Sorting Array
Assignment question

Q1. Write a program to sort an array in descending order using bubble sort.
Input Array {3,5,1,6,0}
Output Array: {6, 5, 3, 1, 0}
Ans:

```java
public class Main {
    public static void main(String[] args) {
        int[] array = {3, 5, 1, 6, 0};

        System.out.println("Original Array:");
        printArray(array);

        bubbleSortDescending(array);

        System.out.println("Sorted Array (Descending):");
        printArray(array);
    }

    public static void bubbleSortDescending(int[] array) {
        int n = array.length;
        for (int i = 0; i < n - 1; i++) {
            for (int j = 0; j < n - i - 1; j++) {
                if (array[j] < array[j + 1]) {
                    // Swap elements
                    int temp = array[j];
                    array[j] = array[j + 1];
                    array[j + 1] = temp;
                }
            }
        }
    }
```

```java
    public static void printArray(int[] array) {
        for (int j : array) {
            System.out.print(j + " ");
        }
        System.out.println();
    }
}
```

Q2. WAP to sort an array in descending order using selection sort
Input Array {3,5,1,6,0}
Output Array: {6, 5, 3, 1, 0}
Ans:

```java
public class Main {
    public static void main(String[] args) {
        int[] array = {3, 5, 1, 6, 0};

        System.out.println("Original Array:");
        printArray(array);

        selectionSortDescending(array);

        System.out.println("Sorted Array (Descending):");
        printArray(array);
    }

    public static void selectionSortDescending(int[] array) {
        int n = array.length;
        for (int i = 0; i < n - 1; i++) {
            int maxIndex = i;
            for (int j = i + 1; j < n; j++) {
                if (array[j] > array[maxIndex]) {
```

```java
                maxIndex = j;
            }
        }
        // Swap elements
        int temp = array[i];
        array[i] = array[maxIndex];
        array[maxIndex] = temp;
    }
}

public static void printArray(int[] array) {
    for (int j : array) {
        System.out.print(j + " ");
    }
    System.out.println();
}
}
```

Output:

Original Array:
3 5 1 6 0
Sorted Array (Descending):
6 5 3 1 0

Q3. WAP to sort an array in decreasing order using insertion sort
Input Array {3,5,1,6,0}
Output Array: {6, 5, 3, 1, 0}

Ans:
```java
public class Main {
    public static void main(String[] args) {
        int[] array = {3, 5, 1, 6, 0};
```

```java
        System.out.println("Original Array:");
        printArray(array);

        insertionSortDescending(array);

        System.out.println("Sorted Array (Descending):");
        printArray(array);
    }

    public static void insertionSortDescending(int[] array) {
        int n = array.length;
        for (int i = 1; i < n; i++) {
            int key = array[i];
            int j = i - 1;

            // Move elements less than key to right
            while (j >= 0 && array[j] < key) {
                array[j + 1] = array[j];
                j--;
            }
            array[j + 1] = key;
        }
    }

    public static void printArray(int[] array) {
        for (int j : array) {
            System.out.print(j + " ");
        }
        System.out.println();
    }
}
```

Output:

Original Array:
3 5 1 6 0
Sorted Array (Descending):
6 5 3 1 0

Q4. Find out how many pass would be required to sort the following array in decreasing order using bubble sort
Input Array {3,5,1,6,0}
Ans
```
public class Main {
    public static void main(String[] args) {
        int[] array = {3, 5, 1, 6, 0};

        System.out.println("Original Array:");
        printArray(array);

        bubbleSortDescending(array);

        System.out.println("Sorted Array (Descending):");
        printArray(array);
    }

    public static void bubbleSortDescending(int[] array) {
        int n = array.length;
        int passes = 0;

        for (int i = 0; i < n - 1; i++) {
            passes++;
            System.out.println("Pass " + passes + ":");
            for (int j = 0; j < n - i - 1; j++) {
                if (array[j] < array[j + 1]) {
                    // Swap elements
                    int temp = array[j];
                    array[j] = array[j + 1];
                    array[j + 1] = temp;
                }
            }
```

```java
            printArray(array);
        }
    }

    public static void printArray(int[] array) {
        for (int j : array) {
            System.out.print(j + " ");
        }
        System.out.println();
    }
}
}
```

Q5. Find out the number of iterations to sort the array in descending order using selection sort.
Input Array {3,5,1,6,0}

Ans:
```java
public class Main {
    public static void main(String[] args) {
        int[] array = {3, 5, 1, 6, 0};

        System.out.println("Original Array:");
        printArray(array);

        selectionSortDescending(array);

        System.out.println("Sorted Array (Descending):");
        printArray(array);
    }

    public static void selectionSortDescending(int[] array) {
        int n = array.length;
        int iterations = 0;

        for (int i = 0; i < n - 1; i++) {
            iterations++;
```

```java
        System.out.println("Iteration " + iterations + ":");
        int maxIndex = i;
        for (int j = i + 1; j < n; j++) {
            if (array[j] > array[maxIndex]) {
                maxIndex = j;
            }
        }
        // Swap elements
        int temp = array[i];
        array[i] = array[maxIndex];
        array[maxIndex] = temp;
        printArray(array);
    }
}

public static void printArray(int[] array) {
    for (int j : array) {
        System.out.print(j + " ");
    }
    System.out.println();
}
}
```