

Chapter-7: File Handling

File Handling -> Binary File

In this tutorial we will discuss the following topics

S. No.	Topics
1	Binary Files
2	Python: pickle module
3	Writing Instance onto a file –Using pickle.dump()
4	Reading Instance from a binary file –Using pickle.load()
5	Operations performed using Binary files:

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Python: File Handling -> Binary Files

What is Binary file?

- In this type of file, there is no terminator for a line and the data is stored after converting it into machine understandable binary language.
- Operations on binary files are faster as no translation required.
- Image files such as .jpg, .png, .gif, etc., and documents such as .doc, .xls, .pdf, etc., all of them constitute binary files.

Some of the most common access modes are listed below:

Binary File Mode	Use	Description
'rb'	Read only	This is the default mode. It Opens file for reading. File must exists, otherwise Python raises I/O errors
'wb'	Write only	This Mode Opens file for writing. If file does not exist, it creates a new file. If file exists it truncates the file.
'ab'	Append	File is in write mode only, new data will be added to the end of existing data i.e. no overwriting. If file not exists it creates a new file
'r+b' or 'rb+'	Read and write	File must exists otherwise error is raised Both reading and writing can take place
'w+b' or 'wb+'	Write and read	File is created if not exists, if exists data will be truncated, both read and write allowed
'a+b' or 'ab+'	Write and read	Same as above but previous content will be retained and both read and write.
'xb'	Write	Opens a file for exclusive creation. If the file already exists, the operation fails.
'xb+'	Write and read	Similar to w+ as it will create a new file if the file does not exist. Otherwise, will raise FileExistsError .

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Python: pickle module

- Sometimes we need to write and read structure objects such as dictionary, list and the objects/instance of a class on a file.
- Python has a module which does this work for us and is extremely easy to use. This module is called ***pickle***.
- It provides us with the ability to ***serialize (by using `dump ()` method)*** and ***deserialize (by using `load ()` method)*** objects, i.e., to convert objects into ***bitstreams*** which can be stored into files and later be used to reconstruct the original objects.
- There are some data types which pickle cannot serialize, but it is still capable of serializing most of the objects typically used in Python programs. A comprehensive list of data types which pickle can serialize.
 - None, True, and False
 - integers, floating point numbers, complex numbers
 - strings, bytes, bytearray
 - tuples, lists, sets, and dictionaries containing only picklable objects
 - functions defined at the top level of a module (using **`def`**, not **`lambda`**)
 - built-in functions defined at the top level of a module
 - classes that are defined at the top level of a module

In order to work with pickle module, you must **import** **pickle** in your program.

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Writing Instance onto a file -Using pickle.dump()

- **pickle.dump()** function to store the object data to the file.
- **pickle.dump()** method is used to write object in the file or to serialize an object hierarchy.

Syntax of dump ():

pickle.dump(object_to_be_written, fileObject)

Example: Program to write structure, dictionary to the binary file.

```

binary.py - C:\Users\Admin\AppData\Local\Programs\Python\Python36-32\binary.py (3.6.5)
File Edit Format Run Options Window Help
import pickle
# Program to write structure, dictionary to binary file
# An arbitrary collection of objects supported by pickle.
data = {
    'a': [1, 2.0, 3, 4+6j],
    'b': ("character string", b"byte string"),
    'c': {None, True, False}
}

with open('bin_data.dat', 'wb') as f:
    # Pickle the 'data' dictionary.
    pickle.dump(data, f)
Ln: 19 Col: 0
  
```

The contents of the generated binary file are encrypted (serialized) in binary:

```

bin_data.dat - Notepad
File Edit Format View Help
€}q (X      aq ]q1(K G@
K'cbuiltinscomplexq'G@+      G@↑
fq'Rq|eX      bq-X+      character
stringq•Czbyte stringqqtq      X
cqcbuiltinssetq]q? (% Ne...qRq#u.
  
```

Reading Instance from a binary file -Using pickle.load()

- To retrieve pickled data, you have to use **pickle.load()** function to do that.
- **pickle.load()** method **unpickle** or **unserialize** the data coming from the file

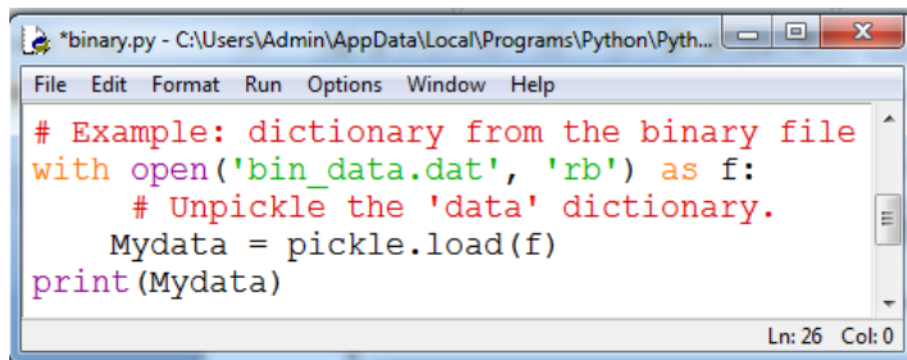
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Syntax of load() :

Object = load (fileObject)

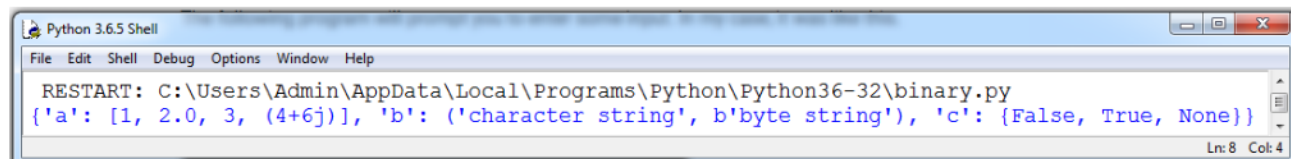
The primary argument of pickle load function is the file object that you get by opening the file in read-binary (**rb**) mode.

Example: To read dictionary from the binary file “ bin_data.dat”



```
*binary.py - C:\Users\Admin\AppData\Local\Programs\Python\Pyth...
File Edit Format Run Options Window Help
# Example: dictionary from the binary file
with open('bin_data.dat', 'rb') as f:
    # Unpickle the 'data' dictionary.
    Mydata = pickle.load(f)
print(Mydata)
Ln: 26 Col: 0
```

OUTPUT:



```
Python 3.6.5 Shell
File Edit Shell Debug Options Window Help
RESTART: C:\Users\Admin\AppData\Local\Programs\Python\Python36-32\binary.py
{'a': [1, 2.0, 3, (4+6j)], 'b': ('character string', b'byte string'), 'c': {False, True, None}}
Ln: 8 Col: 4
```

Operations performed using Binary files:

- a) Reading from Binary file
- b) Writing to Binary File
- c) Appending record (inserting record at the end of the file)
- d) Searching Record in Binary file
- e) Deleting record from Binary file
- f) Copying a file
- g) Modification/ Updation in Binary File.

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```

Editor - D:\Amjad_CS\BinFileOp.py
BinFileOp.py*
1 """
2 @author:learnpython4cbse.com
3 """
4 import pickle
5 # Example: Program to perform all basic operation using dict
6 # onn binay file
7 # 1. Inserting/Appending
8 # 2. Reading/Display
9 # 3. Updating/Modify
10 # 4. Seaching
11 # 5. Deleting
12
13 def Writerecord(sroll,sname,sperc,sremark):
14     with open ('StudentRecord.dat','ab') as Myfile:
15         srecord={"SROLL":sroll,"SNAME":sname,"SPERC":sperc,
16                 "SREMARKS":sremark}
17         pickle.dump(srecord,Myfile)
18
19 def Readrecord():
20     with open ('StudentRecord.dat','rb') as Myfile:
21         print("\n-----DISPALY STUDENTS DETAILS-----")
22         print("\nRoll No.",' ','Name','\t',end='')
23         print('Percetage',' ','Remarks')
24         while True:
25             try:
26                 rec=pickle.load(Myfile)
27                 print(' ',rec['SROLL'],'\t ',rec['SNAME'],'\t ',end=
28                 print(rec['SPERC'],'\t ',rec['SREMARKS']))
29             except EOFError:
30                 break
31 def Input():
32     n=int(input("How many records you want to create :"))
33     for ctr in range(n):
34         sroll=int(input("Enter Roll No"))
35         sname=input("Enter Name: ")
36         sperc=float(input("Enter Percentage: "))
37         sremark=input("Enter Remark: ")
38         Writerecord(sroll,sname,sperc,sremark)
39
40 def SearchRecord(roll):
41     with open ('StudentRecord.dat','rb') as Myfile:
42         while True:
43             try:
44                 rec=pickle.load(Myfile)
45                 if rec['SROLL']==roll:
46                     print("Roll NO:",rec['SROLL'])
47                     print("Name:",rec['SNAME'])
48                     print("Percentage:",rec['SPERC'])
49                     print("Remarks:",rec['SREMARKS'])
50             except EOFError:
51                 break

```

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```
52
53 def Modify(roll,name,perc,remark):
54     with open ('StudentRecord.dat','rb') as Myfile:
55         newRecord=[]
56         while True:
57             try:
58                 rec=pickle.load(Myfile)
59                 newRecord.append(rec)
60             except EOFError:
61                 break
62         for i in range(len(newRecord)):
63             if newRecord[i]['SROLL']==roll:
64                 newRecord[i]['SNAME']=name
65                 newRecord[i]['SPERC']=perc
66                 newRecord[i]['SREMARKS']=remark
67         with open ('StudentRecord.dat','wb') as Myfile:
68             for j in newRecord:
69                 pickle.dump(j,Myfile)
70
71 def DeleteRecord(roll):
72     with open ('StudentRecord.dat','rb') as Myfile:
73         newRecord=[]
74         while True:
75             try:
76                 rec=pickle.load(Myfile)
77                 newRecord.append(rec)
78             except EOFError:
79                 break
80     with open ('StudentRecord.dat','wb') as Myfile:
81         for i in newRecord:
82             if i['SROLL']==roll:
83                 continue
84             pickle.dump(i,Myfile)
85
86 def main():
87     while True:
88         print('\nYour Choices are: ')
89         print('1.Insert Records')
90         print('2.Dispaly Records')
91         print('3.Search Records (By Roll No)')
92         print('4.Update Records')
93         print('5.Delete Records')
94         print('0.Exit (Enter 0 to exit)')
95         ch=int(input('Enter Your Choice: '))
96         if ch==1:
97             Input()
98         elif ch==2:
99             Readrecord()
100         elif ch==3:
101             r=int(input("Enter a Rollno to be Search"))
102             SearchRecord(r)
103
```

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```
104     elif ch==4:
105         r =int(input("Enter a Rollno to be update: "))
106         name=input("Enter Name to be update: ")
107         perc=float(input("Enter Percentage to be update: "))
108         remark=input("Enter remarks to be update: ")
109         Modify(r,name,perc,remark)
110     elif ch==5:
111         r =int(input("Enter a Rollno to be delete: "))
112         DeleteRecord(r)
113     else:
114         break
115 main()
116
```

OUTPUT: on next page

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```

In [1]: runfile('D:/Amjad_CS/BinFileOp.py',
wdir='D:/Amjad_CS')

Your Choices are:
1.Insert Records
2.Dispaly Records
3.Search Records (By Roll No)
4.Update Records
5.Delete Records
0.Exit (Enter 0 to exit)

Enter Your Choice: 1

How many records you want to create :2

Enter Roll No: 1

Enter Name: amit

Enter Percentage: 89

Enter Remark: Good

Enter Roll No: 2

Enter Name: Amaan

Enter Percentage: 90

Enter Remark: V Good

Your Choices are:
1.Insert Records
2.Dispaly Records
3.Search Records (By Roll No)
4.Update Records
5.Delete Records
0.Exit (Enter 0 to exit)

Enter Your Choice: 2

-----DISPALY STUDENTS DETAILS-----

Roll No.   Name      Percetage  Remarks
1          amit      89.0       Good
2          Amaan    90.0       V Good

```

```

Your Choices are:
1.Insert Records
2.Dispaly Records
3.Search Records (By Roll No)
4.Update Records
5.Delete Records
0.Exit (Enter 0 to exit)

Enter Your Choice: 3

Enter a Rollno to be Search: 2
Roll NO: 2
Name: Amaan
Percentage: 90.0
Remarks: V Good

Your Choices are:
1.Insert Records
2.Dispaly Records
3.Search Records (By Roll No)
4.Update Records
5.Delete Records
0.Exit (Enter 0 to exit)

Enter Your Choice: 4

Enter a Rollno to be update: 2

Enter Name to be update: Amaan Ali

Enter Percentage to be update: 90

Enter remarks to be update: V Good

Your Choices are:
1.Insert Records
2.Dispaly Records
3.Search Records (By Roll No)
4.Update Records
5.Delete Records
0.Exit (Enter 0 to exit)

Enter Your Choice: 2

-----DISPALY STUDENTS DETAILS-----

Roll No.   Name      Percetage  Remarks
1          amit      89.0       Good
2          Amaan    90.0       V Good

```

```

issions: RW  -lines: CRLF  iding: ASCII  Lin 21 Col 50 Mem 76 %
issions: RW  -lines: CRLF  iding: ASCII  Lin 21 Col 50 Mem 77 %

```

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Your Choices are:

- 1.Insert Records
- 2.Dispaly Records
- 3.Search Records (By Roll No)
- 4.Update Records
- 5.Delete Records
- 0.Exit (Enter 0 to exit)

Enter Your Choice: 5

Enter a Rollno to be delete: 1

Your Choices are:

- 1.Insert Records
- 2.Dispaly Records
- 3.Search Records (By Roll No)
- 4.Update Records
- 5.Delete Records
- 0.Exit (Enter 0 to exit)

Enter Your Choice: 2

-----DISPALY STUDENTS DETAILS-----

Roll No.	Name	Percetage	Remarks
2	Amaan Ali	90.0	V Good

Your Choices are:

- 1.Insert Records
- 2.Dispaly Records
- 3.Search Records (By Roll No)
- 4.Update Records
- 5.Delete Records
- 0.Exit (Enter 0 to exit)

Enter Your Choice: 0

In [2]:

issions: RW -lines: CRLF iding: ASCII Lin 21 Col 50 Mem 77 %