Outline for October 18, 2021

Reading: §4.5

Assignments: Homework 2, due October 20, 2021

1. 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

2. 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]

3. Using random numbers
   (a) Problem: compute \( \pi \) 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]