SICP Notes

A Notes for cs61a via LaTeX

Author: Yao

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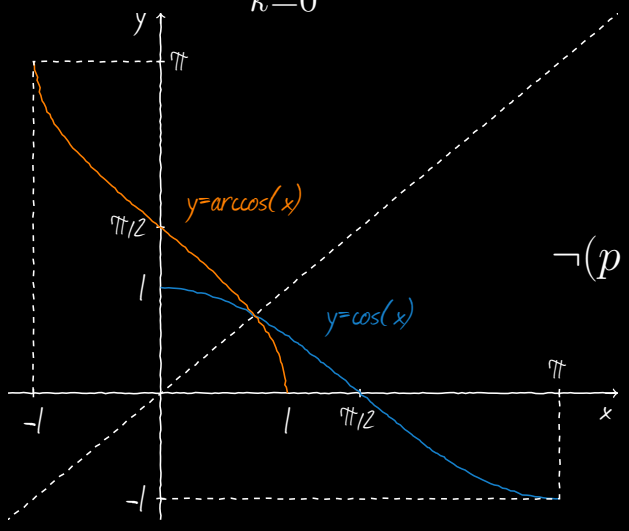
SICP

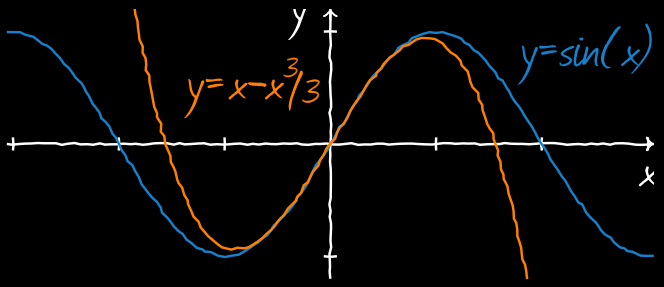
$$(a+b)^n = \sum_{k=0}^{n} \binom{n}{k} a^k b^{n-k}$$



$$\zeta_k = |a|^{1/n} \mathrm{e}^{i(\arg(a)+2k\pi)/n}$$

$$\mathrm{e}^{i\pi} + 1 = 0$$

$$\neg(p \vee q) \equiv (\neg p) \wedge (\neg q)$$



$$\binom{n}{k} = \frac{n!}{k!(n-k)!}$$

Abstract

SICP (Structure and Interpretation of Computer Programs), which is an introduction to programming and computer science. In the tradition of SICP, this text focuses on methods for abstraction, programming paradigms, and techniques for managing the complexity of large programs.

This Note was written by latex, following the course cs61a textbook with my own understanding in Chinese. There are also four chapters and the programming language is mainly Python.

1.1 Getting Started

Excerpts

The high productivity of computer science is only possible because the discipline is built upon an elegant and powerful set of fundamental ideas. All computing begins with representing information, specifying logic to process it, and designing abstractions that manage the complexity of that logic. Mastering these fundamentals will require us to understand precisely how computers interpret computer programs and carry out computational processes.

Thoughts (SICP 的重要性)

CS 得以在各个方面发挥潜力的前提, 是必须具备一个的优雅且强大的规则。computing 起始于信息的表示，逻辑过程，以及去管理这些复杂逻辑的抽象定义。因此，需要去深入理解计算机是如何解释并执行程序的。

1.1.1 Programming in Python

Excerpts

The Python language itself is the product of a large volunteer community that prides itself on the diversity of its contributors. The language was conceived and first implemented by Guido van Rossum in the late 1980's.

Thoughts (选择 Python 的原因)

cs61a 教程使用**Python**，并建议直接使用**Python 交互界面**去探究 programs 是如何执行的。选择 Python 的原因是, 它是一个 popular，beauty, simplicity, and readability 的 instructional 语言。

1.1.2 Installing Python 3

安装 Python3，注意**配置环境**，windows 可以借助 wsl 或者 scoop。

1.1.3 Interactive Sessions

Excerpts

Type python3 at a terminal prompt,If you see the Python prompt, ⋙ then you have successfully started an interactive session.

Thoughts

查看历史命令：之前的命令 (ctrl+P) / 之后的命令 (ctrl+N) / 退出 (ctrl+D), 或者使用 up/down 执行。

1.1.4 First Example

Excerpts

Python has built-in support for a wide range of common programming activities. An import statement loads functionality.Python code consists of expressions and statements.

Thoughts

Python 支持很多内建的 library，可以通过 import 命令去调用 function. codes 由 statements 和 expressions 组成，一个程序包括去计算 value 和执行 action，而 statements 用来描述 action，expressions 用来描述 computing.

Excerpts

Functions encapsulate logic that manipulates data. A set is a type of object, one that supports set operations like computing intersections and membership. An object seamlessly bundles together data and the logic that manipulates that data, in a way that manages the complexity of both. Evaluating compound expressions requires a precise procedure that interprets code in a predictable way. A program that implements such a procedure, evaluating compound expressions, is called an interpreter. we will find that all of these core concepts are closely related: functions are objects, objects are functions, and interpreters are instances of both.

Thoughts

funtion 是将操作 data 的 logic 封装形成的，object 是用来捆绑 data 和操作 data 的 logic 的，interpreter 解释器可以精确预测 evaluation 复杂运算的过程。这些核心概念彼此依存。

1.1.5 Errors

Excerpts

Learning to interpret errors and diagnose the cause of unexpected errors is called debugging.

A.1 SICP textbook

You can see the original textbook online: Geting Start

A.2 LaTex Tools

Two main template tools nexus and xeboiboites can be found on GitHub.

nexus and xeboiboites