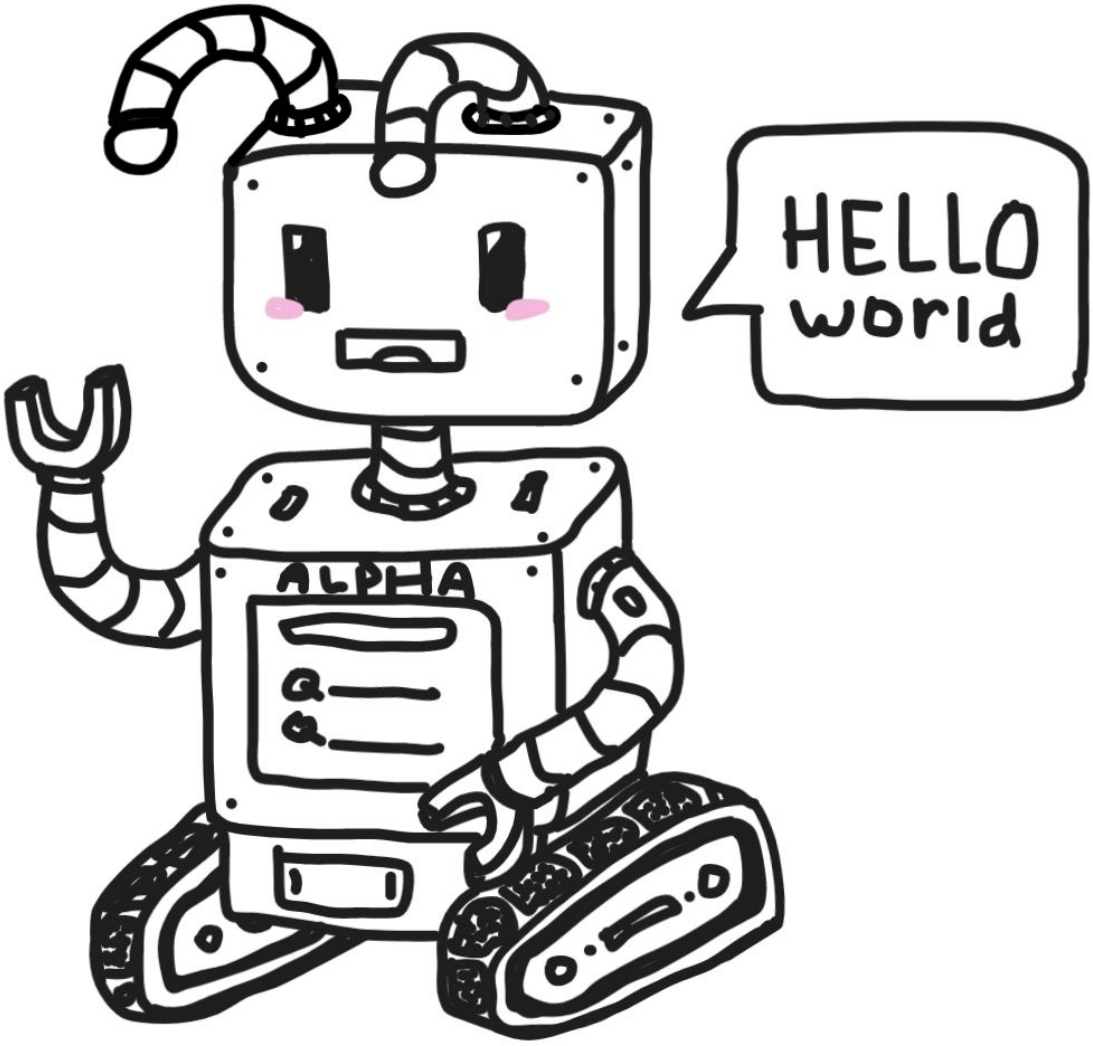
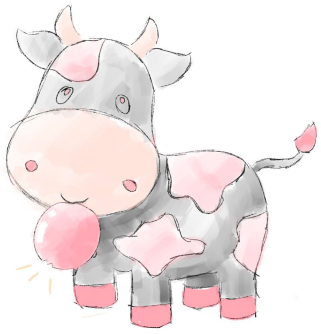


Prologue

This book introduces many mathematical and computer science terms like Fobonacci, graph, tree, recursion, etc. While all of these concepts have rigid formal definitions, they are not so easy to grasp in a glance. Instead, this book will try to describe them in simple words as much as possible.

Coming up with the right names for the characters in this book is equally important as making the algorithms and programs right. The names reflect our inspiration. We spent many nights staring at stars without a decision. But wait, since the computer world is an Animal Kingdom and our characters live in this Kingdom, therefore, we will name them -

Characters



The sky is blue, the grass is green. deep in the forest, lives the BestFour:

- Dark Knight the Horse
    - Gallant hero and adventurer, independent and unrestrained, earn admiration from others, leader
- Banana Split the Monkey
    - intelligent, enthusiastic, confident, humorous, and sociable, can be moody and impatient at times
- Bubble Gum the Cow
    - Good memory, cheerful, good-natured, seek peace and kindness, can settle for less at times
- Mighty Python the Algorithm

- Artificial intelligent, a character to introduce algorithms and code

Computer World is an Animal Kingdom

Many programming languages and tools are named after animal names:
From as big as Elk (analytics software) to as tiny as Ant (build automation tool)
From friendly social Lama (heterogeneous system development) to deadly and evil Cobra (OOP language)
From as sleek as silk Penguin (graphical user interfaces development) to as sharp as Porcupine (web app server)
From as fast as Cheetah (template engine) to as slow as Sloth (slowest language by Larry Page)
From as elegant as Orca (parallel application development) to as gross as Cockroach (SQL Database)

And sometimes, programmers just can not have enough of animals and add a whole family pack like Mac OS big cat family: 10.0 "Cheetah", 10.1 "Puma", 10.2 "Jaguar", 10.3 "Panther", 10.4 "Tiger", 10.5 "Leopard", 10.6 "Snow Leopard", 10.7 "Lion" and 10.8 "Mountain Lion".

You get the point!

Fun Fact
Is Python language named after snake?

When Guido van Rossum began creating Python in the 1980s, he was watching the comedy series "Monty Python's Flying Circus". Van Rossum thought he needed a name that was short, unique, and slightly mysterious, so he decided to call the language Python. The language was first released in 1991.
https://docs.python.org/2/faq/general.html#why-is-it-called-python

Why Python?

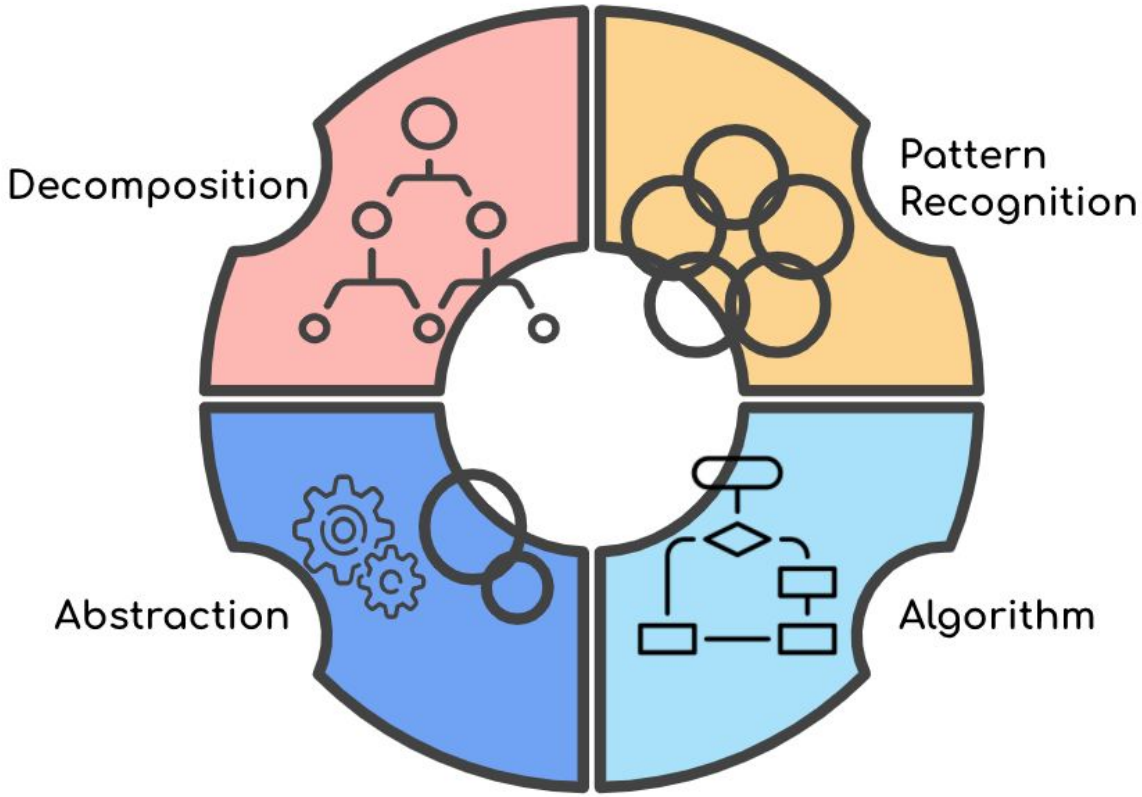
Python is an easy-going friend to make. If you know English language, you've known a portion of Python! It resembles the English language and focuses on what you want to achieve, but not the programming language itself.

Python is a celebrity on all computer continents: Windows, MacOS, Linux. Your Python code works no matter where it runs.

Python is a big brain for you to pick, the artificial intelligence brain. With the support of Python clans (libraries) like **'Numpy'**, **'Pandas' and 'Matplotlib'**, Python handles statistics, matrix data and visualization like a pro. Whatsmore, some of the strong family members, "Keras", "TensorFlow" and "OpenCV" enable artificial intelligence. It is like you have two brains now.

Target Audience

This book is designed to introduce the essential framework that computer science, math and even our lives are built upon: algorithmic thinking. In simple terms, Algorithms are sequence of steps to solve a category of problems.



In this book, we will grant you a magic lens called CalliLens. Wearing this lens, you will see a crystal clear world - a world where complex problems have clear outlines and patterns, and their solution steps jump out in front of you. Does algorithm sound like a scary monster topic? Don't worry, we have introduced lots of visuals and fun facts. If you like to watch movies and take adventurous journeys, you are in the right place. Welcome our adventure buddies!

Knowledge Covered

Algorithms

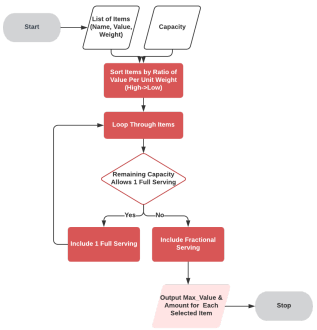
- Coin Change with Greedy Approach
- Fractional Knapsack Problem with Greedy Approach
- Coin Change with Dynamic Programming
- 0-1 Knapsack Problem with Dynamic Programming
- Shortest Path Problem with Minimum Spanning Tree Prim's and Kruskal's Algorithms (Greedy Approach)
- Single Source Shortest Path with Dijkstra's Algorithm (Greedy Approach)
- Solving Maze with Breadth-First Search and Depth-First Search

Data Structures and Important Concepts

- Fibonacci
- Recursion
- Queue
- Stack
- Graph
- Tree
- etc.

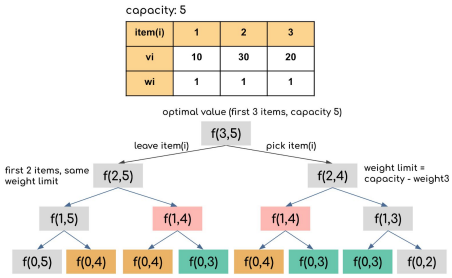
Flow for Each Adventure

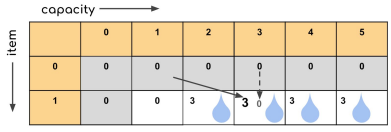
- Daily adventures
- CalliLens guides us through the abstraction, pattern recognition and solution process.
- Flow diagram. If the algorithm is the coffee, the flow diagram is the coffee mate!

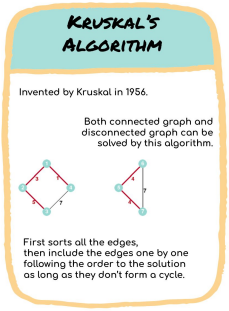


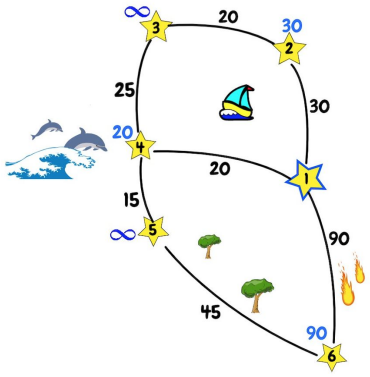
- Python solution and fun pygame
- Connecting to the real world

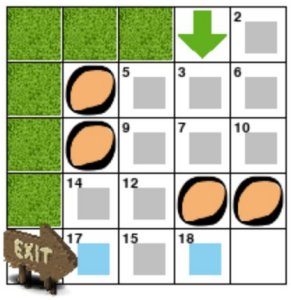
Throughout the book, we introduced lots of visual illustrations.

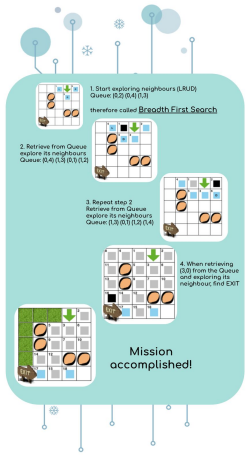












BTW, do you have to love animals to continue reading this book? No, but the world will be a better place if you start now.

Oh, if you unearth a better solution than the one proposed in the book, please share the joy with us!