Jobsheet 6

Subject	Data Structure and Algorithm
Lecturer	Imam Fahrur Rozi ST. MT.
Type	Assignment
Semester	Semester 2
Time	@April 4, 2023
Files & Media	

Assignment

1. Add this code on `SearchStudent` class

```
void selectionSort()
    {
        for(int i = 0; i < listStd.length; i++)
        {
            int idxMin = i;
            for (int j = i + 1; j < listStd.length; j++) if (listStd[j].nim < listStd[idxMin].nim) idxMin = j;
            Students tmp = listStd[idxMin];
            listStd[idxMin] = listStd[i];
            listStd[i] = tmp;
        }
    }
```

then add this code on `StudnetMain` class before searching using binary

```
data.selectionSort();
```

2. modify
    - to search name with sequential search, add this code on `SearchStudent` class

```
    int findNameSequential(String search)
    {
        for (int i = 0; i< listStd.length; i++)
        {
            if (listStd[i].name.equalsIgnoreCase(search)) return i;
        }
        return -1;
    }

    void showNamePosition(String search, int pos)
    {
```

```
        if (pos != -1) System.out.println("Data: " + search + " is found in index-" + pos);
        else System.out.println("Data: " + search + " isn't found");
    }

    void showNameData(String search, int pos)
    {
        if (pos != -1)
        {
            System.out.println("NIM\t : " + listStd[pos].nim);
            System.out.println("Name\t :" + search);
            System.out.println("Age\t : " + listStd[pos].age);
            System.out.println("GPA\t : " + listStd[pos].gpa);
        }
        else System.out.println("Data: " + search + " isn't found");
    }
```

- if there is any duplicate name, the program will only output the first input of the name in the data

3. 2d array, search with sequential

```
package Prac;

public class ArraySearch
{
    int[][] data = {{45, 78, 7, 200, 80}, {90, 1, 17, 100, 50}, {21, 2, 40, 18, 65}};

    int[] sequentialSearch(int search)
    {
        int[] pos = new int[2];
        for (int row = 0; row < data.length; row++)
        {
            for (int col = 0; col < data[row].length; col++)
            {
                if(data[row][col] == search)
                {
                    pos [0] = row;
                    pos [1] = col;
                    return pos;
                }
            }
        }
        return pos;
    }
}
```

main class

```
package Prac;

import java.util.Scanner;

public class ArrayMain
{
    public static void main(String[] args)
    {
        Scanner sc = new Scanner(System.in);
        ArraySearch array2d = new ArraySearch();
```

```
        System.out.println("Searching Program with Sequential");
        System.out.print("Search: ");
        int search = sc.nextInt();

        int[] pos = array2d.sequentialSearch(search);
        if (pos[0] == -1 && pos[1] == -1) System.out.println("Data: " + search + " isn't found");
        else System.out.println("Data: " + search + " is found at row " + pos[0] + " and column " + pos[1]);
    }
}
```

4. 1D array, `Array1D` class

```
package Prac;

public class Array1D
{
    int[] data = {12, 17, 2, 1 , 70, 50, 90, 17, 2, 90};

    void printArray()
    {
        for (int i = 0; i < data.length; i++) System.out.print(data[i] + " ");
    }
    void insertionSortAscend()
    {
        int tmp;
        for (int i = 1; i < data.length; i++)
        {
            tmp = data[i];
            int j = i - 1;
            while (j >= 0 && data[j] > tmp)
            {
                data[j + 1] = data[j];
                j--;
            }
            data[j + 1] = tmp;
        }
    }

    void insertionSortDescend()
    {
        int tmp;
        for (int i = 1; i < data.length; i++)
        {
            tmp = data[i];
            int j = i - 1;
            while (j >= 0 && data[j] < tmp)
            {
                data[j + 1] = data[j];
                j--;
            }
            data[j + 1] = tmp;
        }
    }
    int sequentialSearch(int search)
    {
        for (int i = 0; i < data.length; i++)
        {
            if (data[i] == search) return i;
        }
        return -1;
    }
```

```
    int[] getBiggestValue()
    {
        int[] pos = new int[2];
        int big = 0;
        for (int i = 0; i < data.length; i++)
        {
            if (data[i] > big)
            {
                big = data[i];
                pos[0] = i;
                pos[1] = data[i];
            }
        }
        return pos;
    }
}
```

`Array1DMenu` class

```
package Prac;
import java.util.Scanner;

public class Array1DMenu
{
    Array1D array = new Array1D();
    Scanner sc = new Scanner(System.in);
    void searchMenu()
    {
        System.out.println("------------");
        System.out.println("Search Value");
        System.out.println("------------");
        System.out.print("Search for: ");
        int search = sc.nextInt();
        int pos = array.sequentialSearch(search);
        if (pos == -1) System.out.println("Data: " + search + " isn't found");
        else System.out.println("Data: " + search + " found at index-" + pos);
    }

    void sortAscMenu()
    {
        System.out.println("------------");
        System.out.println("Sort Array by Ascending");
        System.out.println("------------");
        System.out.println("Sorted data");
        array.insertionSortAscend();
        array.printArray();
        System.out.println();
    }

    void sortDscMenu()
    {
        System.out.println("------------");
        System.out.println("Sort Array by Descending");
        System.out.println("------------");
        System.out.println("Sorted data");
        array.insertionSortDescend();
        array.printArray();
        System.out.println();
    }
```

```
    void biggestValue()
    {
        int[] big = array.getBiggestValue();
        System.out.println("------------");
        System.out.println("Get Biggest Value");
        System.out.println("------------");
        System.out.println("The Biggest Value is " + big[1] + " at index " + big[0]);
    }
}
```

`Array1DMain` main class

```
package Prac;
import java.util.Scanner;

public class Array1DMain
{


    public static void main(String[] args)
    {
        Array1D array = new Array1D();
        Array1DMenu arrayMenu = new Array1DMenu();
        Scanner sc = new Scanner(System.in);
        System.out.println("------------");
        array.printArray();
        System.out.println();
        int menu;
        do
        {
            System.out.println("------------");
            System.out.println("Array 1D menu");
            System.out.println("1. Search Value");
            System.out.println("2. Sort Array by Ascending");
            System.out.println("3. Sort Array by Descending");
            System.out.println("4. Get Biggest Value");
            System.out.print("Choose Menu: ");
            menu = sc.nextInt();
            switch (menu)
            {
                case 1:
                    arrayMenu.searchMenu();
                    break;
                case 2:
                    arrayMenu.sortAscMenu();
                    break;
                case 3:
                    arrayMenu.sortDscMenu();
                    break;
                case 4:
                    arrayMenu.biggestValue();
                    break;
                case 0:
                    System.out.println("adios");
                    break;
                default:
                    System.out.println("Please choose Menu correctly!");
                    break;
            }
        }
        while (menu != 0);
```

```
    }
}
```