

# PP 1: Check if a matrix is a Toeplitz or not

## Data Structures Lab (CS111)

A Toeplitz matrix or diagonal-constant matrix is a matrix in which each descending diagonal from left to right is constant. Any  $m \times n$  matrix  $M$  is a Toeplitz matrix if  $M_{i,j} = M_{i+1,j+1} = M_{i+2,j+2}$ , and so on where each  $M_{i,j}$  denotes the element  $M[i][j]$  in the matrix.

Example of a  $3 \times 3$  matrix which is a Toeplitz: 
$$\begin{bmatrix} a & b & c \\ d & a & b \\ e & d & a \end{bmatrix}$$

Example of a  $3 \times 3$  matrix which is not a Toeplitz: 
$$\begin{bmatrix} a & b & c \\ d & a & b \\ e & f & a \end{bmatrix}$$

Write a C/C++ program to check whether a given  $m \times n$  matrix is a Toeplitz or not.