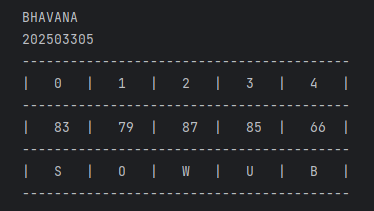
**EXERCISE 1 – SORT**

Write a program to read an integer of randomly in a 1D array and character array using the random integer. Apply the method to sort the array content and return the number of comparisons done. Apply method to Print the sorted array with array index position

**PROGRAM**

import java.util.\*;  
class RandomLetterGenerator {  
 private int min;  
 private int max;  
 private int[] randomNumbers;  
 private char[] letters;  
 public RandomLetterGenerator(int min, int max) {  
 this.min = min;  
 this.max = max;  
 this.randomNumbers = new int[5];  
 this.letters = new char[5];  
 }  
 public void generateRandomNumbers() {  
 Random rd = new Random();  
 for (int i = 0; i < 5; i++) {  
 randomNumbers[i] = rd.nextInt((max - min)) + min;  
 }  
 }  
 public void convertToLetters() {  
 for (int i = 0; i < 5; i++) {  
 letters[i] = (char) randomNumbers[i];  
 }  
 }  
 public void displayResults() {  
 System.*out*.println("\t-----------------------------------------");  
 System.*out*.print("\t|");  
 for (int i = 0; i < 5; i++) {  
 System.*out*.print("\t" + i);  
 System.*out*.print("\t|");  
 }  
 System.*out*.println();  
 System.*out*.println("\t-----------------------------------------");  
 System.*out*.print("\t|");  
 for (int i = 0; i < 5; i++) {  
 System.*out*.print("\t" + randomNumbers[i]);  
 System.*out*.print("\t|");  
 }  
 System.*out*.println();  
 System.*out*.println("\t-----------------------------------------");  
 System.*out*.print("\t|");  
 for (int i = 0; i < 5; i++) {  
 System.*out*.print(" \t" + letters[i]);  
 System.*out*.print("\t|");  
 }  
 System.*out*.println();  
 System.*out*.println("\t-----------------------------------------");  
 }  
}  
public class Assignment2\_\_3305 {  
 public static void main(String[] args) {  
 System.*out*.println("\n\n\tBHAVANA\n\t202503305");  
 RandomLetterGenerator generator = new RandomLetterGenerator(65, 90);  
 generator.generateRandomNumbers();  
 generator.convertToLetters();  
 generator.displayResults();  
 }  
}

**OUTPUT**



**EXERCISE 2: SEARCH ELEMENT OCCURRENCE**

Write a program to read n random integer in a 1D array of A and B of size n. Apply method to search the occurrence of element in B and print the number of B element occurrence in A.

**PROGRAM**

import java.util.Random;

import java.util.Scanner;

public class ArraySearch\_3305 {

public static int[] generateRandomArray(int n, int range) {

System.out.println("Bhavana/n2022503305");

Random random = new Random();

int[] array = new int[n];

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

array[i] = random.nextInt(range); // Generating random numbers within a range

}

return array;

}

public static int countOccurrences(int[] A, int element) {

int count = 0;

for (int i : A) {

if (i == element) {

count++;

}

}

return count;

public static void printOccurrences(int[] A, int[] B) {

for (int element : B) {

int count = countOccurrences(A, element);

System.out.println("Element " + element + " occurs " + count + " times in array A.");

}

}

public static void main(String[] args) {

System.out.println("BHAVANA\n2022503305\n");

Scanner scanner = new Scanner(System.in)

System.out.print("Enter the size of the arrays (n): ");

int n = scanner.nextInt();

int[] A = generateRandomArray(n, 20); // Random numbers in the range [0, 20)

int[] B = generateRandomArray(n, 20);

System.out.print("Array A: ");

for (int a : A) {

System.out.print(a + " ");

}

System.out.println();

System.out.print("Array B: ");

for (int b : B) {

System.out.print(b + " ");

}

System.out.println();

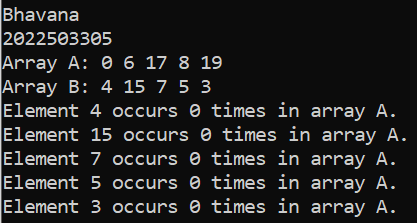
printOccurrences(A, B);

scanner.close();

}

}

**OUTPUT**



**EXERCISE 4: MAGIC SQUARE**

Write a magic square game using 2d array such that All the row, column and diagonal sum are equal. Create a 3 X 3 grid using array of the integers 1 to n^2. Read the random integer for the middle position and then fill the other places to obtain magic square.

**PROGRAM**

import java.util.Arrays;

import java.util.Scanner;

public Assignment{

public static int[][] readArray(int rows, int cols, Scanner scanner) {

int[][] array = new int[rows][cols];

System.out.println("Enter the elements of the array:");

for (int i = 0; i < rows; i++) {

for (int j = 0; j < cols; j++) {

array[i][j] = scanner.nextInt();

}

}

return array;

}

public static int[] columnSums(int[][] array) {

int rows = array.length;

int cols = array[0].length;

int[] sums = new int[cols];

for (int j = 0; j < cols; j++) {

int sum = 0;

for (int i = 0; i < rows; i++) {

sum += array[i][j];

}

sums[j] = sum;

}

return sums;

}

public static void sortArrayByColumnSums(int[][] array) {

int cols = array[0].length;

Integer[] indices = new Integer[cols];

for (int i = 0; i < cols; i++) {

indices[i] = i;

}

int[] columnSums = columnSums(array);

Arrays.sort(indices, (i1, i2) -> columnSums[i1] - columnSums[i2]);

int[][] sortedArray = new int[array.length][cols];

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

for (int j = 0; j < cols; j++) {

sortedArray[i][j] = array[i][indices[j]];

}

}

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

for (int j = 0; j < cols; j++) {

array[i][j] = sortedArray[i][j];

}

}

}

public static void printArray(int[][] array) {

for (int[] row : array) {

for (int element : row) {

System.out.print(element + " ");

}

System.out.println();

}

}

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

System.out.print("Enter the number of rows: ");

int rows = scanner.nextInt();

System.out.print("Enter the number of columns: ");

int cols = scanner.nextInt();

int[][] array1 = readArray(rows, cols, scanner);

int[][] array2 = readArray(rows, cols, scanner);

System.out.println("Array 1 before sorting:");

printArray(array1);

sortArrayByColumnSums(array1);

System.out.println("Array 1 after sorting by column sums:");

printArray(array1);

System.out.println("Array 2 before sorting:");

printArray(array2);

sortArrayByColumnSums(array2);

System.out.println("Array 2 after sorting by column sums:");

printArray(array2);

scanner.close();

}

}

**OUTPUT**

