Day 30

File IO in Python:

What is File I/O?

File I/O means:

- Input → Reading data from a file
- Output → Writing data to a file

Files allow data to be stored permanently, unlike variables (temporary).

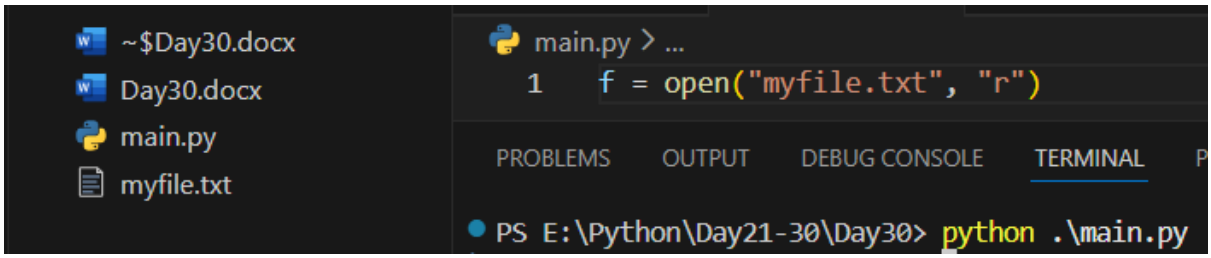
Types of Files

Python mainly works with:

1. Text files → .txt, .csv, .log
2. Binary files → .jpg, .pdf, .exe

Operation	Method
Open file	open()
Read	read(), readline(), readlines()
Write	write(), writelines()
Close	close()
Best practice	with open()

Example: opening the file.



Example: reading the content of myfile.txt

```
1   f = open("myfile.txt", "r")
2   text = f.read()
3   print(text)
4   f.close()
```

```
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PS E:\Python\Day21-30\Day30> python .\main.py
Aditya is a boy.
```
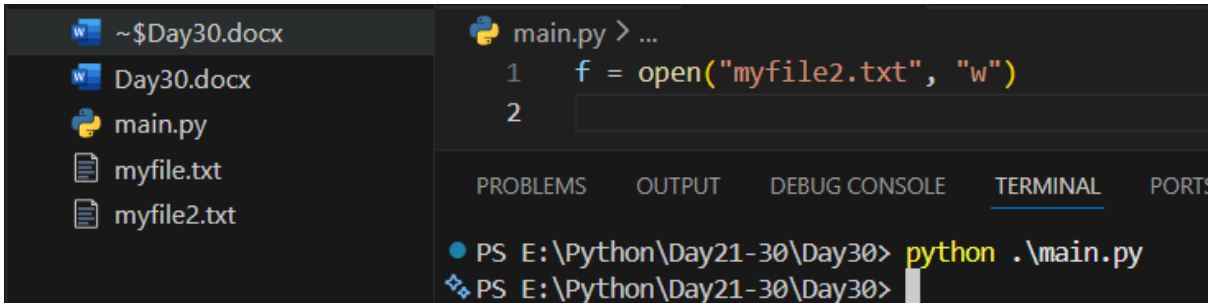
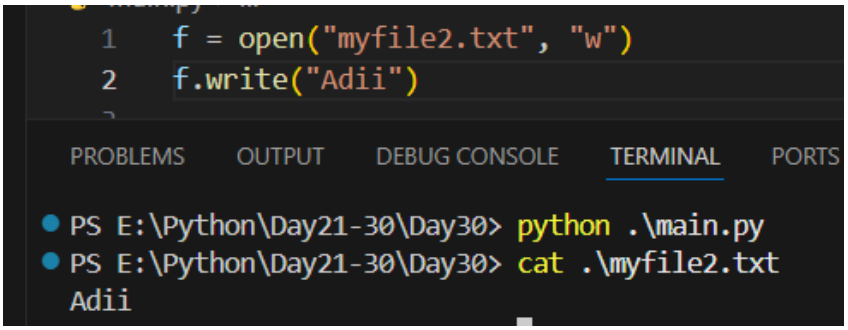

Common File Modes

Mode	Meaning
r	Read (default)
w	Write (overwrite)
a	Append
x	Create new file
r+	Read + Write
b	Binary mode
t	Text mode (default)

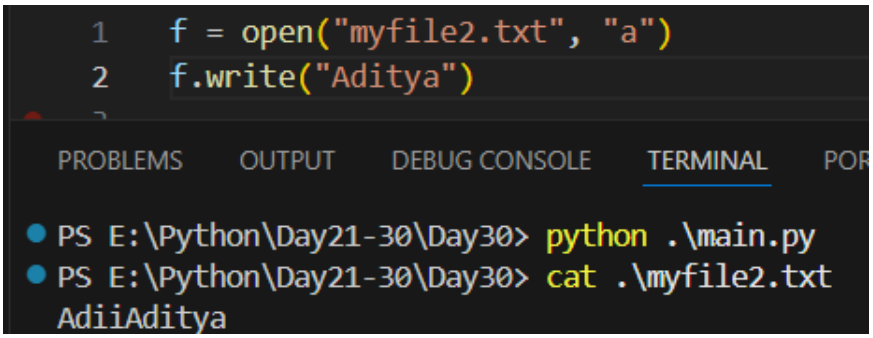
Example: if we open a file which doesn't exists in 'w' mode, then that file automatically get created.



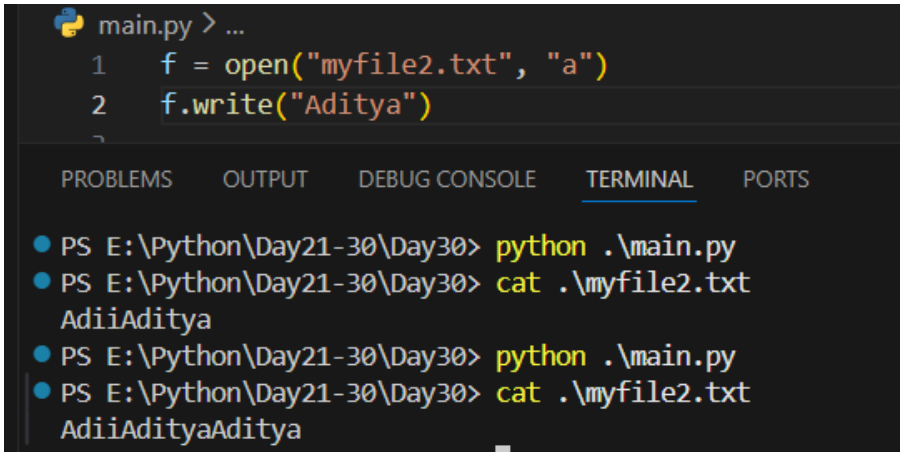
Example: writing in the file.



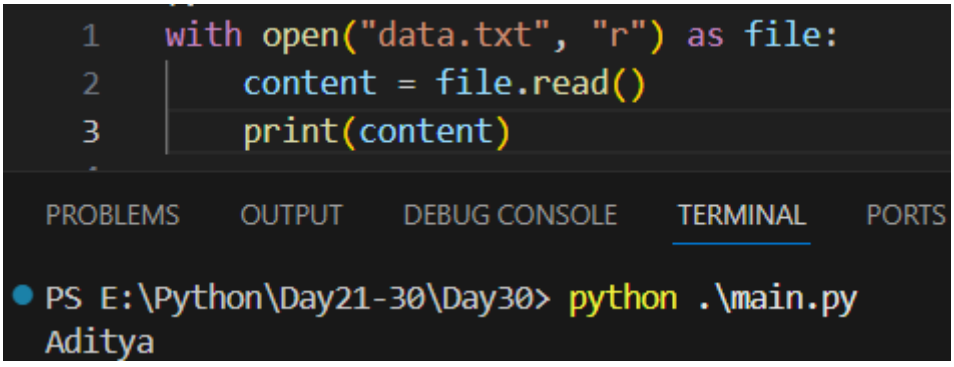
Example: appending in the file.



Example: the number of times we run the code, the number of times it get appended.



Example: **Using with Statement (Best Practice):** Automatically closes the file.



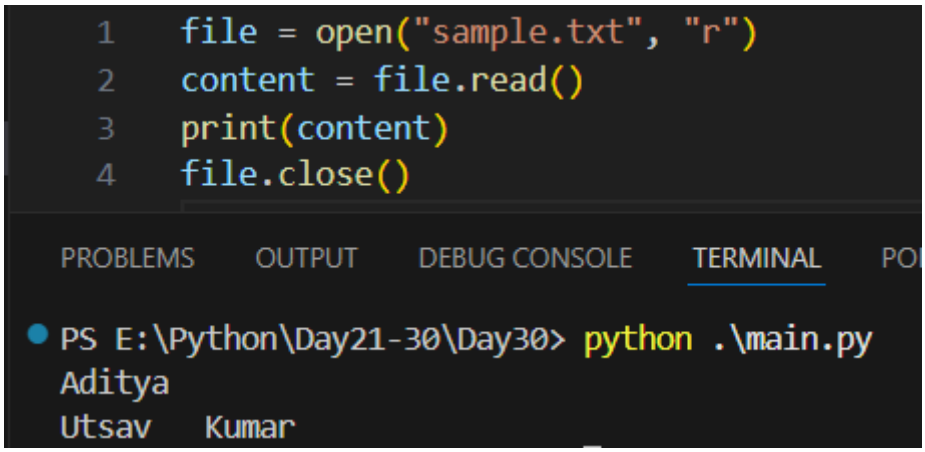
read(), readlines() and other methods:

Before reading, a file must be opened in read mode (r).

read()

- Reads entire file content as one single string
- Can also read a specific number of characters

Example: basic reading of the file.



Example: reading the first ten characters.

readline()

- Reads one line at a time
- Cursor moves to the next line automatically

Example: basic use of readline()

```
7   file = open("sample.txt", "r")
8   line1 = file.readline()
9   line2 = file.readline()
10  print(line1)
11  print(line2)
12  file.close()
```

```
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PS E:\Python\Day21-30\Day30> python .\main.py
Aditya

Utsav   Kumar
```

readlines()

- Reads all lines at once
- Returns a list of strings

Example: a basic example of readlines()

```
14  file = open("sample.txt", "r")
15  lines = file.readlines()
16  print(lines)
17  file.close()
```

```
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PS E:\Python\Day21-30\Day30> python .\main.py
['Aditya \n', 'Utsav   Kumar\n', 'Pihu']
```

Example: **File Cursor Methods: tell() -** Returns current cursor position.

```
19  with open("sample.txt", "r") as file:
20      print(file.tell())
```

```
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PS E:\Python\Day21-30\Day30> python .\main.py
0
```
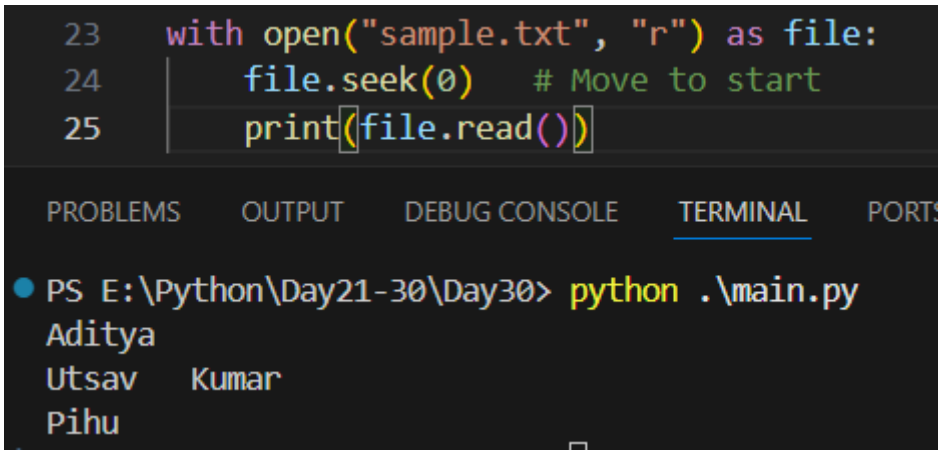

Example: **seek() ->** Moves cursor to a specific position.



Comparison Table

Method	**Returns**	**Reads**	**Memory Usage**
read()	String	Entire file	High
read(n)	String	n characters	Low
readline()	String	One line	Low
readlines()	List	All lines	High
File iteration	String	One line	Very Low

Summary:

- read() → Reads the entire file (or given number of characters) and returns a single string.
- readline() → Reads one line at a time and returns it as a string.
- readlines() → Reads all lines at once and returns them as a list of strings.
- File iteration (for line in file) → Reads the file line-by-line efficiently using minimal memory.
- tell() → Returns the current position of the file cursor.
- seek(pos) → Moves the file cursor to the specified position.
- write() → Writes a string to the file and returns the number of characters written.
- writelines() → Writes a list of strings to the file without adding newlines automatically.
- close() → Closes the file and frees system resources.
- with open() → Automatically opens and closes the file safely (best practice).

--The End--