TASK 5

AIM: To convert a given time from **12-hour AM/PM format** into **24-hour (military) format** using Java.

ALGORITHM:

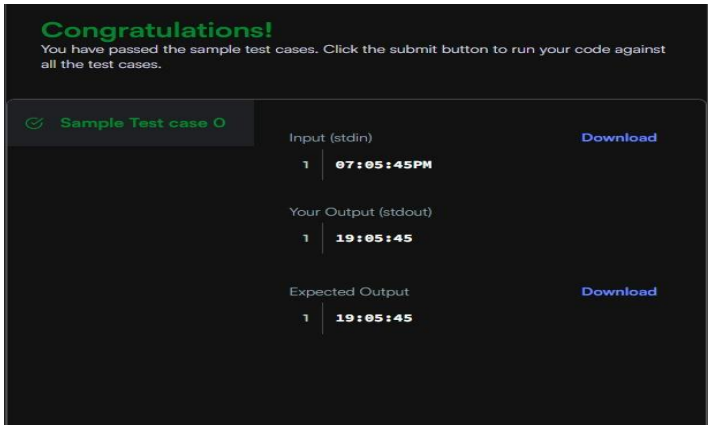
1. Read the input time string in the format `hh:mm:ssAM` or `hh:mm:ssPM`.
2. Extract:
   - The last two characters to determine `AM` or `PM`.
   - The first two characters as the hour.
   - The remaining part `:mm:ss`.
3. If the time is **AM**:
   - Convert `12` to `00`.
4. If the time is **PM**:
   - Add `12` to the hour if it is not already `12`.
5. Format the hour to always have two digits.
6. Append the minutes and seconds .
7. Return the converted time in **24-hour format**.

PROGRAM :

```
import java.io.*;

class Result {

    public static String timeConversion(String s) {

        String period = s.substring(s.length() - 2); // AM or PM

        int hour = Integer.parseInt(s.substring(0, 2));

        String rest = s.substring(2, 8); // :mm:ss

        if (period.equals("AM")) {

            if (hour == 12) {

                hour = 0;

            }

        } else { // PM

            if (hour != 12) {

                hour += 12;}}
```

```
        return String.format("%02d%s", hour, rest);
    }}
public class Solution {
    public static void main(String[] args) throws IOException {
        BufferedReader bufferedReader = new BufferedReader(
                new InputStreamReader(System.in)
        );
        BufferedWriter bufferedWriter = new BufferedWriter(
                new FileWriter(System.getenv("OUTPUT_PATH"))
        );
        String s = bufferedReader.readLine();
        String result = Result.timeConversion(s);
        bufferedWriter.write(result);
        bufferedWriter.newLine();
        bufferedReader.close();
        bufferedWriter.close();}
}
```

OUTPUT:



RESULT: The program successfully converts the given 12-hour format time into its corresponding **24-hour format**.

TASK 6

AIM: To move all zero elements in an array to the end while maintaining the relative order of the non-zero elements.

ALGORITHM;

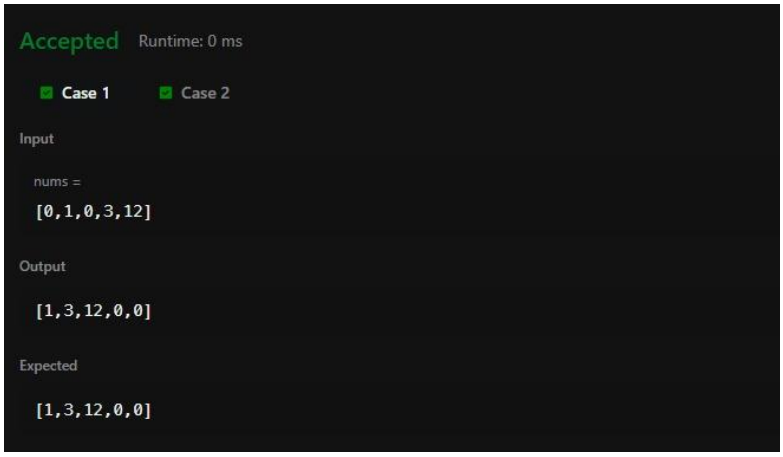
1. Initialize an index variable to `0`.
2. Traverse the array from left to right.
3. Whenever a non-zero element is found, place it at the position indicated by `index` and increment `index`.
4. After all non-zero elements are moved forward, fill the remaining positions in the array with `0`.
5. Display the modified array.

PROGRAM

```
import java.util.Scanner;

class Solution {

    public void moveZeroes(int[] nums) {

        int index = 0;

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

            if (nums[i] != 0) {

                nums[index] = nums[i];

                index++;

            }

        }

        while (index < nums.length) {

            nums[index] = 0;

            index++;}

    public static void main(String[] args) {

        Scanner sc = new Scanner(System.in);

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

        int n = sc.nextInt();

        int[] nums = new int[n];

        System.out.println("Enter elements:");

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

```
            nums[i] = sc.nextInt();
        }Solution sol = new Solution();
        sol.moveZeroes(nums);
        System.out.print("Array after moving zeros: ");
        for (int num : nums) {
            System.out.print(num + " ");
        }
        sc.close();
    }
}
```

OUTPUT :



RESULT: The program rearranges the array by moving all zeros to the end without changing the order of non-zero elements.

TASK 7

AIM: To calculate the **absolute difference between the sums of the primary and secondary diagonals** of a given square matrix.

ALGORITHM:

1. Read the integer `n`, representing the size of the square matrix.
2. Read the `n × n` elements of the matrix into a 2-D list.
3. Initialize two variables:

- `primarySum` for the left-to-right diagonal.
- `secondarySum` for the right-to-left diagonal.

4. Traverse the matrix using a loop:

- Add `arr[i][i]` to `primarySum`.
- Add `arr[i][n - 1 - i]` to `secondarySum`.

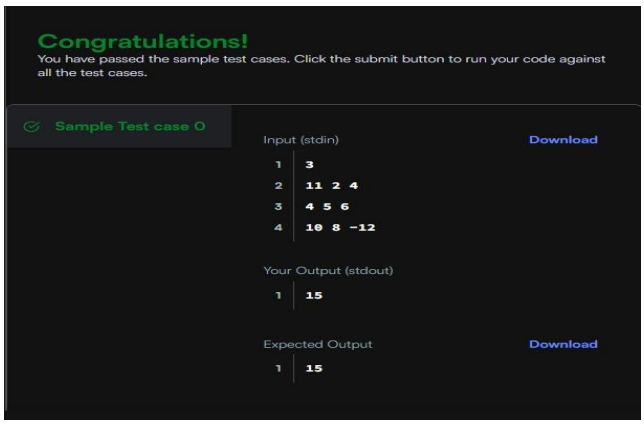
5. Compute the absolute difference between the two sums.
6. Display the result.

PROGRAM

```
import java.io.*;

import java.util.*;

class Result {

    public static int diagonalDifference(List<List<Integer>> arr) {

        int n = arr.size();

        int primarySum = 0;

        int secondarySum = 0;

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

            primarySum += arr.get(i).get(i);

            secondarySum += arr.get(i).get(n - 1 - i);}

        return Math.abs(primarySum - secondarySum);

    }

public class Solution {

    public static void main(String[] args) throws IOException {

        BufferedReader bufferedReader = new BufferedReader(

                new InputStreamReader(System.in)
```

```
        );
        BufferedWriter bufferedWriter = new BufferedWriter(
                new FileWriter(System.getenv("OUTPUT_PATH"))
        );  int n = Integer.parseInt(bufferedReader.readLine().trim());
        List<List<Integer>> arr = new ArrayList<>();
        for (int i = 0; i < n; i++) {
           String[] arrRowTempItems = bufferedReader.readLine().trim().split(" ");
           List<Integer> arrRowItems = new ArrayList<>();
           for (int j = 0; j < n; j++) {
              arrRowItems.add(Integer.parseInt(arrRowTempItems[j]));}
           arr.add(arrRowItems);
        }   int result = Result.diagonalDifference(arr);
        bufferedWriter.write(String.valueOf(result));
        bufferedWriter.newLine();
        bufferedReader.close();
        bufferedWriter.close();  }
    }
```

OUTPUT;



RESULT: The program successfully computes and displays the **absolute difference between the sums of both diagonals** of the given square matrix.

TASK 8

AIM: The goal is to transform a given 2D integer array (matrix) by swapping its rows and columns. Specifically, the element at position `matrix[i][j]` should move to `result[j][i]` in the new matrix.

ALGORITHM:

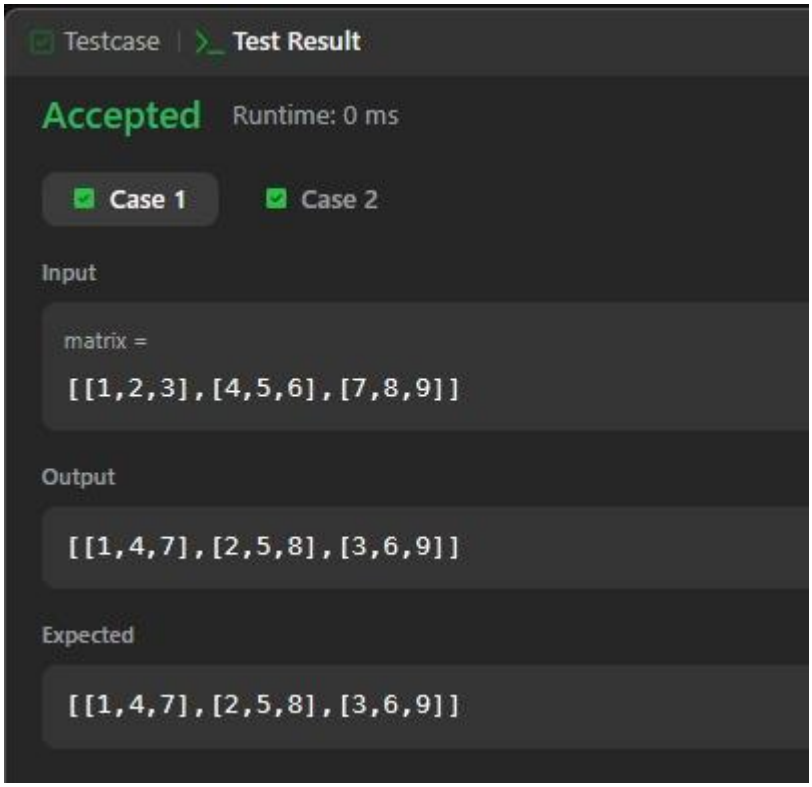
1. **Identify Dimensions**: Find the number of rows (m) and columns (n) of the original matrix.
2. **Initialize Result**: Create a new 2D array `result` with dimensions $n \times m$ (the reverse of the original).
3. **Nested Iteration**:
4. Outer loop: Iterate through each row i from 0 to $m-1$.
5. Inner loop: Iterate through each column j from 0 to $n-1$.
6. **Value Assignment**: Map the value: `result[j][i] = matrix[i][j]`.
7. **Return**: Once all elements are processed, return the `result` matrix

PROGRAM:

```
import java.util.Arrays;

class Solution {

   public int[][] transpose(int[][] matrix) {

       int m = matrix.length;

       int n = matrix[0].length;

        int[][] result = new int[n][m]

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

          for (int j = 0; j < n; j++)

             result[j][i] = matrix[i][j] ;}

}

       return result;

   public static void main(String[] args) {

       Solution sol = new Solution

       int[][] matrix = {

          {1, 2, 3},

          {4, 5, 6}
```

```
    }
    int[][] output = sol.transpose(matrix);
    System.out.println("Transposed Matrix:");
    for (int[] row : output) {
        System.out.println(Arrays.toString(row));}}
    }
```

OUTPUT;



RESULT ; The program has been executed successfully, and the resulting transposed matrix is generated as a new two-dimensional array where the original rows have been converted into columns.