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

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