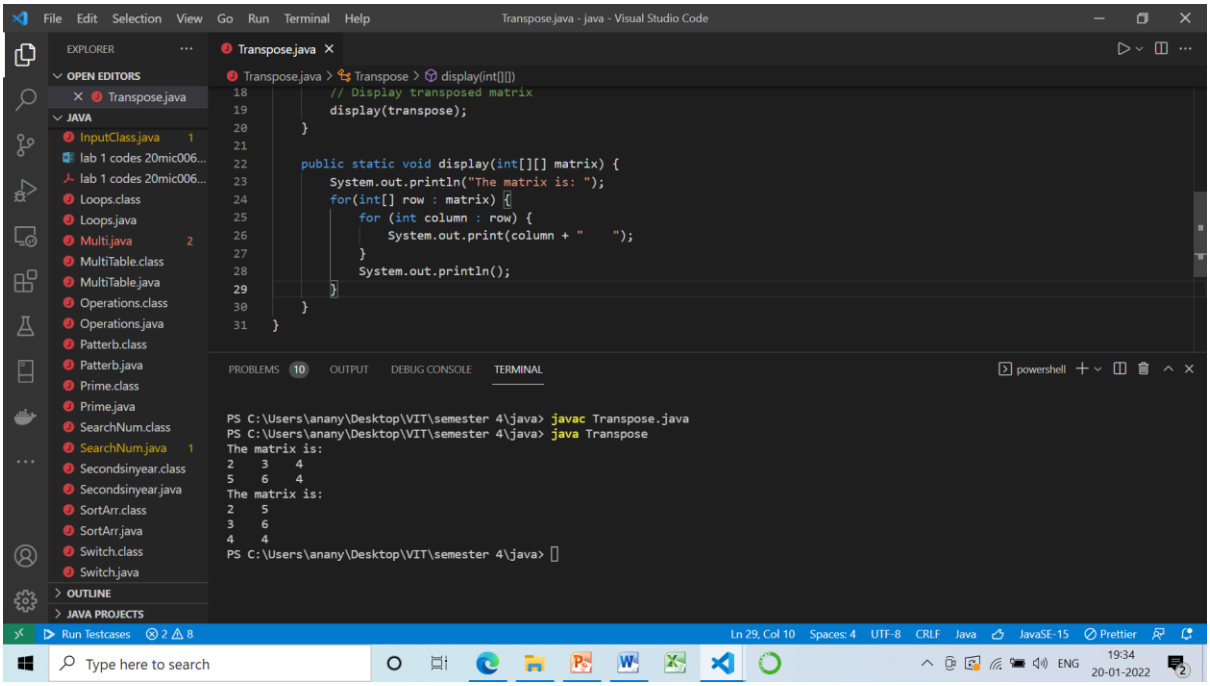
Ananya Ghosh
20MIC0063

1. Find the transpose of a matrix.

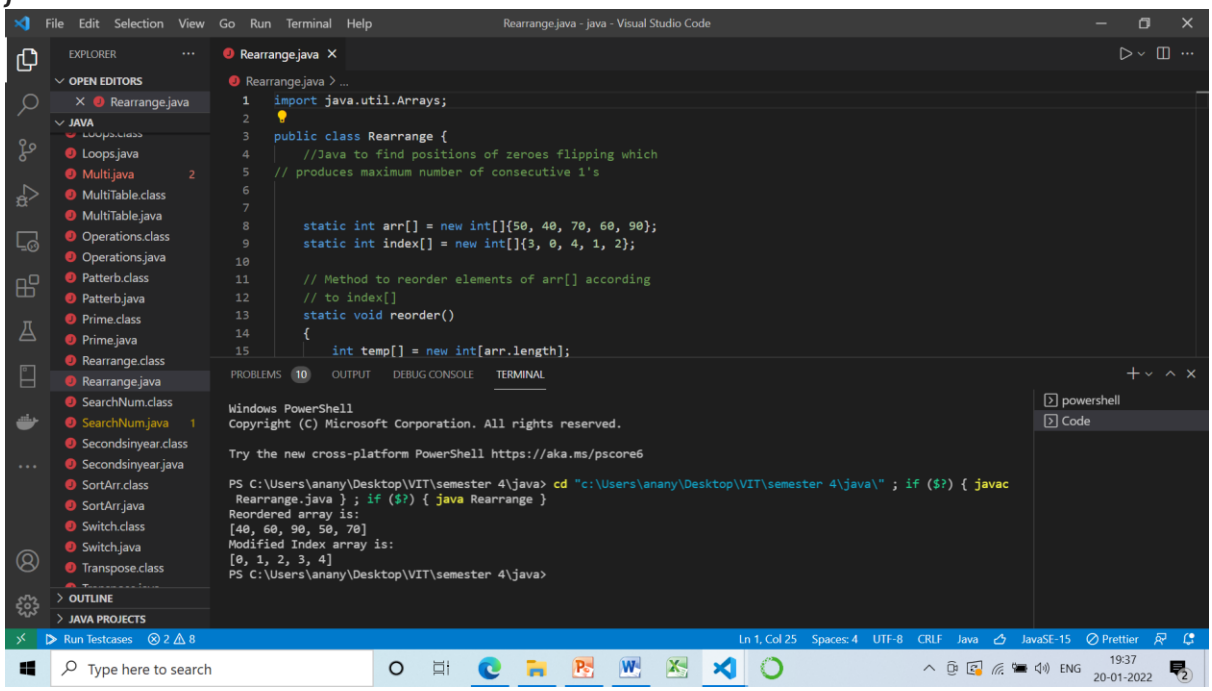
```
public class Transpose {

   public static void main(String[] args) {
      int row = 2, column = 3;
      int[][] matrix = { {2, 3, 4}, {5, 6, 4} };

      // Display current matrix
      display(matrix);

      // Transpose the matrix
      int[][] transpose = new int[column][row];
      for(int i = 0; i < row; i++) {
         for (int j = 0; j < column; j++) {
            transpose[j][i] = matrix[i][j];
         }
      }

      // Display transposed matrix
      display(transpose);
   }

   public static void display(int[][] matrix) {
      System.out.println("The matrix is: ");
      for(int[] row : matrix) {
         for (int column : row) {
            System.out.print(column + "    ");
         }
         System.out.println();
      }
   }
}
```



2. Given a 2D array, re-arrange the rows in the ascending order of the row sum. Row sum is the sum of all the elements in the row.

```
import java.util.Arrays;

public class Rearrange {
   //Java to find positions of zeroes flipping which
// produces maximum number of consecutive 1's


        static int arr[] = new int[]{50, 40, 70, 60, 90};
        static int index[] = new int[]{3, 0, 4, 1, 2};

        // Method to reorder elements of arr[] according
        // to index[]
        static void reorder()
        {
                int temp[] = new int[arr.length];

                // arr[i] should be present at index[i] index
                for (int i=0; i<arr.length; i++)
                        temp[index[i]] = arr[i];

                // Copy temp[] to arr[]
                for (int i=0; i<arr.length; i++)
                {
                arr[i] = temp[i];
                index[i] = i;
                }
```

```
    }

    // Driver method to test the above function
    public static void main(String[] args)
    {

        reorder();

        System.out.println("Reordered array is: ");
        System.out.println(Arrays.toString(arr));
        System.out.println("Modified Index array is:");
        System.out.println(Arrays.toString(index));

    }
}
```



3. If a 2D array has n rows and each k row has k columns then it is called a lower-triangular matrix.

Example
1
2 3
4 5 6
7 8 9 10

The program should return a symmetric matrix as output.

output

1 2 4 7
2 3 5 8
4 5 6 9
7 8 9 10

```
// Java program to print Lower
// triangular and Upper triangular
// matrix of an array
class LowerTriangular
{
	// method to form lower
	// triangular matrix
	static void lower(int matrix[][],
					int row, int col)
	{
		int i, j;
		for (i = 0; i < row; i++)
		{
			for (j = 0; j < col; j++)
			{
				if (i < j)
				{
					System.out.print("0" + " ");
				}
				else
				System.out.print(matrix[i][j] + " ");
			}
			System.out.println();
		}
	}

	// Method to form upper
	// triangular matrix
	static void upper(int matrix[][],
					int row, int col)
	{
		int i, j;
		for (i = 0; i < row; i++)
		{
			for (j = 0; j < col; j++)
			{
				if (i > j)
				{
					System.out.print("0" + " ");
				}
				else
				System.out.print(matrix[i][j] + " ");
			}
			System.out.println();
```

```
        }
    }

    // Driver Code
    public static void main(String args[])
    {
        int matrix[][] = {{1, 2, 3},
                          {4, 5, 6},
                          {7, 8, 9}};
        int row = 3, col = 3;

        System.out.println("Lower triangular matrix: ");
        lower(matrix, row, col);

        System.out.println("Upper triangular matrix: ");
        upper(matrix, row, col);
    }
}
```