Chapter 6. Files and Exceptions

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Python Programming

1. Opening a file

- Example
  - f = open("test.txt")
    # equivalent to 'r' or 'rt’
  - f = open("test.txt",'w’)
    # write in text mode
  - f = open("img.bmp",'r+b’)
    # read and write in binary mode

1. Opening a file

Mode	Description
r	Opens a file for reading. (default)
w	Opens a file for writing. Creates a new file if it does not exist or truncates the file if it exists.
x	Opens a file for exclusive creation. If the file already exists, the operation fails.
a	Opens a file for appending at the end of the file without truncating it. Creates a new file if it does not exist.
t	Opens in text mode. (default)
b	Opens in binary mode.
+	Opens a file for reading and writing

1. Opening a file

- Try to open a file
  - if the file does not exist
- When it fails to open a file
  - how do you handle this?
- Try to open a file with “write mode”
  - if the file does not exist
  - if the file exist, and there are some contents in the file

1. Opening a file

- To Check the open status, recommend to use try-except clause
  - Try - Except

```
try:
     f = open("notexist.txt")
except Exception as e:
     print ("File Open Error")
     print (e)
else:
     result = f.read()
     print (result)
```

2. Read a file

read()	**read all text from a file into a string. This method is useful if you have a small file and you want to manipulate the whole text of that file.**
readline()	read the text file line by line and return all the lines as strings.
readlines()	read all the lines of the text file and return them as a list of strings.

- Example
  - make a program to read all lines in the file "student.txt"

Example code 1

```
f = open("student.txt")

r = f.read(10)
print (r)
r = f.read()
print (r)
```

Example code 2

```
with open("student.txt") as fileobj:
    for line in fileobj:
        print ("Read Line: ", line)
```

Example code 3

```
with open("student.txt") as f:
    rows = f.readlines()
print (rows)
```

3. Write to a file

- Write your data into file
  - How to store the numeric value into a text file

```
firstname = "John"
lastname = "Lee"

with open("studentinfo.txt", 'w') as f:
     f.writelines(firstname+"\n")
     f.writelines(lastname+"\n")
```

```
sid = 100;
sname = "John"
scores = [100, 200, 300]
with open("studentinfo.txt", 'w') as f:
     f.write(str(sid)+"\t")
     f.write(sname+"\t")
     f.write(" ".join(map(str,scores)))
     # f.write(str(scores))
```

4. Programming Lab

- Problem Definition
  - Read all lines from a “student.txt” file
  - Build up the dictionary according to the data from a file
  - Create a excel file and write your dictionary data to the excel file

student.txt

```
First Last        English     Math  Physics
James Lopez       100   90    80
Kurt Hertz        100   100   100
Kim  Bosch        100   90    90
Audrey Heinz      100   100   100
Linda Quoz        100   90    90
```

First	Last	English	Math	Physics
Kurt	Hertz	100	100	100
Kim	Bosch	100	90	90
Audrey	Heinz	100	100	100
Linda	Quoz	100	90	90

student.xls

1 **read and build the list of dictionary**

```
[{'First': 'James', 'Last': 'Lopez', 'English': '100', 'Math': '90', 'Physics': '80’},
{'First': 'Kurt', 'Last': 'Hertz', 'English': '100', 'Math': '100', 'Physics': '100'},
{'First': 'Kim', 'Last': '', 'English': 'Bosch', 'Math': '100', 'Physics': '90'},
{'First': 'Audrey', 'Last': 'Heinz', 'English': '100', 'Math': '100', 'Physics':
'100'}, {'First': 'Linda', 'Last': 'Quoz', 'English': '100', 'Math': '90', 'Physics':
'90'}]
```

4. Programming Lab

1 • Read all lines and Build up Dictionary

student.txt

```
First Last        English     Math  Physics
James Lopez       100   90    80
Kurt Hertz        100   100   100
Kim  Bosch        100   90    90
Audrey Heinz      100   100   100
Linda Quoz        100   90    90
```

```
header = ['first', 'last', 'English', 'Math', 'Physics']


d = {}
d[header[0]] = first item from the line that was read from a file
```

read and build the list of dictionary

```
[{'First': 'James', 'Last': 'Lopez', 'English': '100', 'Math': '90', 'Physics': '80'},
{'First': 'Kurt', 'Last': 'Hertz', 'English': '100', 'Math': '100', 'Physics': '100'},
{'First': 'Kim', 'Last': '', 'English': 'Bosch', 'Math': '100', 'Physics': '90'},
{'First': 'Audrey', 'Last': 'Heinz', 'English': '100', 'Math': '100', 'Physics':
'100'}, {'First': 'Linda', 'Last': 'Quoz', 'English': '100', 'Math': '90', 'Physics':
'90'}]
```

4. Programming Lab

2 • from the dictionary to the Excel file

- import xlwt

```
import xlwt

wb = xlwt.Workbook()
ws = wb.add_sheet('Student')

for i in range(len(header)):
      ws.write(0, i, header[i])
# more code to write the list of dictionary to the Excel file
wb.save('student.xls')
```

```
[{'First': 'James', 'Last': 'Lopez', 'English': '100', 'Math': '90', 'Physics': '80'},
{'First': 'Kurt', 'Last': 'Hertz', 'English': '100', 'Math': '100', 'Physics': '100'},
{'First': 'Kim', 'Last': '', 'English': 'Bosch', 'Math': '100', 'Physics': '90'},
{'First': 'Audrey', 'Last': 'Heinz', 'English': '100', 'Math': '100', 'Physics':
'100'}, {'First': 'Linda', 'Last': 'Quoz', 'English': '100', 'Math': '90', 'Physics':
'90'}]
```

First	Last	English	Math	Physics
Kurt	Hertz	100	100	100
Kim	Bosch	100	90	90
Audrey	Heinz	100	100	100
Linda	Quoz	100	90	90

student.xls