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