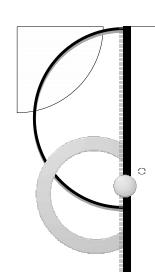


General Computer Science for Engineers CISC 106 Lecture 11

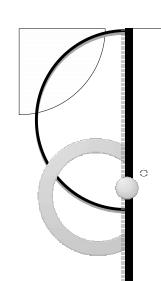
James Atlas
Computer and Information Sciences
07/27/2009



Lecture Overview

- Review
 - Structures in MATLAB
- Advanced MATLAB
 - Classes
 - isa function
 - Cell Arrays
- Graphics
 - Function callbacks (passing functions to functions)
- Project 2
- Lab 07
- Team evaluations for Project 1





A Database Application

• Given:

Name: Chris Credits: 27

Graduation: 12/15/2011

Name: Sola Credits: 18

Graduation: 05/17/2011

Name: Roger Credits: 55

Graduation: 06/10/2009

Name: Tom Credits: 15

Graduation: 05/22/2012

A Database Application

Given:

Name: Chris Credits: 27

Graduation: 12/15/2011

Name: Sola Credits: 18

Graduation: 05/17/2011

Name: Roger Credits: 55

Graduation: 06/10/2009

Name: Tom Credits: 15

Graduation: 05/22/2012

We can implement it with arrays like this:

Name	Name Cradite	
Chris	27	12/15/2011
Sola	18	05/17/2011
Roger	55	06/10/2009
Tom	15	05/22/2012
3		

4



Given:

Name: Chris Credits: 27

Graduation: 12/15/2011

Name: Sola Credits: 18

Graduation: 05/17/2011

Name: Roger Credits: 55

Graduation: 06/10/2009

Name: Tom Credits: 15

Graduation: 05/22/2012

OR we can do it like this an array with

Students (1). Name: Chris Students (1). Credits: 27

Students (1). Graduation: 12/15/2011

Students (2) Name: Sola

Students (2). Graduation: 05/17/2011

Students (3). Name: Roger Students (3). Credits: 55

Students (3). Graduation: 06/10/2009

Students (4). Name: Tom Students (4). Credits: 15

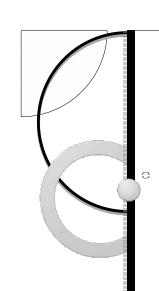
Students (4). Graduation: 05/22/2012

Initializing a structure

```
record1.name = 'Me'; record2.name = 'Not Me'; record1.credits = 27; record2.credits = 30; record1.age = 10; record2.age = 14;
```

```
function [] = displayRecordName(record) disp(record.name);
```

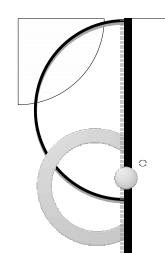
displayRecordName(record1);
displayRecordName(record2);



Classes

- Object-oriented Programming
- Classes represent types of Objects

Similar to structs

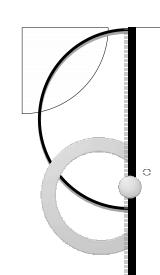


Class definition

```
classdef dog
  properties
  name
  age
  end
end
```



```
classdef dog
  properties
    name
    age
  end
  methods
    function obj=dog(name, age)
      obj.name = name;
      obj.age = age;
    end
  end
end
```

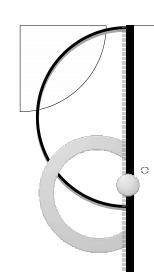


The isa function

• isa(object, 'classname')

isa(dog1, 'dog')

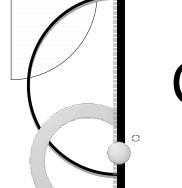
• isa(dog1, 'person')



Arrays of classes?

• [dog1 dog2]

• [dog1 dog2 person1]?



Cell Arrays

Normal array:

zeros
$$(1,5) = 5$$
 doubles $[1 \ 2 \ 3 \ 4] = 4$ doubles

Cell array:

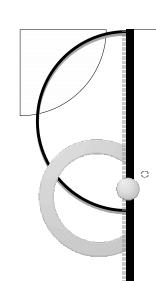
$$\{1\ 2\ 3\ 4\} = ???$$

Cell Arrays (cont)

$$c = \{1 \ 2 \ 3 \ 4\}$$

 $c\{1\} = 'hello'$

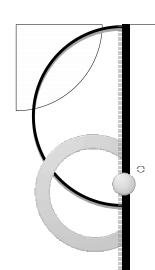
- Cell arrays store an object
 - Can be another array
 - Or a string
 - ... any struct/object/cell array



MATLAB Graphics

- Event-driven user interface
- A figure window contains:
 - axes, line, plot, image, and figure itself
 - controls such as buttons, menus, listboxes, textboxes
 - use uicontrol, and uimenu objects





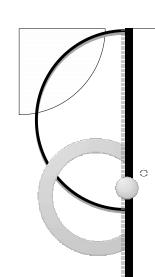
Function callbacks

Passing a function to another function

```
function []=functionPassTest(func, data)
  func(data)

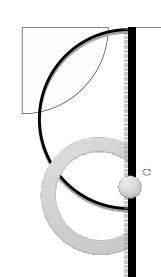
function []=printName(obj)
  disp(obj.name)

cat.name = `Fifi'
functionPassTest(@printName, cat);
```



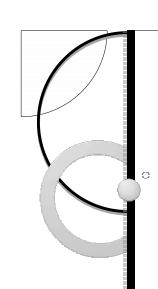
Project 2

- Team project
 - 2-3 persons per team
 - No team members the same as Project 1
- Due Today
 - Team name, members
 - Choice of project focus
- Due Aug 3
 - Individual progress report
- Final Project 2 Due Aug 12



Project 2 Options

- Database (Matlab or C)
- Game
- Animation
- Text Editor
- Graphics Editing Functions (Matlab or C)



Lab 07

- Create some structures, classes
- Experiment with a cell array
- Modify the simple GUI to add a menu

Team Evaluations, Project 1