Topics Covered in 6.00SC
Spring 2011

Linguistic issues
  Values, types, expressions variables
  Builtin types: int, float, string, list, dictionary, tuple
  Mutability and aliasing
  Control flow and iteration
  Functions and methods
  Input/output
  Recursion and call stacks
  Exceptions
  Polymorphism
  Classes, objects
  Pylab

Algorithms
  Big O notation
  Exhaustive enumeration
  Guess and check
  Successive approximation
    Newton's method
  Divide and conquer algorithms
  Binary search
  Merge sort
  Hashing
  Orders of growth
    Exponential
    Polynomial
    Linear
    Log
 Amortized analysis

Simulations and modeling
  Random walks
  Monte Carlo methods
  Queuing network models
  Graph-based models

Understanding data
        Building computational models
        Normal distributions, standard deviation, coefficient of variation,
        Confidence interval, confidence level
        Linear regressions
        Plotting
        Evaluating fits
                Over fitting
        Statistical sins
        GIGO
                Texas sharpshooter
                Data enhancement
                Non-representative sample
                cum hoc ergo propter hoc

Optimization problems
        Knapsack
        Shortest path
        Dynamic programming

Machine learning
        Supervised learning, basic idea
        Unsupervised learning, clustering
                Hierarchical
                k-means

Software engineering
        Debugging and testing
        Data abstraction and inheritance
        Program organization
        Specifications

Anything needed to successfully complete problem sets

6.00SC Introduction to Computer Science and Programming
Spring 2011