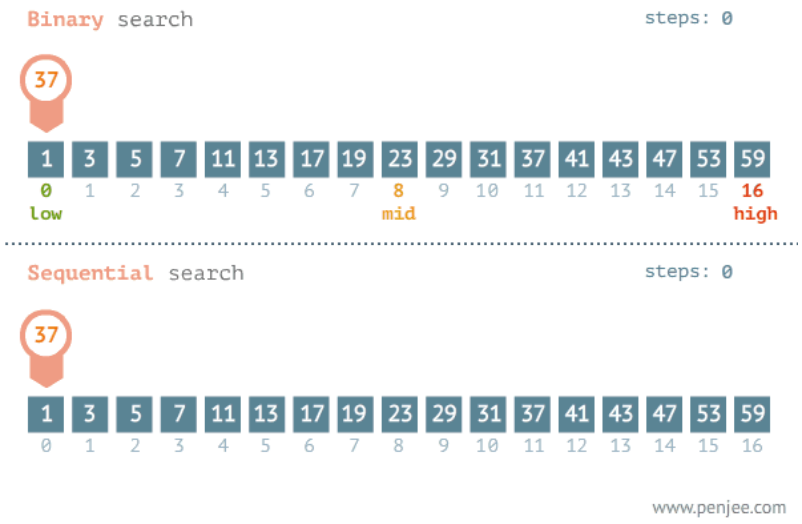
ALGORITHMS - BINARY SEARCH

LANGUAGE: Python

TOPICS: Algorithms and Datastructures



OVERVIEW

In this project, you will work with a partner to code a classic search algorithm: binary search. Your code will search a data set of countries to see if a specific country entered by a user is included. With your teammate, you will begin by working out what your code should do in pseudo code. After you are confident that your algorithm should work, you will try to translate it into terms that your computer can understand.

CONTEXT

The first recorded mention of the most basic form of this algorithm was by **John Mauchly** in 1946. However, through collaboration and iteration, more efficient and versatile variations of this algorithm have been developed and published. Binary search is well-liked because it is easy to implement and has a fairly predictable run-time.

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INSTRUCTIONS

First, work to pseudo code an algorithm that models what binary search should do. Test your pseudo code with a short data set that you make up to ensure that your reasoning is correct. Refer to the_references below_if you get stuck.

Next, work to translate your pseudo code into Python. The starter code we have provided will import your data set for you.

REQUIREMENTS

You may not have time to fully code your algorithm - that's ok! To consider this project complete, you must:

- Have pseudo-code that you are confident would search a list of any length.
- The beginnings of a coded algorithm in Python.
- Be able to explain what in your code works, what doesn't and what you would do next if you had more time.

Of course, if you have time you should work to debug your code to ensure it works effectively. This includes taking and handling user input.

EXTENSIONS

If you finish before time is up, challenge yourself with the following:

- Imagine that you had a data set that was not in numerical or alphabetical order. Describe what you might need to do differently to search the list.
- Turn your search into a guessing game by keeping track of the number of times the user guesses a country that is in the list.
- Add another column to your array of data that gives the capital of each country in your list. Then, update your program so that it returns the capital of the country that a user inputs.

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REFERENCE

Video: How Binary Search Works

This 7 minute video gives a description of how binary search works.

SELECTED DOCUMENTATION

csv library - In this project, we make use of the csv Python library. Learn more about this library and how to read and write csv files, read this **documentation**

string module - In this project, the string module is also a helpful tool. Learn more about the features of this module in this documentation.