

CENG 112 – DATA STRUCTURES

Homework 1b

March 3, 2017

Due Date: March 10, 2017

Assignment 1 Matrix Transpose

Write a program that transposes an input *integer* matrix. The matrix transpose transforms rows of the matrix into its columns. For the 3×4 matrix

$$\begin{bmatrix} 1 & 2 & 3 & 4 \\ 5 & 6 & 7 & 8 \\ 9 & 10 & 11 & 12 \end{bmatrix}$$

the transpose is the 4×3 matrix

$$\begin{bmatrix} 1 & 5 & 9 \\ 2 & 6 & 10 \\ 3 & 7 & 11 \\ 4 & 8 & 12 \end{bmatrix}.$$

Your program should read the dimensions and the matrix entries from the standard input using `cin` from C++ `<iostreams>` header or `scanf` from the C header `<stdio>`. For the first matrix above, the input should be

```
3 4
1 2 3 4
5 6 7 8
9 10 11 12
```

You can store the matrix elements in a one or two dimensional C array or a C++ **vector** during transpose computations.

Your program should output the transpose on the standard output using `cout` from C++ `<iostreams>` header or `printf` from the C header `<stdio>`.