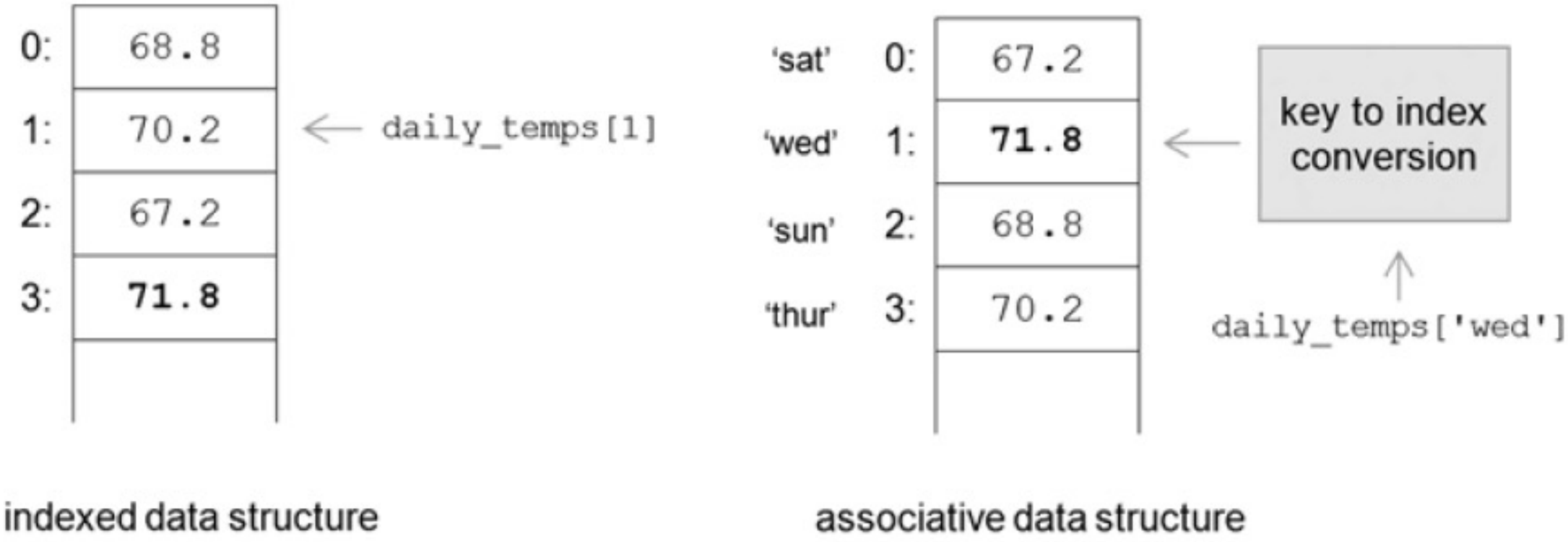
Lesson 12

Dictionary

Lesson Objectives

- what is a dictionary in Python
- operations in dictionary
- methods in dictionary
- applying the concept of dictionary to solve problem

indexed VS associative



Operations for Dictionary

Operation	Results
`dict()`	Creates a new, empty dictionary

`dict(s)`	Creates a new dictionary with key values and their associated values from sequence `s`, for example,
	`fruit_prices = dict(fruit_data)`
	where `fruit_data` is (possibly read from a file):
	`[['apples', .66],…,['bananas', .49]]`

`len(d)`	Length (num of key/value pairs) of dictionary `d`.
`d[key] = value`	Sets the associated value for `key` to `value`, used to either add a new key/value pair, or replace the value of an existing key/value pair.
`del d[key]`	Remove key and associated value from dictionary `d`.
`key in d`	`True` if key value `key` exists in dictionary `d`, otherwise returns `False`.

Try this ! (7 mins)

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

Temperature display program (using list)

```
# Temperature Display Program (List Version)

daily_temps = [68.8, 70.2, 67.2, 71.8, 73.2, 75.6, 74.0]

print('This program will display the average temperature for a given day')
terminate = False

while not terminate:

    day = input("Enter 'sun', 'mon', 'tue', 'wed', 'thur', 'fri', or 'sat': ")

    if day == 'sun':
        dayname = 'Sunday'
        temp = daily_temps[0]
    elif day == 'mon':
        dayname = 'Monday'
        temp = daily_temps[1]
    elif day == 'tue':
        dayname = 'Tuesday'
        temp = daily_temps[2]
    elif day == 'wed':
        dayname = 'Wednesday'
        temp = daily_temps[3]
    elif day == 'thur':
        dayname = 'Thursday'
        temp = daily_temps[4]
    elif day == 'fri':
        dayname = 'Friday'
        temp = daily_temps[5]
    elif day == 'sat':
        dayname = 'Saturday'
        temp = daily_temps[6]

    print('The average temperature for', dayname, 'was', temp, 'degrees\n')

    response = input('Continue with another day? (y/n): ')
    if response == 'n':
        terminate = True
```

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    print('The average temperature for', dayname, 'was', temp, 'degrees\n')

    response = input('Continue with another day? (y/n): ')
    if response == 'n':
        terminate = True
```

Can you rewrite the code using the concept of Dictionary ?

Phone number spelling program

Keypad on your phone

Phone Number Spelling Program – Output

```
This program will generate all possible spellings of the
last four digits of any phone number

Enter phone number (xxx-xxx-xxxx): 410-555-7324
410-555-pdag
410-555-pdah
410-555-pdai
410-555-pdbg
410-555-pdbh
410-555-pdbi
410-555-pdcg
410-555-pdch
410-555-pdci
410-555-peag
410-555-peah
410-555-peai
410-555-pebg
410-555-pebh
410-555-pebi
.
.
Enter another phone number? (y/n): y
Enter phone number (xxx-xxx-xxxx): 410-555-4267
410-555-gamp
410-555-gamq
410-555-gamr
```

Change to local context: 8 – digit phone number

Number ranges [edit]

3xxx xxxx - Business and Corporate IP Telephony Services[2]

6xxx xxxx - Public Switched Telephone Network (PSTN) and Residential IP Telephony Services

8zxx xxxx - Mobile, Data Services, New Numbers and Prepaid Numbers

9yxx xxxx - Mobile, Data Services and Pager (until May 2012)


```
{'0': ('0'), '1':('1'), '2': ('a','b','c'),
 '3': ('d','e','f'),'4': ('g','h','i'),
 '5': ('j','k','l'), '6': ('m','n','o'),
 '7': ('p','q','r','s'),'8': ('t','u','v'),
 '9': ('w','x','y','z')}
```

Expectation of Solution:

- functions to define:
  - getPhoneNum() → no parameter
    - reads a phone number from the user
    - to check whether number is valid (length & first digit)
    - returns phone number when valid
  - displayAllSpellings(phone_num)
    - apply dictionary concept to print out all possible combination for last 4 digits
  - main() → no parameter
    - getPhoneNum() and displayAllSpellings(phone_num) to run inside this main()

Quick Check

1. A dictionary type in Python is an associative data structure that is accessed by a _____ rather than an index value.

2. Associative data structures such as the dictionary type in Python are useful for,
   (a) accessing elements more intuitively than by use of an indexed data structure
   (b) maintaining elements in a particular order

3. Which of the following types can be used as a key in Python dictionaries?
   (a) strings
   (b) lists
   (c) tuples
   (d) numerical values

Quick Check

4. Which of the following is a syntactically correct sequence, `s`, for dynamically creating a dictionary using `dict(s)`.

(a) `s = [[1: 'one'], [2: 'two'], [3: 'three']]`

(b) `s = [[1, 'one'], [2, 'two'], [3, 'three']]`

(c) `s = {1:'one', 2:'two', 3:'three'}`

5. For dictionary `d = {'apples':0.66,'pears':1.25,'bananas':0.49}`, which of the following correctly updates the price of bananas.

(a) `d[2] = 0.52`

(b) `d[0.49] = 0.52`

(c) `d['bananas'] = 0.52`

Work to do . . .

- Temperature Display Program
- Phone Number Spelling Program
- Programming Assignment 10