi
aw St
rl  c
da  e
a   l
u   e
q   S

Enter a sentence :: Best case for insertion sort is linear
rstnret
airooss
e oifae
n st cB
i  r
l  e
   s
   n
   i
```