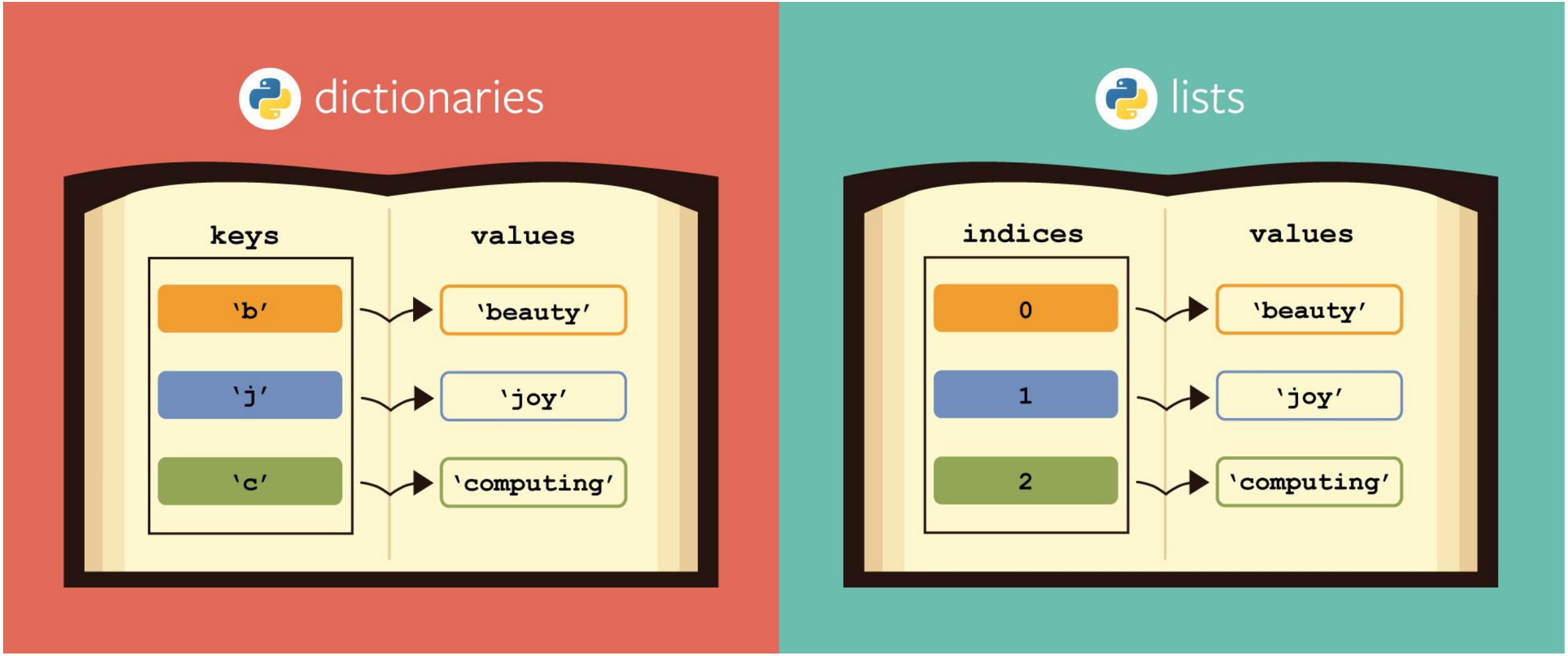
CS 30 Discussion 1A

2020.11.20

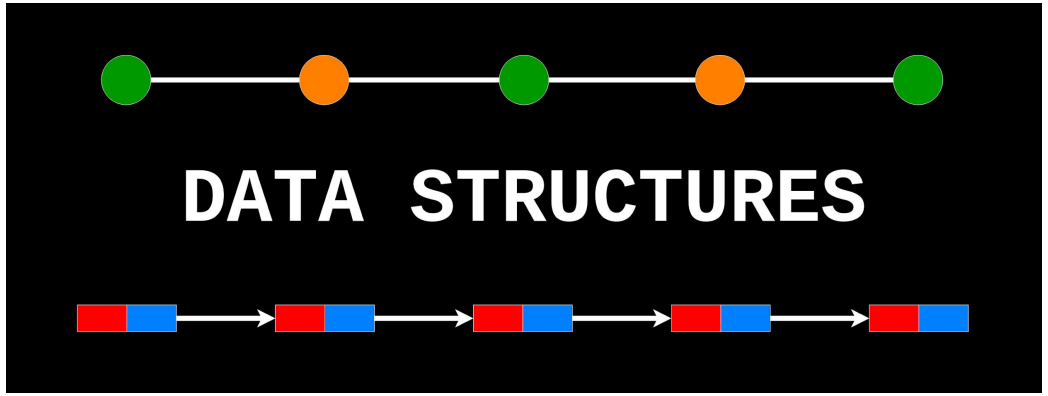
Welcome back to CS30 Discussion

- HW 5 next week.
- Midterm2 Grading.

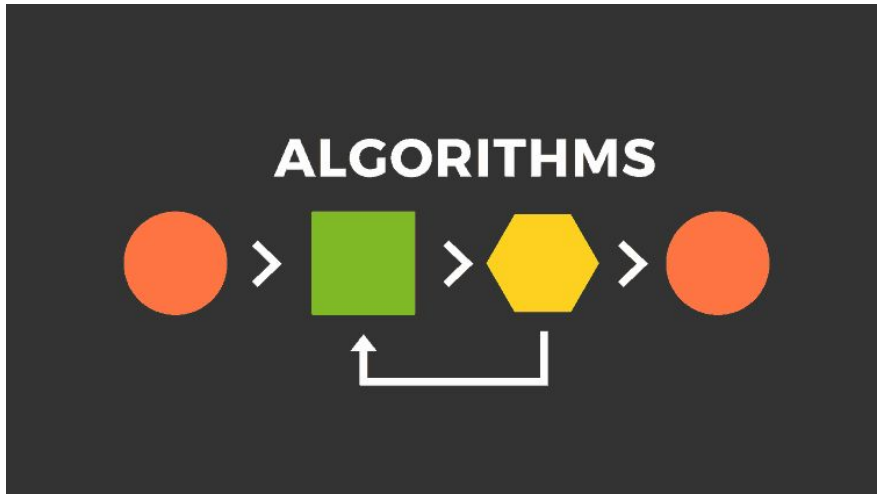
Dictionary -- a data structure, not a function or algorithm



Data structure vs Algorithm



A **data structure** is a collection of data values and the operations that can be applied to the data.
e.g. List, Dict, Set, Tree, ...



An **algorithm** is a finite sequence of well-defined, computer-implementable instructions.
e.g. Sorting Algorithm, Search Algorithm, ...

Dictionary

Dictionaries are used to store data values in **key:value** pairs.

A dictionary is a collection which is **unordered**, **changeable** and does **not** allow **duplicates**.

Dictionaries are written with curly brackets, and have keys and values:

```
thisdict = {
  "brand": "Ford",
  "model": "Mustang",
  "year": 1964
}
```

https://www.w3schools.com/python/python_dictionaries.asp

Dictionary

When we say that dictionaries are ordered, it means that the items does not have a defined order, you cannot refer to an item by using an index.

```
thisdict = {
  "brand": "Ford",
  "model": "Mustang",
  "year": 1964
}

thisdict["brand"]
```

Dictionary

Dictionary items are presented in key:value pairs, and can be referred to by using the key name.

```
thisdict1 = {
  "brand": "Ford",
  "model": "Mustang",
  "year": 1964
}

thisdict2 = {
  "model": "Mustang",
  "brand": "Ford",
  "year": 1964
}

assert thisdict1 == thisdict2
```

Dictionary

Duplicates Not Allowed. ->Dictionaries cannot have two items with the same key.

Duplicate values will overwrite existing values:

```
thisdict1 = {
  "brand": "Ford",
  "model": "Mustang",
  "year": 1964,
  "year": 2020
}

thisdict2 = {
  "brand": "Ford",
  "model": "Mustang",
  "year": 2020
}

assert thisdict1 == thisdict2
```

Dictionary

The values in dictionary items can be of any data type.

```
thisdict = {
  "brand": "Ford",
  "electric": False,
  "year": 1964,
  "colors": ["red", "white", "blue"]
}
```

Dictionary Operations

1. Accessing Items
2. Get Keys
3. Get Values
4. Get items
5. Check if Key Exists
6. Change Items
7. Nested Dictionaries

   ...

Problem Set

Finish all the problems in the worksheet.