Chapter

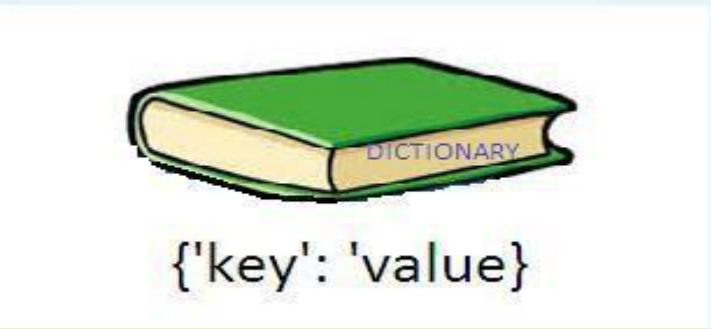
Dictionary

Learning Outcomes

- Dictionary: concept of key-value pair
- Creating
- initializing
- traversing
- updating and deleting elements
- dictionary methods and built-in functions

Introduction

- **Dictionary** is an unordered collection of items where each item consist of a key and a value.
- It is **mutable** (can modify its contents) but Key must be unique and immutable.



Important features of Dictionary

Each key is separated from its value by a colon(:). The items are separated by commas and the entire dictionary is enclosed within curly braces { }.

The value can be of any type but the keys must be of an immutable data type such as strings, numbers or tuples.

a. Creating a Dictionary

The syntax for creating a dictionary is:
<dictionary_name>={"key1":"value1" ",,,key2":"value2",
"key3":"value3"….}

Examples of dictionary

```
>>> d = { }            # empty dictionary

>>> dict1={'W' : 'Winter', 'S' : 'Summer', 'R' : 'Rainy', 'A': 'Autumn'}

>>> print(dict1)
```

a. Creating a Dictionary

Methods to create a dictionary:

1. To create an empty dictionary, put two curly braces.

e.g.

```
>>> d1= { }
>>> type(d1)
<class 'dict'>
```

2. Enclose key-value pairs in curly braces

e.g.

```
>>>  d2={"B " :"Raman","G":"Teresa", "R":"T a g o r e",
"Y":"Kalpana"}
>>> print(d2)
{'B':'Raman','G':'Teresa','R':'Tagore','Y':'Kalpana'}
```

Creating a Dictionary

Add item to dictionary:

To add an item to the dictionary, we use square brackets [ ] for accessing and initializing dictionary values.

```
e.g. d={ }
 d[1]="One"
d[2]="Two"
d[3]="Three”
print(d)
```

{1: 'One', 2: 'Two', 3: 'Three'}

Accessing items a Dictionary

To access dictionary elements you can use square brackets [] along with key to obtain its value.

e.g.

```
dict={'W':'Winter', 'S':'Summer', 'R':'Rainy', 'A':'Autumn'}

print(dict['S'])                    #Summer
print("Season:", dict['S'])         #Season: Summer
```

or

```
print(dict.get('S'))
```

Travesing a Dictionary

Traversing a dictionary means accessing each element of a dictionary. This can be done through loops.

e.g1.

```
dict={1: 'One', 2: 'Two', 3: 'Three'}
for i in dict:
    print(dict[i])
```

Output:

One
Two
Three

e.g2.

```
dict={1: 'One', 2: 'Two', 3: 'Three'}
for i in dict:
    print(i,':',dict[i])
```

Output:

1 : One
2 : Two
3 : Three

Travesing a Dictionary

e.g3.

```
d2={„B":"Raman","G":"Teresa","R":"Tagore","Y":"Kalpan
a"}
for i in d2:
    print(i,':',d2[i])
```

Output:

G : Teresa
B : Raman
Y : Kalpana
R : Tagore

e.g4.

```
d3={'Rno': 1, 'Name': 'Aman','Class':'XI','Marks': 90}
for i in d3:
   print(i,':',d3[i])
```

Output:

Name : Aman
Rno : 1
Class : XI
Marks : 90

Program to create a dictionary using user input.

- One dictionary and we need to store multiple values:
- Rollno, class, name, marks
- {Rollno: [class, name, marks], rollno: [class, name, marks], rollno:[class, name, marks]}
- classXI={}// classXI=dict()
- n=int(input("enter the number of students"))
- i=1

while(i<=n):

- Rollno=input("enter roll number")
- Class=input("enter class")
- Name=input("enter name")
- Marks=input("enter marks")
- B=[class, name, marks]
- classXI[rollno]=B
- i+=1

for i in classXI:

print(i, ": ", classXI[i])

Appending Values in a Dictionary

You can add element to an existing dictionary.

e.g.

```
d1={'mon':'Monday','tue':'Tuesaday'}
d1['wed']='Wednesday'
print(d1)
```

OUTPUT

```
{'tue': 'Tuesday', 'wed': 'Wednesday', 'mon': 'Monday'}
```

Updating Dictionary Elements

We can change the individual element of dictionary.

e.g.

```
dict={'Subject':'Informatics Practices','Class':11}
dict['Subject']='computer science'
print(dict)
```

OUTPUT

{'Class':11, 'Subject':'computer science'}

Updating Dictionary Elements

Two dictionaries can be merged into one by using update() method.

e.g.1

```
d1={1:10, 2:20, 3:30}
d2={4:40,5:50}
d1.update(d2)
print(d1)
```

OUTPUT

{1: 10, 2: 20, 3: 30, 4: 40, 5: 50}

Updating Dictionary Elements

e.g.2

```
d1={1:10, 2:20, 3:30}
d2={2:40}
d1.update(d2)
print(d1)
```

OUTPUT

```
{1: 10, 2: 40, 3: 30}
```

Deleting Dictionary Elements

We can remove an item from the existing dictionary using del command or pop() method.

Deleting Dictionary Elements

del

We pass the key we want to remove. It removes both the key and its associated value. Only one entry can be removed at a time.

e.g. of del

```
dict= {'Subject': 'Informatics Practices', 'Class':
11}  print('Items in dictionary:', dict)
  del dict['Class']                    # delete single element
  print('After Deletion:',dict)
  del dict                             #delete whole dictionary
  print(dict)
```

Output

```
Items in dictionary: {'Class': 11, 'Subject': 'Informatics Practices'}
After Deletion: {'Subject': 'Informatics Practices'}
<class 'dict'>
```

Deleting Dictionary Elements

Pop()

pop() method is used to remove a particular item in a dictionary but it also returns the deleted value.

e.g. of pop()

```
d1={'mon':'Monday','tue':'Tuesday','wed':'Wednesday'}
a=d1.pop('wed')
print(a)
 or
print(d1.pop('w
ed')
print(d1)
```

Output

'Wednesday'

{'tue': 'Tuesday', 'mon': 'Monday'}

‘in’ and ‘not in’ Membership operator

It checks whether a particular key is there in dictionary. If found it returns true otherwise false.

e.g.

```
>>> d1={'mon':'Monday','tue':'Tuesaday','wed':'Wednesday'}
>>> 'wed' in d1
True
>>> 'sat' in d1
False
```

Common dictionary functions and methods

Function	Description	Exmaple
len()	This method returns number of key-value pairs in the given dictionary.	>>> d1={'mon':'Monday', 'tue':'Tuesday', 'wed':'Wednesday'} >>> len(d1) 3
clear()	It removes all items from the particular dictionary.	>>> d1={'mon':'Monday', 'tue':'Tuesday', 'wed':'Wednesday'} >>> d1.clear()

items()	It returns the content of dictionary as a list of key and value. The key and value pair will be in the form of a tuple, which is not in any particular order.	>>> d1={'mon':'Monday', 'tue':'Tuesday', 'wed':'Wednesday'}
		>>> d1.items()
		
		dict_items([('mon', 'Monday'), ('tue', 'Tuesday'), ('wed', 'Wednesday')])

Common dictionary functions and methods

Function	Description	Example

keys()	It returns a list of the key values in a dictionary, , which is not in any particular order.	>>> d1={'mon':'Monday', 'tue':'Tuesday', 'wed':'Wednesday'}
		>>> d.keys()
		
		dict_keys(['mon', 'wed', 'tue'])

values()	It returns list of values from key-value pairs in a dictionary which is not in any particular order.	>>> d1={'mon':'Monday', 'tue':'Tuesday', 'wed':'Wednesday'}
		>>> d1.values()
		
		dict_values(['Wednesday', 'Tuesday', 'Monday'])

cmp ( )	This is used to check whether the given dictionaries are same or not.
	If both are same, it will return 'zero',
	If the first dictionary having more number of items, then it will return 1, otherwise return -1.
		>>>d1={'B':'Raman','G':'Teresa','R':'Tagore','Y':'Kalpana'}
		>>>d2={'B':'Raman','G':'Teresa','R':'Tagore','Y':'Kalpana'}
		>>>d3={'B':'Raman','G':'Teresa'}
		>>> cmp(D1,D3) #both are not equal
		1
		>>> cmp(D1,D2) #both are equal
		0

Examples

1. Write a python program to input ‘n’ names and phone numbers to store it in a dictionary

Code

```
phonebook={}
n=int(input("Enter total number of friends:"))
i=1
while(i<=n):
    a=input("enter name")
    b=int(input("enter phone number"))
    phonebook[a]=b
    i=i+1

print(phonebook)
```

2. Write a python program to input ‘n’ names and phone numbers to store it in a dictionary and to input any name to search and print the phone number of that particular name.

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Code

```
phonebook={}
n=int(input("Enter total number of friends:"))
i=1
while(i<=n):
    a=input("enter name")
    b=int(input("enter phone number"))
    phonebook[a]=b
    i=i+1


print("---------------------------------")
name=input("Enter name to search:")
f=0
k=phonebook.keys()
for i in k:
    if(i==name):
        print("Phone number= ",phonebook[i])
        f=1
if (f==0):
    print("Given name not exist")
```

3. Write the output for the following Python codes.

```
A={1:100,2:200,3:300,4:400,5:500}
print A.items()
print A.keys()
print A.values()
```

Output:

dict_items([(1, 100), (2, 200), (3, 300), (4, 400), (5, 500)])
dict_keys([1, 2, 3, 4, 5])
dict_values([100, 200, 300, 400, 500])

4. Write a program to create a phone book and delete particular phone number using name.

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Code

```
phonebook=dict()
n=int(input("Enter total number of friends:"))
i=1
while(i<=n):
    a=input("enter name")
    b=int(input("enter phone number"))
    phonebook[a]=b
    i=i+1
print("----------------------------")
name=input("Enter name to delete:")
del phonebook[name]

k=phonebook.keys()
print("Phonebook Information")
print("----------------------")
print("Name",'\t',"Phone number")
for i in k:
    print(i,'\t', phonebook[i])
```

Revision:
How to create a dictionary:

```
classXI={}
classXI={'R': 'Walsh', 'B': 'Ward', 'G': ' Ball', 'Y': 'Hart'}
```

Printing the dictionary:

```
print(classXI)  {'R': 'Walsh', 'B': 'Ward', 'G': ' Ball', 'Y': 'Hart'}
```

R: Walsh
B: Ward
G: Ball
Y: Hart

```
for i in classXI:
        print(i, ":", classXI[i])
```

Q) To create a dictionary to store employee names and their number and print the dictionary.

```
Employee={}
Employee={' Riya': 5363673, 'Siya': 689776678, 'Ram': 567788768}
print(Employee)
for i in Employee:
     print(i, ":", Employee[i])
```

5. Write a program to input ‘n’ employee number and name and to display all employee’s information in ascending order based upon their number.

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Code

```
empinfo=dict()
n=int(input("Enter total number of employees"))
i=1
while(i<=n):
        a=int(input("enter number"))
        b=input("enter name")
        empinfo[a]=b
        i=i+1

k=list(empinfo.keys())
k.sort()

print("Employee Information")
print("Emp No",'\t',"Employee Name")
for i in k:
        print(i,'\t',empinfo[i])
```

6. To input total number of sections and stream name and display information

```
class11={}
n=int(input("Enter total number of sections in class 11:"))
i=1
while(i<=n):
    a=input("Enter Section:")
    b=input("Enter Stream:")
    class11[a]=b
    i=i+1
print("Class",'\t',"Section",'\t',"Stream name")
for sec in class11:
    print('XI','\t',sec,'\t',class11[sec])
```

Practice Question:
Create a dictionary to input names of n countries , their capitals and currency, store it in a dictionary and display it in tabular form. Also search and display information for a particular country.

```
for i in country:
    print(i, '\t',  country[i])
```

Accessing item from dictionary:
Key=input("enter the name of the country whose information you need")
print(dictname[key])
or
print(dictname.get(key))