Outline for October 19, 2023

Reading: §4.5   **Assignments:** Homework 2, due October 26, 2023

1. Recursion
    (a) *n* factorial [*nfact.py*]

2. Thinking recursively [*recfun.py*]
    (a) First: think of the recursive case (write the problem in terms of something involving a smaller instance of the problem)
    (b) Next: think of base case (when to stop)
    (c) Example: Find the length of a string
    (d) Example: Does the string only have alphabetic characters in it?
    (e) Example: Find the maximum element of a list
    (f) Example: Construct a string from a list of strings
    (g) Example: Reverse a string

3. Recursion
    (a) Palindromes [*palindrome.py*]
    (b) Fibonacci numbers [*rfib.py*]
    (c) Sum of digits [*sumdigits.py*]
    (d) Greatest common divisor [*gcd.py*]
    (e) Nested lists: is an item in a list? [*isinlist.py*]
    (f) Tower of Hanoi [*hanoi.py*]

4. Using random numbers
    (a) Problem: compute π by tossing darts at a unit square
    (b) First build routine to simulate dart toss at unit square [*mc-1.py*]
    (c) Then build routine to see if co-ordinates are in unit circle [*mc-2.py*]
    (d) Then build routine to read in number of tosses [*mc-3.py*]
    (e) Put it all together [*mc-4.py*]
    (f) Graphics! [*mc-5.py*]