

# CN208

## Introductory Computer Programming

Week 10:- Arrays

By

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## Arrays & Matrices

- **Arrays Concept**
- Cell Arrays
- Arrays in MATLAB

## Arrays & Matrices

- Array should be considered as container in which one data object of any class can be stored.
- Alternatively, it can be treated as concatenation and slicing.

## Arrays & Matrices

- Arrays Concept
- **Cell Arrays**
- Arrays in MATLAB

# Arrays & Matrices



# Arrays & Matrices

- Arrays Concept
- Cell Arrays
- **Arrays in MATLAB**

## Arrays & Matrices

- **Creating Cell Arrays**

```
>> A{1} = 42
```

```
>> A[1] = 42
```

```
>> A = {42, 21}
```

```
>> A = [42 21]
```

## Arrays & Matrices

- **Accessing Cell Arrays**

```
>> E = D(2)
```

```
>> D {2}
```

# Arrays & Matrices

Examples of arrays

```
A = [1, 2; 3, 4; 5, 6]
```

Creates a 3x2 array, 3 rows and 2 columns. The semicolon creates a new row.

```
A = 1 2
    3 4
    5 6
```

```
x = [4; 5]
```

Creates an array with 2 rows and one column.

```
x = 4
    5
```

If we multiply A by x, the rules of matrix algebra apply. That is,

```
A*x = 1*4 + 2*5 = 14
      3*4 + 4*5 = 32
      5*4 + 6*5 = 50
```

A\*x is an array with 3 rows and one column.

# Arrays & Matrices

## 2. Element by Element Operations

Many times matrix multiplication is not desired. For example, when we want the square in each element in an array.

```
x = 0:1:4
```

```
y = x .* x
```

Note that .\* is used to denote element by element operation. The result is;

```
x = [0 1 2 3 4]
```

```
y = [0 1 4 9 16]
```

Also If stem replaces plot in the above examples, a plot of discrete values represented by a lollipop structure results. For example;

```
stem(x,y)
```

You can add axis labels and a title to stem plots.

# Arrays & Matrices

## 3. Suppressing Output

MATLAB echos back all input and values generated. The semicolon, `;`, suppresses this output. For example;

```
x = 1:01:10;
```

generates an array `x` with 100 elements, but the array is not echoed back.

## 4. Special Arrays

`zeros(4,5)` is an array with 4 rows and 5 columns where every element is 0

`ones(2,3)` is an array with 2 rows and 3 columns where every element is 1

# Arrays & Matrices

## 5. Array Addressing

Consider the 3x4 array

```
A = 1 2 3 4
     5 6 7 9
     0 9 3 1
```

The array has 3 rows and 4 columns. Any individual element can be extracted from the array. For example,

```
x = A(2,3);
```

results in a value of 7 for `x`.

The command

```
D = A(:,3);
```

produces the column array `D`

```
D = 3
     7
     3
```

# Arrays & Matrices

The command

```
y = A([1 2],[2 4])
```

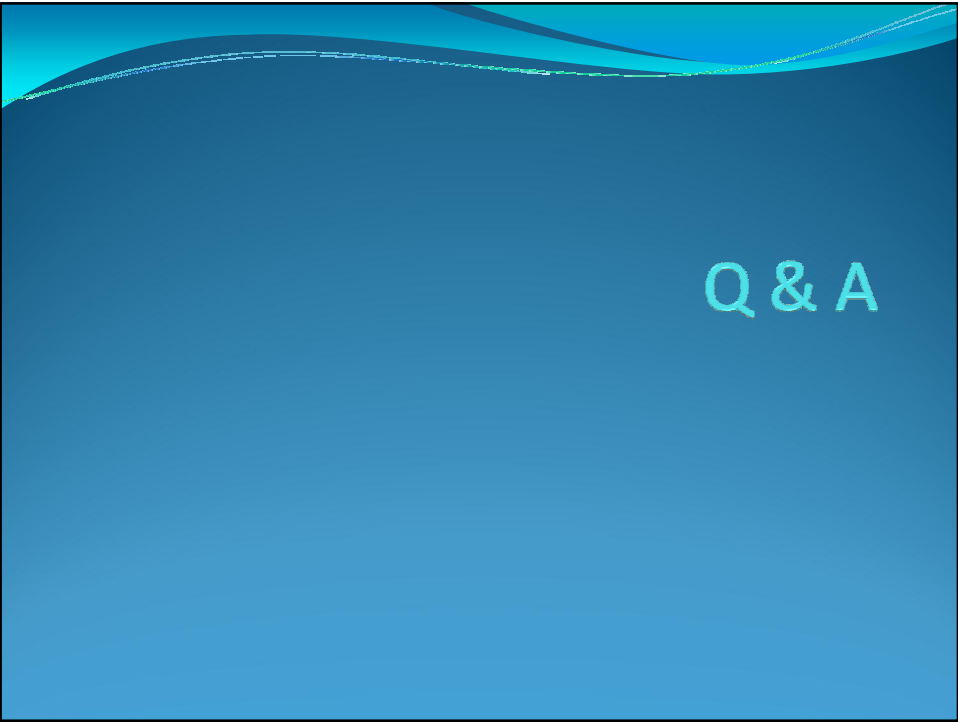
results in the array,

```
y = 2 4  
    6 9
```

y consists of rows 1 and 2 and columns 2 and 4 of the array A.

# Reference

<http://www.ele.uri.edu/Courses/ele541/tutorials/matlab.html>  
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Q & A