

# CS 1132 lecture 2

## I. Scripts

- A. Collect a sequence of commands together
  - 1. Batch execution
  - 2. Easy reuse
- B. Name of script is name of file (sans extension)
  - 1. Matlab looks for files matching command names in current folder
- C. Input, output interact with humans
- D. Variables live in common workspace
  - 1. Danger of contamination

## II. Functions

- A. Inputs, outputs interact with other code
- B. Isolated temporary workspace (local scope)
- C. Syntax
  - 1. Declared with “function” keyword
  - 2. Filename must match function name
  - 3. May have multiple output parameters (return values)
  - 4. To use, call by invoking name, providing arguments for input parameters, and assigning return values to variables
  - 5. Comments after header used to generate documentation
- D. Matlab will search path after current directory

## III. Monte Carlo methods

- A. Relate desired quantity to a probability
- B. Estimate probability via computer simulation

C. Example: estimate pi by throwing darts

1. Top-down design

```
% Number of darts and size of board
N= 100; L= 1;

% For each of N trials

    % Throw a dart

% If it lands in circle

    % add 1 to total # of hits

% pi is 4*hits/N
```

IV. Repetition via for-loop (definite iteration)

A. Loop syntax

B. Loop variable

C. Range expression

1. Increment option (default: 1)
2. Inclusive bounds (if consistent with increment)
3. May go backwards

D. Loop body

V. Uniform random numbers

A. Scale and shift

## VI. Conditional execution via if-statements

- A. if, elseif, else syntax
- B. Boolean expressions
  - 1. Relational operators
  - 2. Logical operators
    - a) *Short-circuit behavior*