Program:1

import java.util.HashSet;

import java.util.Set;

//Find duplicate elements from an array and print.

public class Javapro1

{

public static void main(String[] args) {

int[] arr = { 12, 19, 34, 12, 26, 34, 99, 81, 56, 64, 19, 54 };

findDuplicate(arr);

}

private static void findDuplicate(int[] arr) {

Set<Integer> uniqueSet = new HashSet<Integer>();

Set<Integer> duplicateSet = new HashSet<Integer>();

for (int n : arr) {

if (!uniqueSet.add(n)) {

duplicateSet.add(n);

}

}

System.out.println(duplicateSet);

}

}

//Write a program that finds the highest/lowest product obtained by multiplying each combination of two values in an array.

**public** **class** Javapro2 {

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

**int**[] arr = { 2, 5, 7, 12, 1, 3, 4 };

*findMinMaxProduct*(arr);

}

**private** **static** **void** findMinMaxProduct(**int**[] arr) {

**if** (arr.length <= 2) {

System.***out***.println("Only two elements in the array");

**return**;

}

**int** maxProduct = Integer.***MIN\_VALUE***;

**int** minProduct = Integer.***MAX\_VALUE***;

**int** pro = 0;

**for** (**int** i = 0; i < arr.length - 1; i++) {

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

pro = arr[i] \* arr[j];

**if** (pro < minProduct) {

minProduct = pro;

}

**if** (pro > maxProduct) {

maxProduct = pro;

}

}

}

System.***out***.println("Minimum product value:  " + minProduct);

System.***out***.println("Maximum product value:  " + maxProduct);

}

}

Program:3

**import** java.util.Arrays;

**public** **class** JavaPro3 {

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

**int**[] arr = { 2, 5, 7, 12, 1, 3, 4 };

*findMinMaxDiff*(arr);

}

**private** **static** **void** findMinMaxDiff(**int**[] arr) {

**if** (arr.length <= 2) {

System.***out***.println("Only two elements in the array");

**return**;

}

Arrays.*sort*(arr);

**int** maxDiff = Integer.***MIN\_VALUE***;

**int** minDiff = Integer.***MAX\_VALUE***;

**for** (**int** i = 0; i < arr.length - 1; i++) {

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

**int** pro = arr[j] - arr[i];

**if** (pro < minDiff) {

minDiff = pro;

}

**if** (pro > maxDiff) {

maxDiff = pro;

}

}

}

System.***out***.println("Minimum product value:  " + minDiff);

System.***out***.println("Maximum product value:  " + maxDiff);

}

}

Program 4:

**import** java.util.Arrays;

**public** **class** JavaPro4 {

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

**int**[] arr = { 2, 5, 7, 12, 1, 3, 4 };

*findMinMaxSum*(arr);

}

**private** **static** **void** findMinMaxSum(**int**[] arr) {

**if** (arr.length <= 2) {

System.***out***.println("Only two elements in the array");

**return**;

}

Arrays.*sort*(arr);

**int** maxSum = Integer.***MIN\_VALUE***;

**int** minSum = Integer.***MAX\_VALUE***;

**for** (**int** i = 0; i < arr.length - 1; i++) {

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

**int** pro = arr[j] + arr[i];

**if** (pro < minSum) {

minSum = pro;

}

**if** (pro > maxSum) {

maxSum = pro;

}

}

}

System.***out***.println("Minimum product value:  " + minSum);

System.***out***.println("Maximum product value:  " + maxSum);

}

}

Program 5:

**public** **class** Javapro5 {

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

String str = "aabbcabd";

String ans = *findLongStringwithoutDuplicate*(str);

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

}

**private** **static** String findLongStringwithoutDuplicate(String str) {

**if** (str.length() == 0) {

**return** **null**;

}

**int** maxLength = 0;

String longestSubstring = "";

**int** start = 0;

Map<Character, Integer> charIndexMap = **new** LinkedHashMap<>();

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

**char** ch = str.charAt(i);

**if** (charIndexMap.containsKey(ch)) {

start = Math.*max*(start, charIndexMap.get(ch) + 1);

}

charIndexMap.put(ch, i);

**if** (charIndexMap.size() > maxLength) {

maxLength = charIndexMap.size();

longestSubstring = str.substring(start, i + 1);

}

}

**return** longestSubstring;

}

}