CSE 7
Introduction to Programming in MATLAB

Chapter 3
Scripts and Programming
Part 2
Simple Program

- **Program**: Combination of a script (stored in an M-file) and the function(s) (also stored in M-files)

- **General Form**

  script.m

  - Get input
  - Call fn to calculate result
  - Print result

  fn.m

  ```matlab
  function outArgs = fn(inArgs)
  outArgs = value based on inArgs;
  end
  ```

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Example Program

• Volume of a hollow sphere is: $\frac{4}{3} \pi (R_o^3 - R_i^3)$
  • where $R_o$ is the outer radius and
  • $R_i$ is the inner radius

• Want a script
  • To prompt user for radii,
  • Call a function to calculate volume, and
  • Print the result

• Also, we will write the function!
% This script calculates the volume of a hollow sphere
inner = input('Enter the inner radius: ');
outer = input('Enter the outer radius: ');
volume = vol_hol_sphere(inner, outer);
fprintf('The volume is %.2f\n', volume)

function hollvol = vol_hol_sphere( inner, outer )
% Calculates volume of a hollow sphere
    hollvol = 4/3 * pi * (outer^3 - inner^3);
end

Note: local variables
Scripts

- **Location:**
  - In a file (file name is how script is called)
- **Use:**
  - Type script name in Command Window
- **Input/Output:**
  - Careful to have variable(s) with certain names set to input values before calling, then look at variable(s) with certain names to see what happened/output
- **Scope** (command window):
  - Script has access to all variables as if its code was typed in Command Window (base workspace),

Functions

- **Location:**
  - In a file with same name as function
- **Use:**
  - Type function name in Command Window, with assignment of output and/or input arguments
- **Input/Output:**
  - Input(s) are arguments, output(s) are return values
- **Scope** (local variable):
  - Function can access input arguments from Command Window and change only Command Window outputs