Lesson 18:

1. Introduction

DuckDuckGo says our search engine is too slow.

1. Making Things Fast

Algorithm Analysis

Procedure = well-defined sequence of steps that can be executed mechanically, and is guaranteed to always finish and produce the correct result.

Cost = algorithm time based on input size

1. Quiz: Measuring Speed

Predict how long it will take for a program to execute.

Want to know how the time will change as computers get faster.

We want to understand fundamental properties of our algorithms, not things specific to a particular input or machine.

1. Stopwatch

time.clock() # processor time in seconds

1. Spin Loop

Simple loop to understand how time increases based off input.

1. Quiz: Predicting Run Time

Guess ~52 seconds. Actual 57.168562 seconds.

1. Make Big Index

lookup(table\_data, item\_to\_find)

1. Quiz: Index Size Vs. Time

10,000,000 keywords = ~1 second for lookup

1. Quiz: Lookup Time
2. seconds since first index made is ‘aaaaaaaa’

input and type of input can affect speed

1. Quiz: Worst Case

Word that is not in index and last word added = worst run times.

1. Quiz: Fast Enough

It depends on how many keywords there are.

It depends on how many lookups there are.

1. Making Lookup Faster
2. Quiz: Hash Table
3. Hash Function
4. Modulus Operator
5. Quiz: Modulus Quiz
6. Quiz: Equivalent Expressions
7. Quiz: Bad Hash
8. Quiz: Better Hash Functions
9. Testing Hash Functions
10. Quiz: Keywords and Buckets
11. Quiz: Implementing Hash Tables
12. Quiz: Empty Hash Table
13. Quiz: The Hard Way
14. Quiz: Finding Buckets
15. Quiz: Adding Keywords
16. Quiz: Lookup
17. Quiz: Update
18. Dictionaries
19. Using Dictionaries
20. Quiz: Population
21. A Noble Gas
22. Quiz: Modifying the Search Engine
23. Quiz: Changing Lookup
24. Coming Up Next