Islamic University of Technology (IUT)

Organization of Islamic Cooperation (OIC)

Department of Electrical and Electronic Engineering (EEE)

EEE 4416: Simulation Lab

Lab – 07 (Part B)

Exercise - 01

Problem statement: *Max Out*

Write a function named 'max_out' that takes a matrix and an integer (a) as input and performs the following operation on the matrix –

$$\text{Mat} = \begin{bmatrix} 244 & 323 & 312 & 113 & 453 & 302 & 43 & 119 \\ 18 & 190 & 294 & 86 & 490 & 356 & 132 & 230 \\ 224 & 406 & 104 & 114 & 220 & 111 & 401 & 482 \\ 154 & 267 & 151 & 218 & 56 & 59 & 15 & 274 \\ 255 & 176 & 236 & 156 & 130 & 149 & 465 & 261 \\ 256 & 470 & 116 & 462 & 205 & 160 & 366 & 116 \\ 409 & 438 & 423 & 216 & 298 & 213 & 245 & 245 \\ 398 & 276 & 98 & 93 & 132 & 254 & 290 & 313 \end{bmatrix}$$

- a=2

Since a=2, take a 2-by-2 block in your original matrix and calculate the maximum element. Then move on to the next 2-by-2 block and again calculate the maximum of that block.

Create a new matrix with those maximum elements of each block, maintaining the sequence. The output matrix should look like the following -

$$\text{Out} = \begin{bmatrix} 323 & 312 & 490 & 230 \\ 406 & 218 & 220 & 482 \\ 470 & 462 & 205 & 465 \\ 438423 & 298 & 313 \end{bmatrix}$$

As you can see, the output matrix is reduced to half its original size.

⇨ What would happen if the size doesn't match?

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Exercise – 02

Problem Statement: Write a script that takes a string as an input and returns –

i. the count of #vowels.
ii. Find the index of 'o'
iii. The string removing all the vowels.
iv. The string removing all the letters from a to j.
v. The string removing all the consonants.
vi. The string replacing all the vowels with an asterisk (*)
vii. The string removing all the digits.

Test Case – 01:

- Input: A= 'david attenborogh'
- Output:
  i. 6
  ii. [13,15]
  iii. 'dvd ttnbrgh'
  iv. 'v ttnoro'
  v. 'ai aeoo'
  vi. 'd*v*d *tt*nb*r*gh'
  vii. 'david attenborogh'

Key Takeaway:

- Regular Expression (regexp, regexprep)
- ismember
- strfind
- contains

- 'regular expression' is a very powerful technique for string manipulation. It is widely used for text data processing and cleaning. It can be quite a bit tricky. So, this portion is only for introductory purposes. Don't sweat it.

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Exercise – 03

Problem Statement: *Insert, Replace, Erase, Extract*

In the previous problem, you have seen how to work with regular expression. It's quite a bit tricky. MATLAB has some other built-in functions that can make the handling much simpler.

The four functions named above usually offer 3 common operations – after, before, and between. For example, *'insertBefore', and 'insertAfter'*.

Say, we have a string like this - "Dhaka, Bangladesh"

Here, first, we have the capital and then we have the country name. What if you want to extract the country name?

Test Case – 01:

- Input: "Dhaka, Bangladesh"
- Output: "Bangladesh"

Test Case – 02:

- Input: "Beijing, China"
- Output: "China"

Class task: Try to extract the capital name by yourself.

- These operations can be applied not only to a single string but also to an entire column of strings in a data table. We will explore this in the next lab.

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