Dictionaries, Part 2

October 31, 2022

Administrative Notes

You have one more week to complete Project 1

- It’s due Monday, November 7
- If you’re having problems you should be asking for help!

A reminder of last Wednesday’s lecture

Dictionaries

- A mapping between a set of keys and a set of values
    - Each key must be unique, and must be an immutable data type
    - Each key is mapped to a specific value, which can be a list or dictionary in addition to a string, int, float or boolean (okay, a value can be any type)
- We talked about creating a dictionary
    - An empty dictionary
    - A dictionary that isn’t empty
- We talked about adding a new key/value pair to a dictionary
    - Just use an assignment statement
        - If the key’s not in the dictionary, this assignment adds the key and the associated value
        - If the key is in the dictionary, the assignment statement changes the value associated with that key

Monday, redux

- We talked about accessing a key/value pair in a dictionary
    - Remember, this is dangerous - if you try to access a key that isn't there your program will crash
    - You can use the "get" method to provide a safe way to access an element in a dictionary
        - If the key you're looking for isn't there, the program doesn't crash
        - The statement just returns whatever value you specify in the statement - or None, if you don't specify anything
- We also talked about the .keys() and .values() methods
    - .keys() returns an object containing the set of all keys currently defined in the dictionary
        - It is NOT a list, even though if you print it out it sort-of, kind-of, looks like it might be one
    - .values() returns an object containing the set of all values currently defined in the dictionary
        - Same as for .keys(); it's not a list even if you think it looks like one
        -

Searching a dictionary

- You can search for keys in a dictionary; you cannot easily search for values
- It’s kind of like searching a paper dictionary for a definition if you don’t know the corresponding word - you have to look at each key to see if the definition is the one you want
- Our old friend “in” is useful
    - You can check to see if something is in the dictionary’s keys or in the dictionary’s values

And now for some new material

Now for some new material

- We’ll go through how to delete an element from a dictionary
- Then move on to some examples of how and why you might want to use a dictionary in a Python program

Removing an element from a dictionary

```
del dict[key]
```

In the dogs example:

```
  del dogs[‘cinder’]
```

Removes the entire key/value pair associated with ‘cinder’

But again, if that key doesn’t exist in the dictionary, you’ll error out. Your program may crash.

```
  del dogs[‘lady’]


if ‘lady’ in dogs.keys():
    del dogs[‘lady’]  # gets rid of key and value pair
```

A more resilient way to delete - the pop method

```
dogs.pop(‘lady’)
```

Still causes an error if ‘lady’ is not a key in the dictionary

But you can specify a default value to return if the key isn’t there

```
dogs.pop(‘lady’, None)
```

OR

`dogs.pop(‘lady’, -1)` etc.

Why would you use a dictionary?

When you want to keep all information about an object together, and there are different types of information

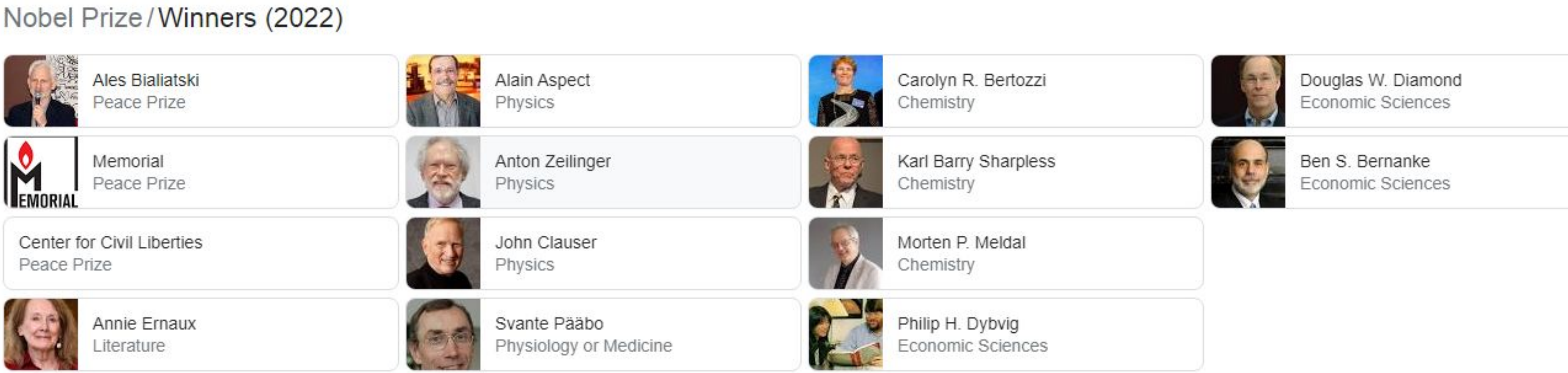
Suppose you want to collect information about this year’s Nobel Prize winners?

A first skeleton of our dictionary

We know the categories, but don’t know the winners:

```
# this file creates a dictionary of the 2022 Nobel Prize winners

# keys will be the categories;
# in the initial version values are the names of the winners

# later we'll produce a more complicated version

nobels = {
   "medicine": None,
   "chemistry": None,
   "physics": None,
   "literature": None,
   "peace": None,
   "economics": None

}
```

The 2022 winners:



Nobel Prize / Winners (2022)

Ales Bialiatski	Peace Prize
Memorial	Peace Prize
Center for Civil Liberties	Peace Prize
Annie Ernaux	Literature
Alain Aspect	Physics
Anton Zeilinger	Physics
John Clauser	Physics
Svante Pääbo	Physiology or Medicine
Carolyn R. Bertozzi	Chemistry
Karl Barry Sharpless	Chemistry
Morten P. Meldal	Chemistry
Philip H. Dybvig	Economic Sciences
Douglas W. Diamond	Economic Sciences
Ben S. Bernanke	Economic Sciences