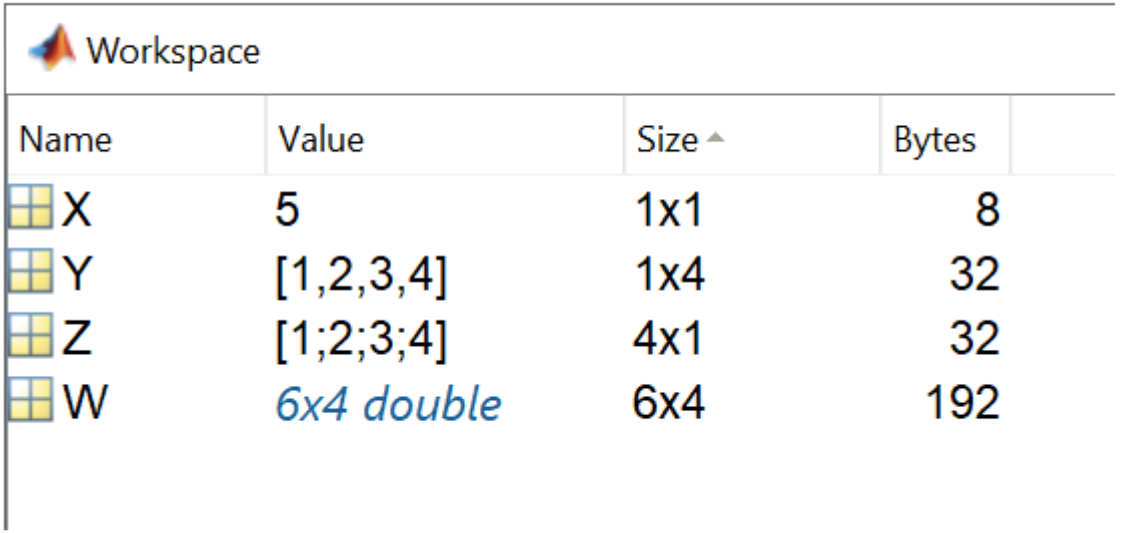
# Variables in MATLAB

# 1st principal

All MATLAB variables are multidimensional *arrays*, no matter what type of data.




two-dimensional arrays

# Array Creation
# row vector

- **By components listing**

  >>a= [1 2 3 4]

  >>a= [ 1 ,2 ,3 ,4]

  **a = 1 2 3 4**

# Array Creation
# row vector

- **By components description**

>>a= 1:4

**a = 1 2 3 4**

>>a= 1:2:8

**a = 1 3 5 7**

**>>a=1: -1: 9**

**a=[] %empty**

# Array Creation
# row vector

- **MATLAB functions**

  linspace, logspace, rand, ones, zeros,

>> **linspace(initial, final, cpt)**

**>> linspace(2, 9, 5)**

```
ans =
2.0000    3.7500    5.5000    7.2500    9.0000
```

>>**logspace(2, 9, 5)**

```
ans =
      100.00      5623.41    316227.77   17782794.10
1000000000.00
```

# Array Creation
# row vector

- **Other methods :**
  - **concatenation**

    >>a=[1 2 3], b=[5 6 7],

    >> c=[a, b]

    c=

    1 2 3  5 6 7
  - **Import data**

    MAT files : >>Load  or File menu

# Array Creation
# column vector

- **By components listing**

```
>>a=  [ 1 ; 2 ; 3 ; 4]

   a=
        1
        2
        3
        4
```

- **By components description**

```
>> a=(1:4)'

>>a= ( 1:2:8)'

>>a=(1: -1: 9)'

  a=[]  %empty
```

```
1
3
5
7
```

# Array Creation
# column vector

- **MATLAB functions**

>> linspace(2, 9, 5)‘

ans =

**2.0000**

3.7500

5.5000

7.2500

9.0000

- **concatenation**

>> a=(1:4)’

>>b= ( 1:2:8)’

>>C=[a ; b]

1

2

3

4

1

3

5

7

- **Import data**

# Array Creation
# matrix

- **By components listing**

```
>>a=  [ 1 2 3 ; 4 5 6 ; 7 8 9]
        a=
                  1    2    3
                  4    5    6
                  7    8    9
```

- **By components description**

```
        a=  [1 : 3  ;  4 : 6   ;  7 : 9]
         b=[(1:3:7)', (2:3:8)' ,  (3:3:9)']
```

# Array Creation
# matrix

- **MATLAB functions**

**>> function_name(rows? , columns?)**

>> ones(3,5) >>rand(2,4)

>> zeros(3,5) >>randi([-3,2], 2,5)

**Square matrices**

>>ones(3)

>>zeros(4)

>>rand(2)

**Can we create vectors using these functions?**

# Array Creation
# matrix

- **Concatenation**

convenient arrays size

>>C=[Z B; A D F]

>>cat(2,A,F)% [A,F].

>>cat(1,D,Z)% [D;Z].

| variable | size |
|---|---|
| A | 2X1 |
| D | 2X2 |
| F | 2X4 |
| Z | 3X2 |
| B | 3X5 |
| C | ? |
| ans | ? |
| ans | ? |

# Array Creation practice

- Create a vector of odd values from 1 to 10
- Create a matrix of 4 rows by 4 columns of value 3
- Create a matrix of 2x5 random integer values ranged from 1 to 6

# Array Creation practice

```
>>A=1  : 2 :  10

>>M=3*ones(4)

>>Z=randi([1,6],2,5)
```