CS 1132 lecture 3

I. Printing with fprintf()
    a. First argument is format string, subsequent arguments are substitution values
    b. Right-aligned within total number of columns – good for tables
    c. Fixed-point: absolute precision
    d. Floating-point (scientific notation): relative precision (sig-figs)
    e. Must explicitly request end of line with '\n'
    f. To capture full precision of double values, must use %.17e (or %.17g)
II. Relational operators
    a. Cannot write "in between" relations – each operation evaluates to 0 or 1
III. Logical operators
    a. Short-circuit behavior
    b. Avoid evaluating expensive, invalid expressions
IV. Visualization for Monte Carlo estimator
    a. plot() syntax
    b. "hold on": Overlay subsequent plots
    c. "axis equal": Preserve geometry (consider if x and y have same units)
    d. Demo
V. Example: estimate pi via annulus
    a. Relate area ratio to pi
    b. Compound condition for "hit"
VI. while-loop
    a. Indefinite iteration
    b. Does not include counter
    c. Can do anything a for-loop can
    d. Loop patterns
        i. Repeat N times
        ii. Repeat until stopping signal
VII. Vectors
    a. All variables in MATLAB store matrices
    b. Indexing

i. Starts at 1
ii. Ends with length(v) (or keyword “end”)
iii. Syntax: parentheses

c. Creating
i. zeros(), ones(), rand()
ii. linspace()
iii. Range expression
iv. Literals (square brackets)
1. Spaces, commas separate columns (create row-vectors)
2. Semicolons separate rows (create column-vectors)

VIII. Example: Cumulative sum

```
function csum = cumulativeSum(v)

% csum is the vector of cumulative sums of vector v.
% Assume v is not empty.
```

IX. Plotting vectors

a. Can plot lines
b. Can plot many points without “hold on” (and will be faster)