**DAY-9 PRACTICE EXERCISE**

**BASICS OF JAVA**

**Problem : 1.QuickSort Class**

**package** org.software.com;

**import** java.util.Scanner;

**public** **class** QuickSort {

**private** **static** **void** quickSort(**int**[] arr, **int** low, **int** high) {

**if** (low < high) {

**int** pi = *partition*(arr, low, high);

*quickSort*(arr, low, pi - 1);

*quickSort*(arr, pi + 1, high);

}

}

**private** **static** **int** partition(**int**[] arr, **int** low, **int** high) {

**int** pivot = arr[high];

**int** i = (low - 1);

**for** (**int** j = low; j < high; j++) {

**if** (arr[j] < pivot) {

i++;

**int** temp = arr[i];

arr[i] = arr[j];

arr[j] = temp;

}

}

**int** temp = arr[i + 1];

arr[i + 1] = arr[high];

arr[high] = temp;

**return** i + 1;

}

}

**public** **static** **void** main(String[] args) {

Scanner sc = **new** Scanner(System.***in***);

System.***out***.println("Enter length of Array");

**int** length = sc.nextInt();

**int** arr[] = **new** **int**[length];

System.***out***.println("Enter Elements");

**for** (**int** i = 0; i < arr.length; i++) {

arr[i] = sc.nextInt();

}

*quickSort*(arr, 0, arr.length - 1);

**for** (**int** i : arr) {

System.***out***.print(i + " ");

}

}

**Problem : 2.MergeSort Class**

**package** org.software.com;

**import** java.util.\*;

**public** **class** MergeSort {

**private** **static** **int**[] divider(**int**[] arr) {

**if** (arr.length == 1)

**return** arr;

**int** mid = arr.length / 2;

**int** left[] = *divider*(Arrays.*copyOfRange*(arr, 0, mid));

**int** right[] = *divider*(Arrays.*copyOfRange*(arr, mid, arr.length));

**return** *merge*(left, right);

}

**private** **static** **int**[] merge(**int**[] left, **int**[] right) {

**int** m[] = **new** **int**[left.length + right.length];

**int** i = 0, j = 0, k = 0;

**while** (i < left.length && j < right.length) {

**if** (left[i] < right[j])

m[k++] = left[i++];

**else**

m[k++] = right[j++];

}

**while** (i < left.length)

m[k++] = left[i++];

**while** (j < right.length)

m[k++] = right[j++];

**return** m;

}

**public** **static** **void** main(String[] args) {

Scanner sc=**new** Scanner(System.***in***);

System.***out***.println("Enter length of Array");

**int** length=sc.nextInt();

**int** arr[] = **new** **int**[length];

System.***out***.println("Enter Elements");

**for** (**int** i = 0; i < arr.length; i++) {

arr[i]=sc.nextInt();

}

**int** sort[] = *divider*(arr);

System.***out***.println("Sorted Array: ");

**for** (**int** i : sort) {

System.***out***.print(i + " ");

}

}

}

**Problem : 3.LinearSearch Class**

**package** org.software.com;

**import** java.util.Scanner;

**public** **class** LinearSearch {

**public** **static** **int** linearSearch(**int**[] arr, **int** target) {

**for** (**int** i = 0; i < arr.length; i++) {

**if** (arr[i] == target) {

**return** i;

}

}

**return** -1;

}

**public** **static** **void** main(String[] args) {

Scanner sc = **new** Scanner(System.***in***);

System.***out***.println("Enter length of Array");

**int** length = sc.nextInt();

**int** arr[] = **new** **int**[length];

System.***out***.println("Enter Elements");

**for** (**int** i = 0; i < arr.length; i++) {

arr[i] = sc.nextInt();

}

System.***out***.println("Enter Target");

**int** target = sc.nextInt();

**int** result = *linearSearch*(arr, target);

**if** (result != -1) {

System.***out***.println("Element found at index: " + result);

} **else** {

System.***out***.println("Element not found in the array.");

}

}

}

**Problem : 4.SelectionSortStrings Class**

**package** org.software.com;

**import** java.util.Scanner;

**public** **class** SelectionSortStrings {

**public** **static** **void** selectionSort(String[] arr) {

**int** n = arr.length;

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

**int** minIndex = i;

**for** (**int** j = i + 1; j < n; j++) {

**if** (arr[j].compareTo(arr[minIndex]) < 0) {

minIndex = j;

}

}

String temp = arr[minIndex];

arr[minIndex] = arr[i];

arr[i] = temp;

}

}

**public** **static** **void** main(String[] args) {

Scanner sc = **new** Scanner(System.***in***);

System.***out***.println("Enter length of Array");

**int** length = sc.nextInt();

String arr[] = **new** String[length];

System.***out***.println("Enter Elements");

**for** (**int** i = 0; i < arr.length; i++) {

arr[i] = sc.next();

}

System.***out***.println("Original array:");

**for** (String s : arr) {

System.***out***.print(s + " ");

}

System.***out***.println();

*selectionSort*(arr);

System.***out***.println("Sorted array:");

**for** (String s : arr) {

System.***out***.print(s + " ");

}

}

}

**Problem : 5.InsertionSort Class**

**package** org.software.com;

**import** java.util.Scanner;

**public** **class** InsertionSort {

**public** **static** **void** main(String[] args) {

Scanner sc = **new** Scanner(System.***in***);

System.***out***.println("Enter length of Array");

**int** length = sc.nextInt();

**double** arr[] = **new** **double**[length];

System.***out***.println("Enter Elements");

**for** (**int** i = 0; i < arr.length; i++) {

arr[i] = sc.nextDouble();

}

**for** (**int** i = 1; i < arr.length; i++) {

**double** temp = arr[i];

**int** j;

**for** (j = i - 1; j >= 0 && arr[j] > temp; j--) {

arr[j + 1] = arr[j];

}

arr[j + 1] = temp;

}

System.***out***.println("Sorted Array:");

**for** (**double** num : arr) {

System.***out***.print(num + " ");

}

}

}

**Problem : 6.BinarySearchString Class**

**package** org.software.com;

**import** java.util.Scanner;

**public** **class** BinarySearchString {

**public** **static** **int** binarySearch(String[] arr, String target) {

**int** left = 0;

**int** right = arr.length - 1;

**while** (left <= right) {

**int** mid = left + (right - left) / 2;

**int** result = target.compareTo(arr[mid]);

**if** (result == 0) {

**return** mid;

}

**if** (result > 0) {

left = mid + 1;

} **else** {

right = mid - 1;

}

}

**return** -1;

}

**public** **static** **void** main(String[] args) {

Scanner sc = **new** Scanner(System.***in***);

System.***out***.println("Enter length of Array");

**int** length = sc.nextInt();

String arr[] = **new** String[length];

System.***out***.println("Enter Elements");

**for** (**int** i = 0; i < arr.length; i++) {

arr[i] = sc.next();

}

System.***out***.println("Enter Searching Element");

String target = sc.next();

**int** index = *binarySearch*(arr, target);

**if** (index != -1) {

System.***out***.println("Element " + target + " found at index " + index);

} **else** {

System.***out***.println("Element " + target + " not found");

}

}

}