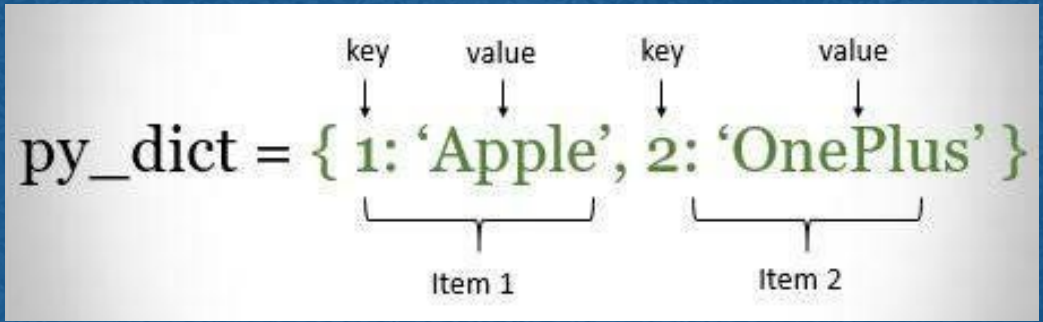
COMPUTER SCIENCE CLUB

Intro to Competitive Programming (Pt. 5)

Roy Zhang

What is a Dictionary?

- Stores information in key value pairs
- Lists:
  - **Has indexes**
  - O(n) look up
  - O(n) deletion
  - O(1) look up (using index)
- Dictionaries:
  - **No indexes**
  - O(1) look up
  - O(1) deletion



Dictionaries in Python

```python
# creating a dictionary
my_dict = {"a": 1, "b": 2, "c": 3}

# adding an element
my_dict["d"] = 4

# updating element if key is already in a dictionary
my_dict["a"] = 5

# accessing an element
# NOTE will return key error if key not in dict
var = my_dict["a"]

# delete an element
del my_dict["b"]
```

Looping through dictionaries

```
17  # loop through all keys
18  for key in my_dict:
19      print(key)
20
21  # loop through all values
22  for value in my_dict.values():
23      print(value)
```

Why use dictionaries in CCC?

- Can often be faster than lists due to its O(1) lookup time
- In the following data structures find the index/value of the letter “c”

```
25
26  my_dict = {"a": 0, "b": 1, "c": 2}
27  print(my_dict["c"])
```

O(1) Much faster!

```
29  li = ["a", "b", "c"]
30  for i in range(li):
31      if li[i] == "c":
32          print(i)
33          break
```

O(n) Much slower

Why use dictionaries in CCC?

- Easier to model certain information
- Store the following information in a data structure:
  - Apples cost 1$
  - Bananas cost 2$
  - Pears cost 3$

```
34
35    fruits = {"apples": 1, "bananas": 2, "pears": 3}
36
```

Problems

Beginner:

https://dmoj.ca/problem/ccc06j3 - CCC '06 J3 - Cell-Phone Messaging

Intermediate:

https://dmoj.ca/problem/ccc10s2 - CCC '10 S2 - Huffman Encoding

Advanced:

https://dmoj.ca/problem/ccc07s3 - CCC '07 S3 - Friends