Topics: Variable & assignment, input & output
Reading (ML): Sec 2.1, 2.2, 2.5, 2.6, 2.8 (exclude matrix operations), 2.9
(JV): p 1–23 optional

Example: surface area of a sphere

```matlab
% Example 1_1: Compute surface area of a sphere
% A: surface area of the sphere
% r: radius of the sphere

r = input('Enter the radius: ');
A = 4*3.14159*r^2;
fprintf('Surface area is %.2f
', A);
```

Anatomy of a program

- input
- calculation
- output
- comments

Definitions

- **Algorithm**: a set of procedures for solving a problem
- **Program**: an algorithm written in some language
- **Variable**: a named memory space for storing a value
- **Assignment**: the action of putting a value into a named space (variable)
- **Expression**: a combination of operators and operands (variables, constants) that evaluate to a value

Input & output statements

Input: \( \text{variable} = \text{input('prompt')} \)
Output: \( \text{disp('words to be displayed')} \)
\( \text{disp(['words' num2str(variable) 'words'])} \)
\( \text{fprintf('Value of x is %f, not %d
', x, y)} \)

Comments

- Use comments for readability!
- Start each program with a **concise** description of what it does
- Define each important variable/constant
- Top a block of code for a specific task with a **concise** comment
- A comment starts with the “\%” symbol and goes to the end of the line
Example: expanding sphere

Modify the previous program to calculate the increase in surface area given an increase in the radius of a sphere.

% Example 1_2: Explore how the surface area of a sphere
% changes with an increase in the radius.

r = input('Enter radius r in miles: ');
delta = input('Enter delta r in inches: ');

fprintf('Increase in area (mile^2) is %f.
', incr);