

# Lists (index, slice, in, iterate)

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## Lists

### Data Structures

#### What?

Different ways to organize and store data

#### Why?

Data can be accessed in the fastest way possible, depending on the data

A list is a type of data structure!

There are different data structures that help us organize, store, and access data. We can decide which data structure to use to represent our data depending on the data we are using.

It might make more sense to use one data structure to represent data based on how we want to organize it. Also the data structure we use determines how fast we can access the data. So many factors go into deciding which data structure to use because there are trade offs!

### Lists

Data structure containing **ordered list of elements**, which can be strings, numbers, other data types, and other data structures including lists

**Is a data type**, just like str, int, bool, float

Can `len()`, `index`, `slice`, `in` operator, `iterate`, `concatenate` - like strings!

You should think to use a list when you have data that needs to be stored in a certain order!

In other words, with the data you have, if the order matters, store it in a list!

## Lists vs. Strings

### Similarities

Both are **sequences** - order matters!

Can **len()**, **index into**, **slice**, **in operator**, **concatenate**, and **iterate over** them

### Differences

Strings can only hold **characters**

Lists can hold **any data type**, including characters, strings, and other lists

The operations that you can use on strings and lists are so similar!

Both lists and strings are sequences that you can:

- calculate length using **len()**
- index
- slice
- use **in** operator
- use **+** to concatenate
- use **\*** to repeat
- iterate/traverse over

Python provides [built-in functions for strings](#):

- **upper()**
- **lower()**
- **format()**
- **replace()**
- etc.

Python provides [built-in functions for lists](#):

- **append()**
- **copy()**
- **pop()**
- **sort()**
- etc.

## TODOS

- ☐ Project 1 (pt. 4) - Blackjack!
  - Due on Sunday!
- ☐ HW 5 - For Loops
  - Released tomorrow and due next Wednesday!
- ☐ Quiz 5 - For Loops, Lists
  - ~~This Friday!~~ Moved to next Friday because class was canceled due to weather!
- ☐ STEP Internship @ Google

- Applications open Sep 30, 2024 and close on Oct 25, 2024 !!
  - For 1st year and 2nd year students, applications will be available at [g.co/jobs/step](https://g.co/jobs/step)!
  - All of the available intern opportunities can be found at [google.com/students](https://google.com/students)!