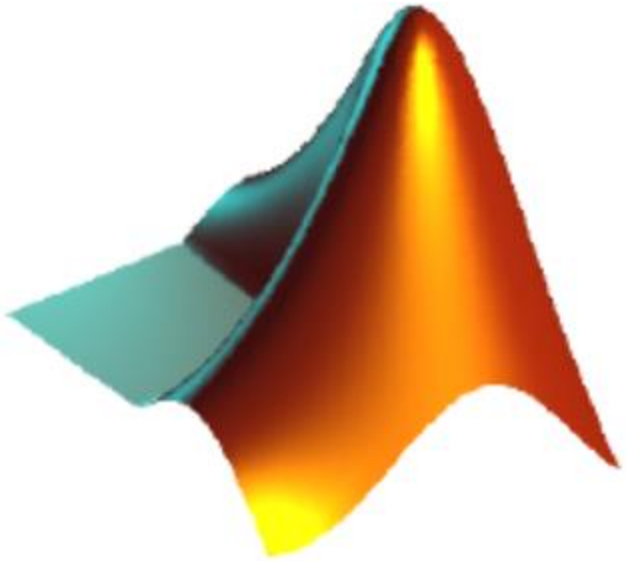
Structure
In Matlab
(3)



Structures

- **Structure** is **multidimensional array** with **elements accessed** by **textual** field **names**.

Example:

Create a **structure** named **mydata** with **three fields; namely name**, **ssn**, and **courses array**

```
>> mydata.name= ‘ahmed’
>> mydata.ssn= 145567
>> mydata.courses= ['CS500' ;  'OR500' ; 'IS500'  ;'MS500']
    mydata =
          name: 'ahmed'
           ssn: 145567
       courses: [4x5 char]
```

Array of Structures

- **Two ways to create an array of structure:**

  1- for each element in the array, assign each of the structure fields individually

```
>>mydata(2).name= ‘mohammed’
>>mydata(2).ssn= 145568
>>mydata(2).courses= ['CS500' ;  'OR500' ;  AS500']
   mydata =  1x2 struct array with fields:
                    name
                    ssn
                    courses
```

Array of Structures (cont.)

- **Two ways to create an array of structure:**

  2- Use the **struct** function

```
>> mydata(3)=struct('name', 'mahmoud');
   Subscripted assignment between dissimilar structures.

>>mydata(3)=struct('name', 'mahmoud', 'ssn', 145569, 'courses',
  ['CS500' ;  'OR500' ;  'AS500']);
  mydata =  1x3 struct array with fields:
                name
                ssn
                courses
```

Accessing an element in an array of Structures

```
>> mydata(3)
ans =  name: 'mahmoud'
       ssn: 145569
       courses: [3x5 char]

>>mydata(3).name
ans =   mahmoud

>> mydata.ssn
ans =     145567
ans =     145568
ans =      145569
```

Accessing an element in an array of Structures (Cont.)

```
>> [mydata.ssn]          %returns an array
ans =      145567     145568    145569
>>size(ans)
ans= 1*3

>> {mydata.ssn}          %returns a cell
ans =     [145567]    [145568]    [145569]

%assign each element to a separate output variable
>>[s1, s, s3]=mydata.ssn
s1 =      145567
s =       145568
s3 =      145569
```

Array of struct

```
>> field = 'f';
>> value = {'some text'; [10, 20, 30]; magic(5)};  %use cell to create an array of struct
>> s = struct (field, value);
>> s(1)
     ans =      f: 'some text'

>> s(2)
     ans =     f: [10 20 30]

>> s(3)
     ans =     f: [5x5 double]
```

Quiz 1

- Create an employee structure that include the ID, salary, and position of 10 employee.
- ID: is ranged from 1 to 10.
- Age:
  - the first 2 employee are 50 years old,
  - starting from the 3rd to the 5th employees are 43
  - starting from the 6th to the 7th employees are 36
  - the 8th to the 10th employees are 25 years old.
- Salary: depends on the age.
  - Age>40 & Age <=60 → salary=2000
  - Age >25& Age<=40 → salary = 1000
  - Otherwise → salary = 800

Quiz 1: Solution

```
>> for i=1:10
        id{i}=i;
    end

>> for i=1:10
        if(i==1|i==2)
          age{i}=50;
        elseif(i>2 &i<=5)
           age{i}=43;
        elseif(i==6|i==7)
            age{i}=36;
         else
            age{i}=25;
         end
    end
```

Quiz 1: Solution

```
>> for i=1:10
        if(age{i}>40 & age{i}<=60)
            salary{i}=2000;
        elseif(age{i}>25&age{i}<=40)
            salary{i}=1000;
        else
            salary{i}=800;
        end
    end

>> employee=struct('id', id, 'age', age, 'salary', salary)

>> employee(1)
     ans = id: 1
           age: 50
           salary: 2000

>>employee.salary
   ans =[2000   2000   2000   2000   2000   1000   1000   800   800   800]
```