# National University of Computer and Emerging Sciences, Lahore Campus

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|  | **Course:** | **COAL Lab** | **Course Code:** | **EL 213** |
| **Program:** | **BS(Computer Science)** | **Semester:** | **Fall 2020** |
| **Duration:** | **Two Weeks** | **Total Marks:** | **10** |
| **Date** | **12-10-2020** | **Weight** | **3%** |
| **Section:** | **E** | **Pages:** | **1** |

A transpose of a matrix is actually a matrix which is formed by turning all the rows of a given matrix into columns and vice-versa.

Suppose you have an **array representing a 2D Matrix placed** in a row major order along with its **rows** and **columns** as

**arr:** dw  1 , 2

       dw  3 , 4

       dw  5 , 6

       dw  7 , 8

**rows:**dw 4

**columns:** dw 2

Write a subroutine that will be passed 3 parameters

 1- Address of this array

 2- Address of rows

 3- Address of columns

The subroutine must implement a transpose of that matrix (represented by array) without using/allocating any extra array and update rows and columns respectively.

(you may use 1 or 2 local variables though, only if you need it ).

After subroutine execution complete, the arr will become

**arr**     1 , 3 , 5, 7

           2 , 4 , 6, 8

**rows**2

**columns** 4

Remember this is just a representation it can also be represented like this

**arr:** dw 1, 2, 3, 4, 5, 6, 7, 8

**arr:** dw 1, 3, 5, 7, 2, 4, 6, 8 ( final result )

You must use the following code

[org 0x0100]

jmp start

arr: dw 1 , 2

dw 3 , 4

dw 5 , 6

dw 7 , 8

rows: dw 4

columns: dw 2

start:

mov ax, 0x4c00

int 0x21