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Task 1:

Code:

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| class Infinite  {  public static void main(String[] args)  { int i=1;  while(i==1)  {  System.out.println("This is a infinite loop!!");  }    }  } |

Task 2:

CODE:

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| import java.util.Scanner;  class Infinite {  public static void main(String[] args) {  Scanner sc = new Scanner(System.in);  String comment;  System.out.println("Enter your Comment Line: ");  comment = sc.nextLine();  System.out.println("Your Comment is: " + comment);  }  } |

Task 3:

CODE:

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| public class HelloWorld {  public static void main(String[] args) {  outerloop:  for (int i = 0; i < 10; i++) {  for (int j = 0; j < 10; j++) {  if (i \* j > 20) {  System.out.println("Breaking out of outer loop");  break outerloop;  }  }  }  }  } |

TASK 4:

CODE:

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| import java.util.Scanner;  class Duplicate {  public static void main(String[] args) {  int[] arr = new int[10];  Scanner sc = new Scanner(System.in);    // Reading array elements from user input  for (int i = 0; i < arr.length; i++) {  System.out.println("Enter element: ");  arr[i] = sc.nextInt();  }  // Finding first duplicate element  for (int i = 0; i < arr.length; i++) {  for (int j = i + 1; j < arr.length; j++) {  if (arr[i] == arr[j]) {  System.out.println("First duplicate value is " + arr[i]);  return;  }  }  }  System.out.println("No duplicates found.");  }  } |

TASK 4:

CODE:

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| import java.util.\*;  public class DuplicateFinder {    // Method to find a single duplicate in an array of integers  public static int findDuplicate(int[] nums) {  for (int i = 0; i < nums.length; i++) {  int index = Math.abs(nums[i]) - 1;  if (nums[index] < 0) {  return index + 1;  } else {  nums[index] = -nums[index];  }  }  return -1;  }    // Method to find non-unique duplicates in an array of integers  public static List<Integer> findNonUniqueDuplicates(int[] nums) {  List<Integer> result = new ArrayList<>();  for (int i = 0; i < nums.length; i++) {  int index = Math.abs(nums[i]) - 1;  if (nums[index] < 0) {  if (!result.contains(index + 1)) {  result.add(index + 1);  }  } else {  nums[index] = -nums[index];  }  }  for (int i = 0; i < nums.length; i++) {  nums[i] = Math.abs(nums[i]);  }  return result;  }    public static void main(String[] args) {  Scanner sc = new Scanner(System.in);  int n;  System.out.println("Enter the size of the array: ");  n = sc.nextInt();  int[] arr = new int[n];  System.out.println("Enter the elements of the array: ");  for (int i = 0; i < n; i++) {  arr[i] = sc.nextInt();  }  int duplicate = findDuplicate(arr);  if (duplicate != -1) {  System.out.println("The single duplicate in the array is: " + duplicate);  } else {  System.out.println("There is no duplicate in the array.");  }  List<Integer> duplicates = findNonUniqueDuplicates(arr);  if (duplicates.size() > 0) {  System.out.println("The non-unique duplicates in the array are: " + duplicates);  } else {  System.out.println("There are no non-unique duplicates in the array.");  }  }  } |

TASK 5:

CODE:

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| --- |
| import java.util.\*;  public class DuplicateFinder {    // Method to find a single duplicate in an array of integers  public static int findDuplicate(int[] nums) {  for (int i = 0; i < nums.length; i++) {  int index = Math.abs(nums[i]) - 1;  if (nums[index] < 0) {  return index + 1;  } else {  nums[index] = -nums[index];  }  }  return -1;  }    // Method to find non-unique duplicates in an array of integers  public static List<Integer> findNonUniqueDuplicates(int[] nums) {  List<Integer> result = new ArrayList<>();  for (int i = 0; i < nums.length; i++) {  int index = Math.abs(nums[i]) - 1;  if (nums[index] < 0) {  if (!result.contains(index + 1)) {  result.add(index + 1);  }  } else {  nums[index] = -nums[index];  }  }  for (int i = 0; i < nums.length; i++) {  nums[i] = Math.abs(nums[i]);  }  return result;  }    public static void main(String[] args) {  Scanner sc = new Scanner(System.in);  int n;  System.out.println("Enter the size of the array: ");  n = sc.nextInt();  int[] arr = new int[n];  System.out.println("Enter the elements of the array: ");  for (int i = 0; i < n; i++) {  arr[i] = sc.nextInt();  }  int duplicate = findDuplicate(arr);  if (duplicate != -1) {  System.out.println("The single duplicate in the array is: " + duplicate);  } else {  System.out.println("There is no duplicate in the array.");  }  List<Integer> duplicates = findNonUniqueDuplicates(arr);  if (duplicates.size() > 0) {  System.out.println("The non-unique duplicates in the array are: " + duplicates);  } else {  System.out.println("There are no non-unique duplicates in the array.");  }  }  } |