Assignment 1: 2d arrays

1. For an n*n matrix diagonal elements are given. All non-diagonal elements are equal, say x. Find out the minimum value of x such that the sum of diagonal elements is less than the sum of non-diagonal elements.
   Input:
   ```
   4
   5 10 4 7
   ```
   Output:
   ```
   5  3  3  3
   3 10  3  3
   3  3  4  3
   3  3  3  7
   ```
   (Hint: Sum of diagonal element: 26, sum of other elements: 36)

2. In a matrix, calculate the sum of all neighboring elements of each diagonal element (up, down, left, right, and 4 diagonal elements -- a total of 8 elements). Print these values corresponding to each diagonal element. Also print the index of that diagonal element whose corresponding sum is highest.
   Input:
   ```
   5
   3   2   0   4   5
   1  10   4  -2   6
   0   3   7   0   8
   6   5   1   4   4
   9   7   0  -1   3
   ```
   Output:
   ```
   3: 13
   10: 20
   7: 25
   4: 22
   3: 7
   index: 2
   ```

3. Take a matrix of size m*n. Find out its transpose using a function `transpose(arr, &m, &n)`.
   Input:
   ```
   2 3
   1 1 1
   2 2 2
   ```
   Output:
   ```
   1 2
   1 2
   1 2
   ```

4. Read a square matrix of size n. Do the following tasks:

   a. Print all unique values along each row.

   b. Print all unique values along each column.

   c. Print all unique values in the matrix.

   Input:

```
4
5  1  2  1
4 10  3  5
2  1  4  4
1  2  0  7
```

   Output:

```
Along rows:
1 2 5
3 4 5 10
1 2 4
0 1 2 7
Along columns:
1 2 4 5
1 2 10
0 2 3 4
14 5 7
Matrix:
0 1 2 3 4 5 7 10
```

5. Create an array of employee names.
   a. Arrange them in lexicographically sorted order
   b. Print all unique names

   Input:

```
8
Ram Mohan Shyam Amit Kritika Ram Mohit Amit
```

   Output:

```
Sorted:
Amit Amit Kritika Mohan Mohit Ram Ram Shyam
Unique:
Amit Kritika Mohan Mohit Ram Shyam
```

6. Enter a square matrix and print the the i^{th} row and j^{th} column whose sums are equal.

   Input:

```
4
1 1 1 5
1 1 1 0
2 2 2 1
3 3 3 2
```

   Output:

```
Row: 1
Column: 4
```

7. Check whether given strings are palindrome.

   Input:

   ```
   4
   sos
   abc
   hello
   abba
   ```

   Output:

   ```
   yes
   no
   no
   yes
   ```

8. For an n*n matrix diagonal elements are given. Find if the matrix is such that diagonal element is equal to the sum of its neighboring (up/down/right/left only) elements.

   Input:

   ```
   5
   3   2   0   4   5
   1  10   4  -2   6
   0   3   7  -1   8
   6   5   1   4   5
   9   7   2  -1   4
   ```

   Output:

   ```
   yes
   ```