



# Recitation Class II

## Midterm 1 Review

Matlab Basic

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VG101 - Intro to Computers & Programming

# Matlab array manipulations



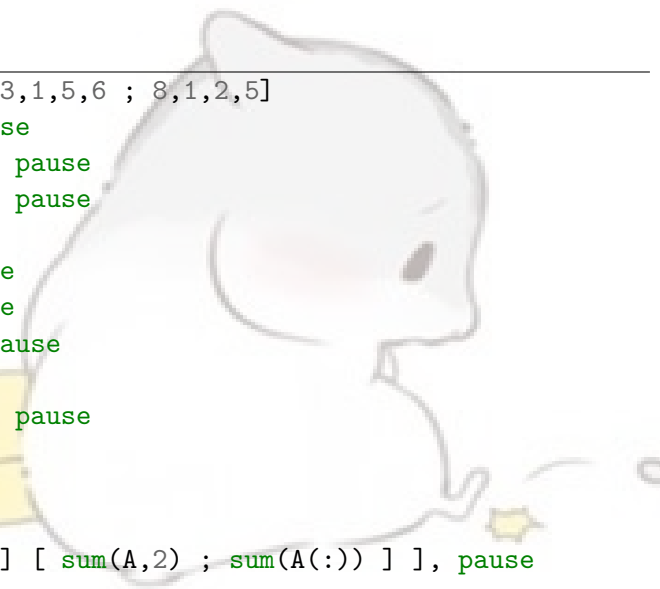
- Array Creation
  - ▶ start:step:end
  - ▶ zeros(row,col) - initialization
- Array Opeartion
  - ▶ element-wise
  - ▶ matrix operation
  - ▶ logical
- Array Concatenation
- Array Access

## Warm-up Exercises

Input a vector of numbers, filter out all the prime numbers.

## Example

```
1 A = [2,7,9,7 ; 3,1,5,6 ; 8,1,2,5]
2 A(:, [1 4]), pause
3 A([2 3], [3 1]), pause
4 reshape(A,2,6), pause
5 A(:), pause
6 flipud(A), pause
7 fliplr(A), pause
8 [A A(:,end)], pause
9 A(1:3,:), pause
10 [A ; A(1:2,:)], pause
11 sum(A), pause
12 sum(A'), pause
13 sum(A,2), pause
14 [ [ A ; sum(A) ] [ sum(A,2) ; sum(A(:)) ] ], pause
15 A.'
```



## Matlab branch statement

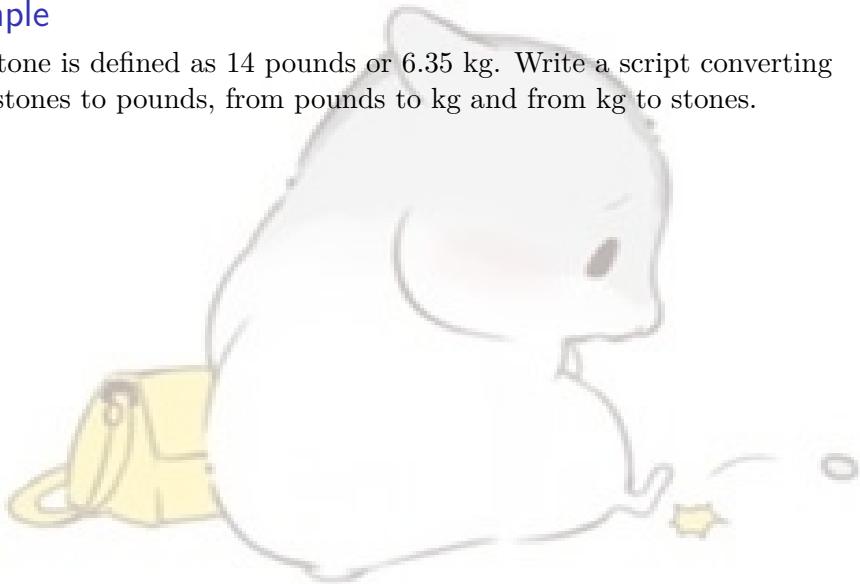
- `if` and `switch` statement
- Comparative operators:
  - ▶ equal to : `==`
  - ▶ not equal : `~=`
- Logical operators: `&` | `~` `xor(.,.)`
- Short-circuit operators:
  - ▶ Evaluate expression B if and only if A is true: `A && B`
  - ▶ Evaluates expression B only if A is false: `A || B`

Which one is correct?

```
1 A = [1 2 3 4 5 6];  
2 find(mod(A,2)==0 & A>2)  
3 find(mod(A,2)==0 && A>2)
```

## Example

A stone is defined as 14 pounds or 6.35 kg. Write a script converting from stones to pounds, from pounds to kg and from kg to stones.



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```
1 list_value = input('');
2 conversion = input('','s');
3 switch conversion
4     case 'stones to pounds'
5         re = list_value .* 14;
6     case 'pounds to kg'
7         re = list_value .* 0.454;
8     case 'kg to stones'
9         re = list_value ./ 6.35;
10    otherwise
11        re = 0;
12 end
```

# Matlab loops

Loops in MATLAB:

- Types: `while`, `for`, and vectorizing
- Vectorizing: generate a vector containing all elements
- For loop: clear steps and predefined end
- While loop: end based on a boolean expression
- Order of preference: vectorizing, `for`, and `while`

## Thinking

What would happen?

```
1 while true
2     ...;
3 end
```

## Exercise 1

1. We define the distance between two words as the sum of differences of the corresponding letters in each word. Input two words and calculate their distance.

- case insensitive, 'a'='A'.
- two words have different length, print NaN
- two words only contain alphabetic characters

Input:

```
cba  
nba
```

Output:

```
11
```

$$\text{abs}(3 - 14) + \text{abs}(2 - 2) + \text{abs}(1 - 1) = 11$$



## Exercise 2

2. Write a function `find16()` that takes into an array of numeric numbers, and display the index of numbers with digitsum equals to 16.
- input is a vector, disp index of first appearance
  - input is a matrix, disp index of first appearance in each row
  - no appearance -> set to 0

Input: `find16(2:2:10)`

Output: 0

Input: `find16([1,2,3;4,9025,6;7,8,9])`

Output: 0 2 0

## Reference

- Charlemagne, Manuel. Homework 1.
- Zhu, Kan. VG101-2021SU-RC1 Slides
- Zhou, Shuyi. VG101-2020FA-Mid1 Slides.



End

