Introduction to Dictionaries in Python

Introduction:

Objective:

• Understand the concept of dictionaries in Python.

• Learn how to create, access, and modify dictionaries.

Dictionaries:

Dictionaries in Python are like real-world dictionaries. They store information in pairs, where each pair has a 'key' (like a word) and a 'value' (like the meaning of the word). For example, in a real-world dictionary, "apple" would be the key, and its meaning would be the value.

Real Life Examples:

Phone Contacts:

- Imagine you have a list of your friends' names (keys) and their phone numbers (values) stored in a dictionary. This way, you can quickly look up a friend's number by their name.

  contacts = {'John': '555-1234', 'Jane': '555-5678', 'Bob': '555-7890'}

Student Grades:

- A dictionary can be used to store students' names (keys) along with their respective grades (values) in different subjects.

  grades = {'John Doe': {'Math': 85, 'Science': 90, 'English': 80}, 'Jane Smith': {'Math': 95, 'Science': 75, 'English': 85}}

Zip Code Lookup:

- You can use a dictionary to associate zip codes (keys) with city names (values).

  zip_codes = {'12345': 'New York', '67890': 'Los Angeles', '13579': 'Chicago'}

Creating Dictionaries: In Python, you can create a dictionary using curly braces {}. You put the key-value pairs inside, separated by colons (:). For example, {'apple': 2, 'banana': 3, 'cherry': 5} is a dictionary where "apple" is a key with a value of 2, "banana" is a key with a value of 3, and so on.

Syntax: {key1: value1, key2: value2, ...}

```
my_dict = {'apple': 2, 'banana': 3, 'cherry': 5}
```

Accessing Values: To get the value associated with a key, you use square brackets [] with the key inside. For example, if you have my_dict = {'apple': 2, 'banana': 3, 'cherry': 5}, my_dict['banana'] will give you 3, because 'banana' is the key associated with the value 3.

```
my_dict = {'apple': 2, 'banana': 3, 'cherry': 5}

print(my_dict['banana']) # Output: 3
```

Modifying Entries: If you want to change the value of an existing key, you use the same square brackets [] with the key, and then assign a new value. For example, my_dict['banana'] = 4 changes the value associated with 'banana' to 4.

```
my_dict['banana'] = 4
```

Adding Entries: If you want to add a new key-value pair, you use the same square brackets with a new key and assign a value. For example, my_dict['grape'] = 6 adds a new key 'grape' with a value of 6.

```
my_dict['grape'] = 6
```

Mini Hands-on Activity:

Phone Book

Objective: Create a phone book using a dictionary to store names and phone numbers.

Instructions:

1. Create an empty dictionary called `phone_book`.
2. Add at least three entries (name: phone number) to the phone book.
3. Print out the phone book to see the entries.

```
phone_book = {'John': '555-1234', 'Jane': '555-5678', 'Bob': '555-7890'}
print(phone_book)
```

Hands-on Activity:

• Provide a list of fruits and have students create a dictionary to represent the inventory with fruit names as keys and quantities as values.

• Instruct them to:

• Access quantities of specific fruits.

• Add new fruits and quantities.

• Modify quantities of existing fruits.

```
#Create a dictionary
fruit_dict = {'apple': 5, 'banana': 3, 'cherry': 8}

#Access the value of 'apple'
apple_quantity = fruit_dict['apple']

#Change the quantity of bananas
fruit_dict['banana'] = 6

#Add a new fruit and its quantity
fruit_dict['orange'] = 4

#Remove the entry for 'cherry'
del fruit_dict['cherry']

#Check if 'kiwi' is in the dictionary
if 'kiwi' in fruit_dict:

    print("We have kiwis!")

else:
    print("We don't have any kiwis.")
```

In this activity, you'll imagine you have a list of fruits. Each fruit will be a key in your dictionary, and the quantity of that fruit will be the value. For example, 'apple' might have a quantity of `10`. We performed the following things in the above activity.

- A dictionary is like a special list where each item has a name (key) and a number (value). In this example, we have a dictionary of fruits and how many of each we have.
- Here, we're asking the dictionary how many apples we have. We use the name 'apple' to get the number.
- We made a mistake. We actually have 6 bananas, not 3. So, we're changing the quantity to 6.
- We found some oranges! We're adding them to our dictionary with a quantity of 4.
- We ate all the cherries! So, we're removing them from our dictionary.
- We're checking if we have any kiwis in our dictionary. If we do, we print a message. If not, we print a different message.

Final Project: Random Colors Using Dictionary

In this project you will be creating the function to change the background color of the root window on a click of a button randomly. Here are the things you need to do:

1. Set the random background colors of the root window on click of a button.
2. Using the concept of random numbers you will be picking up random colors from the dictionary.
3. And updating the background colors of the root window.

```
from tkinter import *
import random

root=Tk()
root.title("Dictionary")
root.geometry("600x400")

dictionary = {"colour" : ["maroon1","lawn green","magenta2","purple1","springgreen2","chocolate1",
                          "deep pink","cyan"]}

def bg_change():
    random_no =random.randint(0,7)
    print(dictionary["colour"][random_no])
    root.configure(background = dictionary["colour"][random_no])

btn = Button(root,text = "Click me", command = bg_change)
btn.place(relx = 0.5, rely =0.5, anchor = CENTER)

root.mainloop()
```

- Write the basic template of tkinter.
- Import the random package of python
- Define a dictionary by storing a key value pair in which:

  Key = "Colours"

  Value =list of colour ["maroon1","lawn green","magenta2","purple1","springgreen2","chocolate1", "deep pink","cyan"]

- Then access the value present in the list of the dictionary by passing the key as colours and the random number generated as index, and store it inside a variable. You are doing this, so that you will be passing the random number generated as the index to the list of colours present in the dictionary to get any random colors.
- You can try printing this random color picked from a dictionary on the console using the print() function.
- Now write the code for setting the background color of the root window as per the random color picked from the dictionary