



Computer Science

File handling



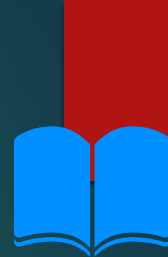
Lesson Objectives

Students will learn:

- Different file operations in Python programming language
- Example program to analyse data in a file

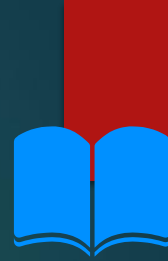
A large, stylized blue number '1.' is positioned in the upper right corner. A solid red vertical bar is located above the dot of the number.

Content



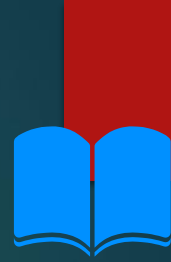
Introduction

- Data used in programs is lost once the program is closed.
- To access data even when programs are closed, files are used.
- Data from programs are written to files and stored.



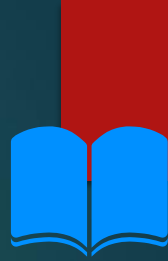
Using data files

- To use a data file, the program needs:
 - ✓ Name of a file
 - ✓ Its location
 - ✓ What operation is to be performed? (Read/ Write)
 - ✓ A communication channel



File commands

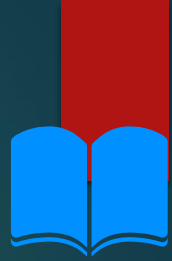
- File commands in programming languages are designed to perform the following operations:
 - ✓ Open the file for read/write operation. In case, the file does not exist for a write operation, it is created.
 - ✓ Close a file
 - ✓ Identify the end of file.



Example: Pseudocode to write data into a file

- Data of the first 10 elements from a one-dimensional array can be stored to file using this pseudocode.
- data is the one-dimensional array. Using a for loop, each data is saved to newfile.dat

```
open for write access newfile.dat  
for i= 0 to 9  
    write to file data(i)  
    next i  
close newfile.dat
```



Example: Pseudocode to read data from a file

- Data of the first 10 elements from stored in a file is read.
- data is the one-dimensional array.

```
open for read access newfile.dat  
j=0  
while not end of file  
    read from file to data(j)  
    j=j+1  
endwhile  
close newfile.dat
```




Python code for file operations

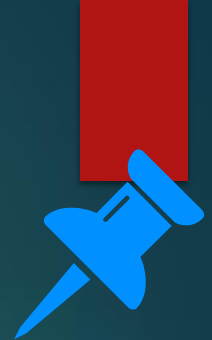
- The Python code to open a file and write data is:

with open("test.txt", 'w') as f:

f.write("This is my first file\n")

f.write("I am using Python\n")

f.write("It is easy")



Python code: Write operation

- When this code has executed the line: This is my first file is written in the file text.txt.
- In case the file does not exist, a new txt file with name test is created.
- The letter 'w' in the open method represents the write mode

with open("test.txt",'w') as f:

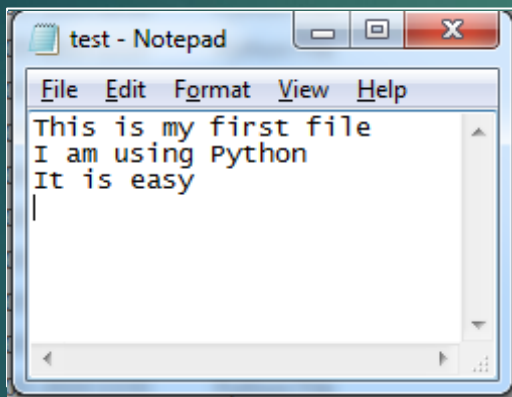
f.write("This is my first file\n")

f.write("I am using Python\n")

f.write("It is easy")



test.txt after executing the code

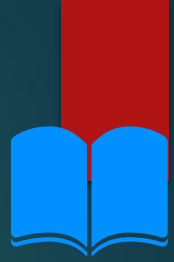


with open("test.txt",'w') as f:

f.write("This is my first file\n")

f.write("I am using Python\n")

f.write("It is easy")



'w' mode

- It is important to use 'w' mode carefully as the previously saved data is lost.
- To keep the previously saved data safe, the file is opened in append mode ('a'). This mode does not overwrite the previous data.

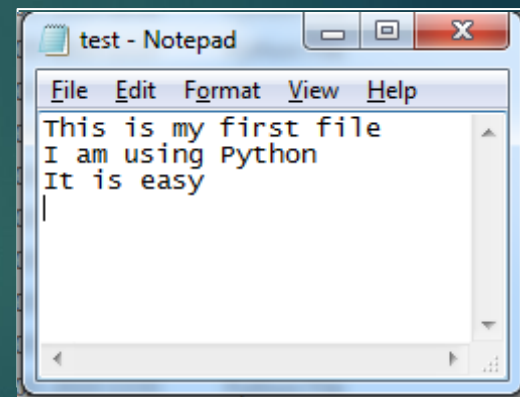


Python code: Read operation

- The Python code to open a file is:

```
f=open("test.txt",'r')
```

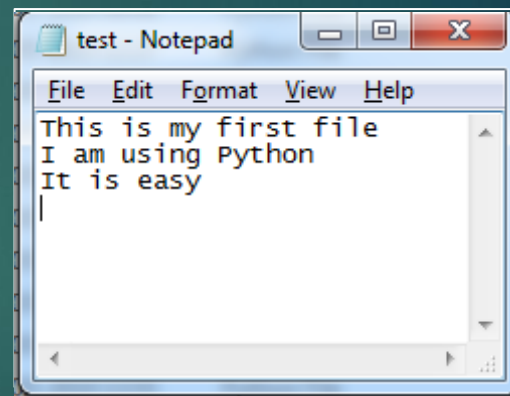
- *f.read(1) returns the first character. In this case, 'T'.*
- *f.read(4) returns the next four character. In this case, 'his '.*
- *f.read() reads the rest of the complete data in the file.*
- *Further f.read() returns empty string ''*





Python code: Read operation

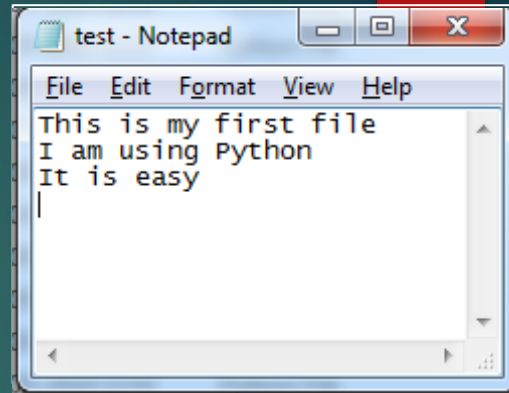
```
>>> f=open("test.txt", 'r')
>>> f.read(1)
'T'
>>> f.read(4)
'his '
>>> f.read()
'is my first file\nI am using Python\nIt is easy'
>>> f.read()
''
```



Python code: Example 1

- Python program to print contents of a file line by line is given.
- The output is:

```
This is my first file  
I am using Python  
It is easy
```



```
with open("test.txt") as f:  
    for line in f:  
        print(line, end=")
```

Python code: Example 2

- Python program to count all occurrences of a string in a file is given.
- Output:

```
Enter string to be searched: is
Total occurrences: 2
```

```
Enter string to be searched: This
Total occurrences: 1
```

```
string=str(input("Enter string to be searched: "))
x=0
with open("test.txt") as f:
    for line in f:
        words=line.split()
        for i in words:
            if (i==string):
                x=x+1
print("Total occurrences: ",x)
```

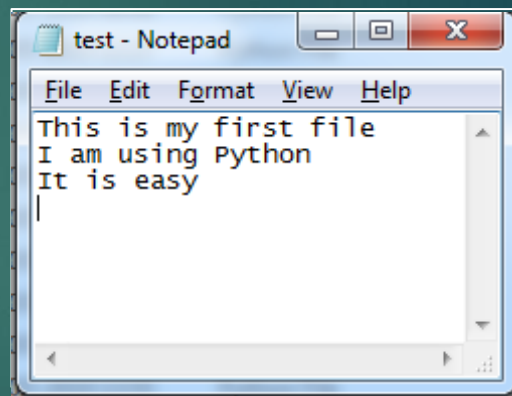



Python code: Example 2

Output:

```
Enter string to be searched: is
Total occurrences: 2
```

```
Enter string to be searched: This
Total occurrences: 1
```





Let's review some concepts

Different modes to open a file

'w'-write mode
'a'-append mode
'r'-read mode

Printing contents of a file line by line:

```
with open("test.txt") as f:  
    for line in f:  
        print(line, end="")
```

Methods for file operations in Python

Open
Read
Write
Close



2.


Activity



Activity-1

Duration: 15 minutes

1. Create a Python program to find whether a string is present in a file or not. If yes, print the line in which the string is present.
2. Create a Python program to count the total number of words in a file.



3.

End of topic questions



End of topic questions

1. What is the significance of using files in programming?
2. Write down the pseudocode for accessing a file to read its data to a one-dimensional array.
3. What are the different file mode available to open a file?
4. What happens when you access a file that does not exist in write mode?
5. Why should we be careful while using write mode in important files? How is this problem solved?

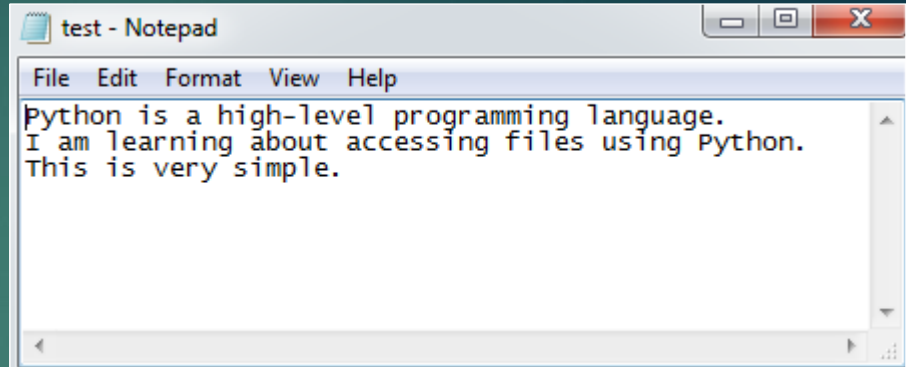
6. test.txt is opened.

```
f=open("test.txt",'r')
```

Here are the contents of test.txt.

What are the results of the following commands?

- a) `f.read(6)`
- b) After executing `f.read(6)`, `f.read(10)` is entered
- c) After executing both (a) & (b), `f.read()` is entered
- d) After executing (a), (b) and (c), `f.read()` is entered





End of topic questions

7. How do you print the contents of a file line by line?



CREDIT

- Teach Computer Science