

Kapita Selecta Teaching Materials

by Eka Antonius Kurniawan

https://www.dropbox.com/sh/ivhgnpp4um1dh3b/AACjvENnD0w_h9qcMCivP_2Ta?dl=0

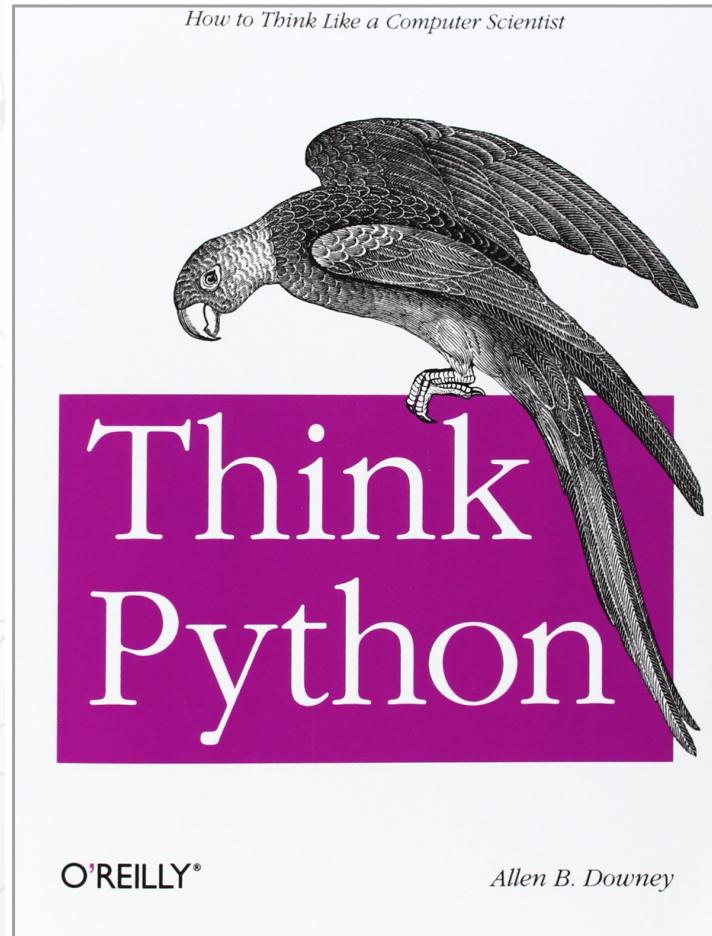
Weekly Topics

- ❑ W1: Introduction to Bioinformatics and Machine Learning
- ❑ W2: Python Programming
- ❑ W3: Python Programming Exercise - Building Search Engine
- ❑ W4: Algorithms in Bioinformatics
- ❑ W5: Algorithms Programming in Bioinformatics
- ❑ W6: Algorithms in Machine Learning
- ❑ W7: Algorithms Programming in Machine Learning

Python Programming Books

Think Python

by Allen Downey



Google's Python Class

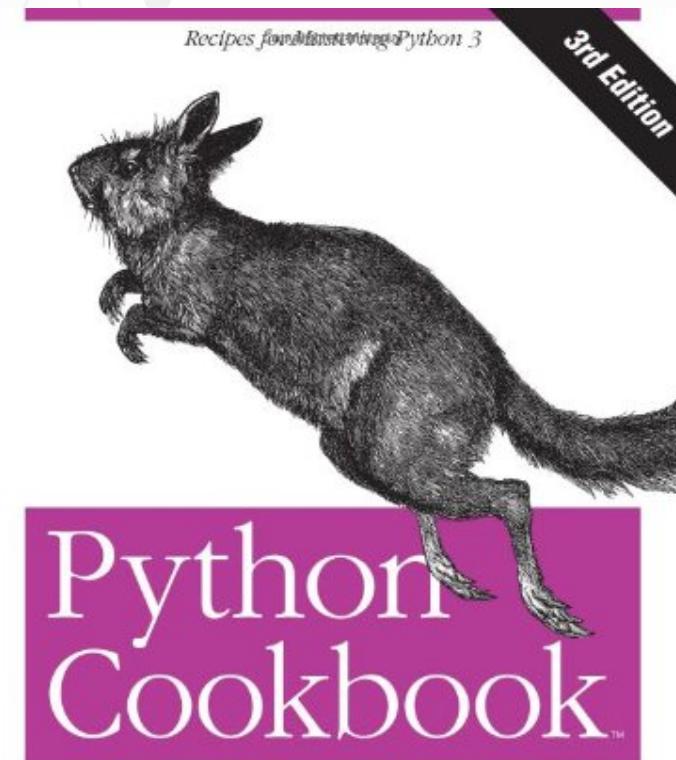
The screenshot shows the Google Developers website with a dark header featuring a network graph pattern. The main title is "Google's Python Class". Below the header is a navigation bar with the Google Developers logo, a search icon, a "Google for Education" button, a "Search" input field, and a "SIGN IN" link. The URL in the address bar is "https://developers.google.com/edu/python/". The page content area has a teal header with the text "Google for Education". On the left, there is a sidebar with a "Python Course" section containing links like "Overview", "Python Set Up", "Introduction", etc., and sections for "Lecture Videos" and "Python Exercises".

Google's Python Class

Welcome to Google's Python Class -- this is a free class for people with a little bit of programming experience who want to learn Python. The class includes written materials, lecture videos, and lots of code exercises to practice Python coding. These materials are used within Google to introduce Python to people who have just a little programming experience. The first exercises work on basic Python concepts like strings and lists, building up to the later exercises which are full programs dealing with text files, processes, and http connections. The class is geared for people who have a little bit of programming experience in some language, enough to know what a "variable" or "if statement" is. Beyond that, you do not need to be an expert programmer to use this material.

To get started, the Python sections are linked at the left -- [Python Set Up](#) to get Python installed on your machine, [Python Introduction](#) for an introduction to the language, and then [Python Strings](#)

Python Cookbook by David Beazley and Brian Jones

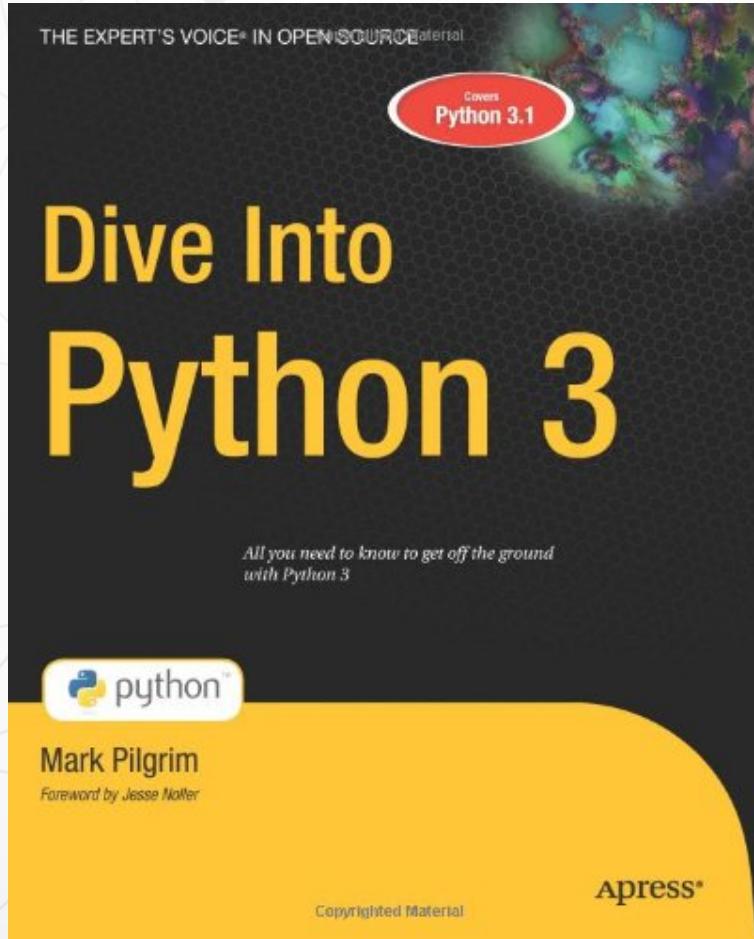


O'REILLY®

David Beazley & Brian K. Jones

Copyrighted Material

Dive Into Python 3 by Mark Pilgrim



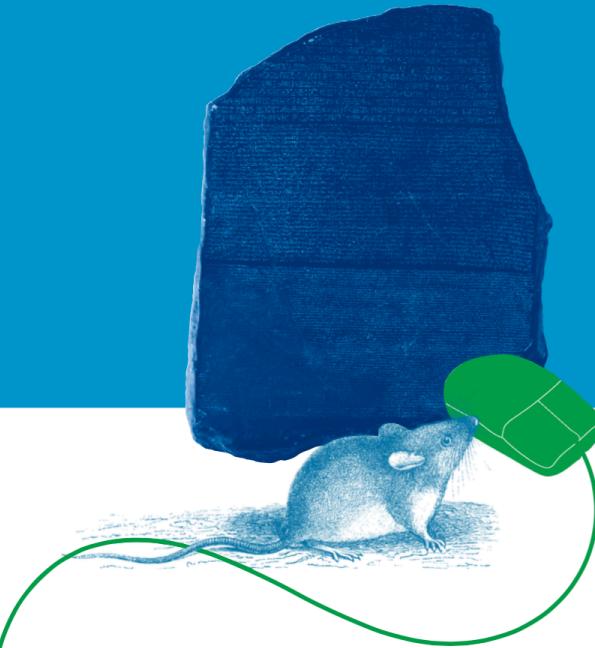
Bioinformatics Books

An Introduction to Bioinformatics Algorithms

by Neil C. Jones and Pavel A. Pevzner

AN INTRODUCTION TO
BIOINFORMATICS ALGORITHMS

NEIL C. JONES AND PAVEL A. PEVZNER



Machine Learning Books

Machine Learning course materials

from
Stanford University

Lecture Notes

- [Lecture notes 1 \(ps\) \(pdf\)](#) Supervised Learning, Discriminative Algorithms
- [Lecture notes 2 \(ps\) \(pdf\)](#) Generative Algorithms
- [Lecture notes 3 \(ps\) \(pdf\)](#) Support Vector Machines
- [Lecture notes 4 \(ps\) \(pdf\)](#) Learning Theory
- [Lecture notes 5 \(ps\) \(pdf\)](#) Regularization and Model Selection
- [Lecture notes 6 \(ps\) \(pdf\)](#) Online Learning and the Perceptron Algorithm. (optional reading)
- [Lecture notes 7a \(ps\) \(pdf\)](#) Unsupervised Learning, k-means clustering.
- [Lecture notes 7b \(ps\) \(pdf\)](#) Mixture of Gaussians
- [Lecture notes 8 \(ps\) \(pdf\)](#) The EM Algorithm
- [Lecture notes 9 \(ps\) \(pdf\)](#) Factor Analysis
- [Lecture notes 10 \(ps\) \(pdf\)](#) Principal Components Analysis
- [Lecture notes 11 \(ps\) \(pdf\)](#) Independent Components Analysis
- [Lecture notes 12 \(ps\) \(pdf\)](#) Reinforcement Learning and Control

Additional Materials

Python Software Foundation

The screenshot shows the Python Software Foundation website. At the top, there is a navigation bar with tabs: Python (selected), PSF, Docs, PyPI, Jobs, and Community. Below the navigation bar is the Python logo and a search bar with a magnifying glass icon and a "GO" button. The main content area features a dark blue sidebar on the left containing Python code examples. To the right of the sidebar is a section titled "Intuitive Interpretation" with text about Python's arithmetic operators. At the bottom of the page, there is a footer with a call-to-action button and a link to learn more.

Python PSF Docs PyPI Jobs Community

python™

About Downloads Documentation Community Success Stories News Events

```
# Python 3: Simple arithmetic
>>> 1 / 2
0.5
>>> 2 ** 3
8
>>> 17 / 3 # classic division returns a float
5.666666666666667
>>> 17 // 3 # floor division
5
```

>_

Intuitive Interpretation

Calculations are simple with Python, and expression syntax is straightforward: the operators `+`, `-`, `*` and `/` work as expected; parentheses `()` can be used for grouping. [More about simple math functions in Python 3.](#)

1 2 3 4 5

Python is a programming language that lets you work quickly and integrate systems more effectively. [» Learn More](#)

<https://www.python.org>

Intro to Computer Science by David Evans

The screenshot shows the Udacity course page for "Intro to Computer Science" by David Evans. The top navigation bar includes links for Nanodegree, Catalog, Sign In, and Sign Up. The course title "Intro to Computer Science" is prominently displayed, along with the subtitle "Build a Search Engine & a Social Network". Below the title, there are sections for "Beginner" level, "Join 501,280 Students", and a video thumbnail with a play button labeled "VIEW TRAILER". The "Course Summary" section describes the course as teaching key computer science concepts through building search engines and social networks using Python. The "Enroll in Course" section offers a "Start free trial" button, pricing information (\$199/month after trial), and a "You get" section listing benefits like coach support. The "Access Course Materials" section has a "Free" badge.

UDACITY

Nanodegree Catalog Sign In Sign Up

Intro to Computer Science

Build a Search Engine & a Social Network

Beginner

Join 501,280 Students

Course Summary

In this introduction to computer programming course, you'll learn and practice key computer science concepts by building your own versions of popular web applications. You'll learn Python, a powerful, easy-to-learn, and widely used programming language, and you'll explore computer science basics, as you build your own search engine and social network.

Approx. 3 months

Assumes 6hr/wk (work at your own pace)

Start free trial

\$199/month after 14-day trial

Best for learners serious about course completion & career advancement

You get

Stuck? Get help from Coaches

See All ▾

Access Course Materials

Access course materials

Free

<https://www.udacity.com/course/intro-to-computer-science--cs101>

Bioinformatics Specialisation

by Phillip Compeau,
Pavel Pevzner, and Nikolay Vyahhi

1

Finding Hidden Messages in DNA (Bioinformatics I)

2

Genome Sequencing (Bioinformatics II)

3

Comparing Genes, Proteins, and Genomes...

4

Deciphering Molecular Evolution (Bioinformatics...)

5

Genomic Data Science and Clustering...

6

Finding Mutations in DNA and Proteins...



Bioinformatics Capstone: Big Data in Biology

Course 1

Finding Hidden Messages in DNA (Bioinformatics I)

Start Now - \$49

Upcoming Session: August 31, 2015

Duration: 4 weeks

Estimated Workload: 4-10 hours/week

Where in the Genome Does Replication Begin? (Algorithmic Warmup):

- Introduction to DNA replication
- Hidden messages in the replication origin
- Some hidden messages are more surprising than others
- An explosion of hidden messages
- The simplest way to replicate DNA
- Asymmetry of replication
- Peculiar statistics of the forward and reverse half-strands
- Some hidden messages are more elusive than others

Algorithms, Biology, and Programming for Beginners

by Pavel Pevzner and Phillip Compeau

coursera

Catalog

Search catalog



Institutions

Log In

Sign Up

UC San Diego

Algorithms, Biology, and Programming for Beginners

This course will cover algorithms for solving various biological problems along with a handful of programming challenges testing your ability to implement these algorithms. It offers a gentler-paced alternative to the instructors' two other courses, Bioinformatics Algorithms (Part 1 and Part 2).



Machine Learning

 by Stanford University

The screenshot shows the Coursera platform interface. At the top, there's a navigation bar with the Coursera logo, a 'Catalog' button with a search input field, and links for 'Institutions', 'Log In', and 'Sign Up'. Below the navigation, a large banner for the 'Machine Learning' course by Stanford University is displayed. The banner features the Stanford University logo, the course title 'Machine Learning', and the text 'by Stanford University'. On the left side of the main content area, there's a dark sidebar with the course title and a 'Course Info' button. The main content area contains a section titled 'About this Course' with a detailed description of machine learning.

Coursera

Catalog Search catalog

Institutions Log In Sign Up

Stanford University

Machine Learning
by Stanford University

Course Info

About this Course

Machine learning is the science of getting computers to act without being explicitly programmed. In the past decade, machine learning has given us self-driving cars, practical speech recognition, effective web search, and a vastly improved understanding of the human genome. Machine learning

<https://www.coursera.org/learn/machine-learning>

Thesis Topics

Proposed Thesis Criteria

- ❑ Bioinformatics Field
- ❑ Solving Real-world Problems
- ❑ Collaboration with Government Health Divisions, Hospitals, Laboratories, and Research Centers

Machine Learning Workshop

https://www.socioelitics.com/meeting?object_name=machinelearningworkshop2015

Machine Learning Workshop

- ❑ W1: Introduction to Machine Learning
- ❑ W2: Linear Regression with example on predicting sells revenue and housing price
- ❑ W3: Collaborative Filtering with example on movie recommendation system
- ❑ W4: Support Vector Machine with example on classifying emails into spam and non-spam
- ❑ W5: Unsupervised Learning with example on image compression
- ❑ W6: Neural Network with example on character recognition

Setting Up Python

Setting Up Python

- ❑ Python 3.3
- ❑ Libraries:
 - ❑ Numpy
 - ❑ Scipy
 - ❑ iPython
 - ❑ Matplotlib

❑ Detail: <http://nbviewer.ipython.org/github/ekaakurniawan/3nb/blob/master/Installation.ipynb?create=1>



Q&A