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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 –

```
Mat = [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]
```

- 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 -

```
Out= [ 323  312  490  230
        406  218  220  482
        470  462  205  465
        438 423  298  313]
```

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

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

Exercise – 02

Problem Statement: *Reverse the Words (not letters) of a String*

Write a function that takes a string as input and returns the words of the string such that the words appear in reverse order.

Test Case – 01:

- Input: “Dhaka Bangladesh”
- Output: “Bangladesh Dhaka”

Test Case – 02:

- Input: “Severus please”
- Output: “please Severus”

Test Case – 03:

- Input: “One ring to rule them all”
- Output: “all them rule to ring One”

Test Case – 04:

- Input: “Kalashnikov”
- Output: “Kalashnikov”

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.

Exercise – 04

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 attenborough’
- 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 attenborough’

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.