Categories of Topics

1) Data Structures
   • Linked List
   • Dictionary (Hash, Hash Table, Associative List)
   • Tree
   • Graph: directed, acyclic, cyclic
     1) Vertices, Nodes, and States
     2) Fringe Unseen, and Adjacency Vertices
   • Stack, First-in, Last-out (FILO)
   • Queue, First-in, First-out (FIFO)
   • Abstract Data Type

2) Object Oriented Programming
   • Inheritance/Subclass
   • Multiple Inheritance vs. Interface
   • overriding methods
   • extend class
   • Derived vs. Base Class
   • Instance vs. Class
   • Constructor

3) Algorithms, and Analysis of Algorithms
   • Big O notation
   • Sorting and Searching
   • Sort algorithms: slow, bubble, merge, and quick
   • Divide and Conquer Algorithms
   • Breadth First Search
   • Depth First Search
   • Orders of Complexity: constant, linear, quadratic, exponential

4) Recursion
   • Base case
   • Examples: length of linked list, insert into binary tree, search, etc.
   • Recursive algorithms
   • Recursive data structures

5) Python
   • Review: expressions, variables, defining functions, boolean expressions, control blocks (if, else, elif, while, for), assignment, strings, integers, floating point numbers, modules/libraries, calling methods and functions
   • Differences between Python 2 and Python 3
   • File manipulation
   • Defining Classes
   • Defining Methods
• Special “magic” methods: __len__, __init__, __getitem__, __setitem__, etc.
• self
• Using * with list of arguments
• List Comprehension

6) Assignments
• Prime numbers
• Unique words in a text
• Common words in a text
• Class of friends
• Linked List
• Binary Tree
• 20 Questions
• Interactive Fiction

What's next?

Parallel Programming
High Performance Computing
Compilers
Artificial Intelligence
C, Java, C#, Perl, Lisp, etc.
Hardware
Analysis of Algorithms
Theory of Computation
Logic
Cognitive Science
Emergence
Computational Linguistics
Web Design
Databases
Game Theory
Graphics
Information and Coding Theory
Computer Organization
Programming Languages
Computational Models