Dictionaries

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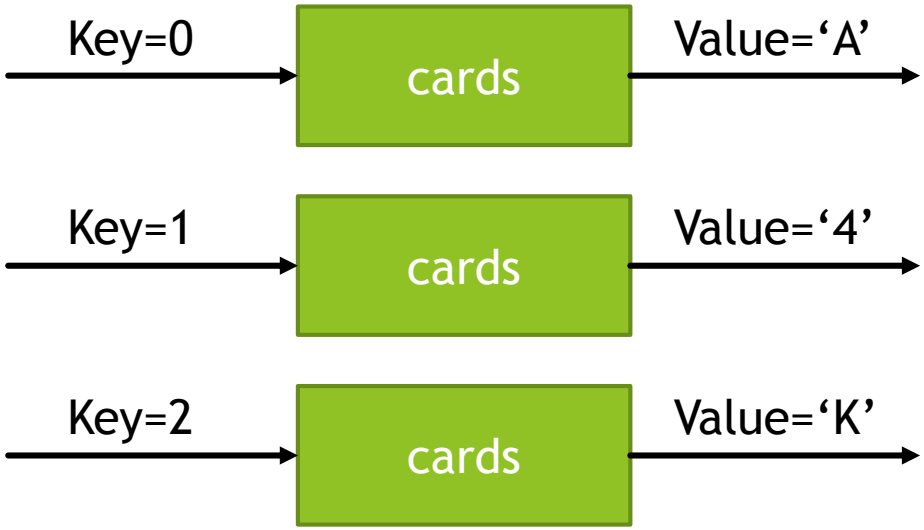
Yu's Elite Education

Review: Lists

- Python lists: store a different piece of data for each index
- cards[0] = ‘A’
- cards[1] = ‘4’
- cards[2] = ‘K’

Key-Value

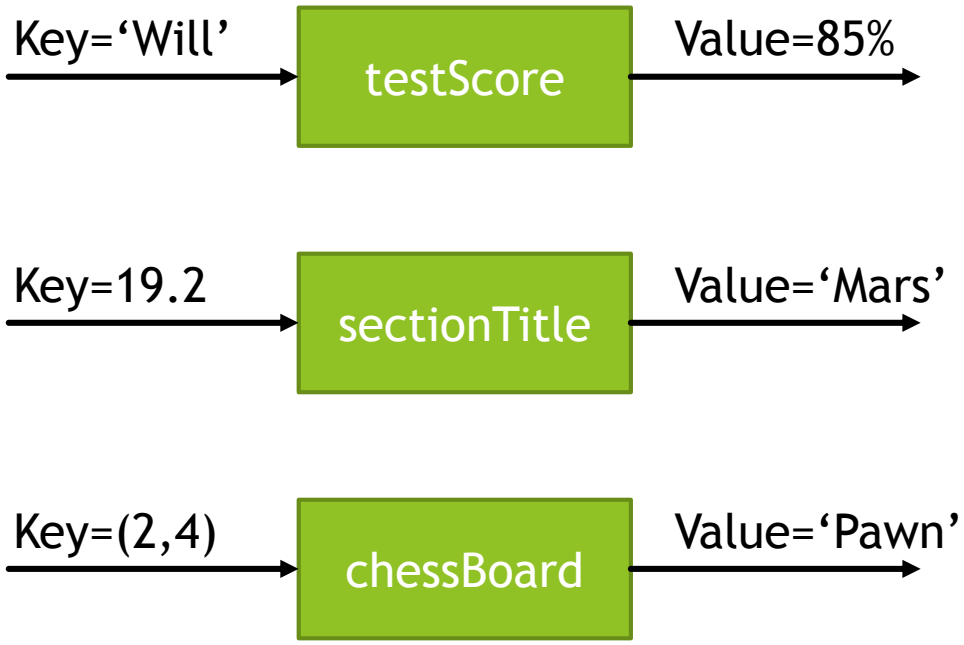
- Let's switch to talking about "keys" and "values"
- For a list, we give an index as a key, get data as a value



Other kinds of keys

- What if I want to store the population of lots of different cities?
- I want to be able to use keys that are not just integers:

Other kinds of keys



Dictionaries

- Dictionary: data type that allows us to use (almost) any data type as a key
- Create dictionaries using curly brackets or dict()

```
populations = {}
populations = dict()
```

- Storing new key-value pair:

```
populations['Princeton'] = 16027
populations['Trenton'] = 84308
```

Dictionaries

- Retrieving a stored value for a key

```
print(populations['Princeton'])
```

- Changing stored value

```
populations['Trenton'] = 1200
```

Dictionaries

- Checking if a key exists, using `in` keyword:

```
if ('Princeton' in populations):
    print(populations['Princeton'])
else:
    print('Unknown city')
```

Example: word count

Project: Automatic book writing

- Goal: Write a program that will generate English-like sentences of words.

- Plan: Pick one word at a time, based on the last word

```
On _____
On Tuesday ____
On Tuesday the ____
On Tuesday the car ____
```

Markov chain

- This is a type of “Markov chain” – a sequence where each output depends just on the previous output
- Other things that are approximately Markov chains:
  - The weather
  - Board games
  - Random walking

Picking each word

- Let's say the last word was "blue" – how should we pick the next word?

- Plan: use a book to learn what words usually come after blue, and pick one of those
- Create a dictionary where a key is a word, and a value is the list of all words that follow that word

Project: Automatic book writing

Sets

- Sometimes we only care about the keys and not values
- For example, when I take attendance I just want to know which people are here (the keys)

- Python “sets” are like dictionaries that only have keys, no values
- We can add or remove keys, or test if key exists in set
- **No duplicate keys** allowed

Sets in python

```
countriesVisited = set()
countriesVisited.add('USA')
countriesVisited.add('Mexico')

if 'USA' in countriesVisited:
    print('Visited USA')

countriesVisited.remove('USA')
```