



IIT Madras

ONLINE DEGREE

Programming in Python
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Reading and Writing to a File

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```
srsriyengar@Sudarshans-Mac pod $ !python
Python 3.9.5 (default, May 4 2021, 03:36:27)
Type 'copyright', 'credits' or 'license' for more information
IPython 7.24.1 -- An enhanced Interactive Python. Type '?' for help.

In [1]: !pwd
/Users/srsriyengar/pod

In [2]: f=open("aytest.txt","w")

In [3]: f.write('Sudarshan ')
Out[3]: 10

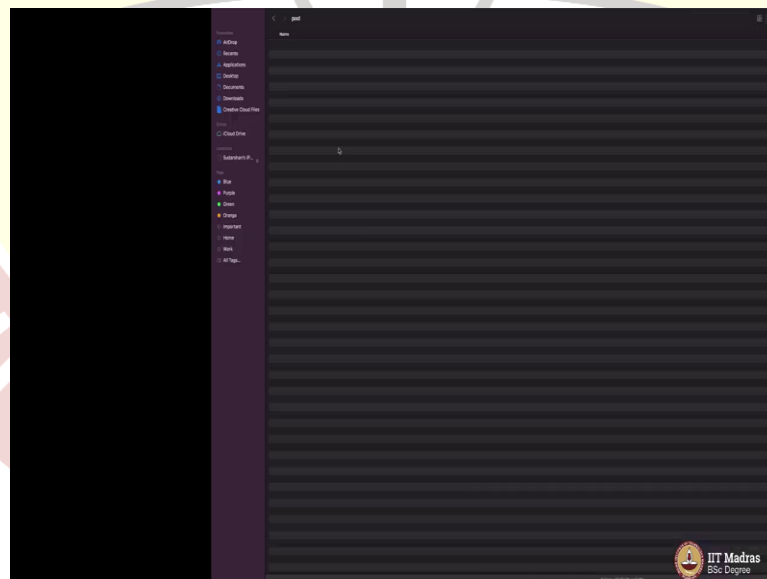
In [4]: f.write('yourname ')
Out[4]: 9

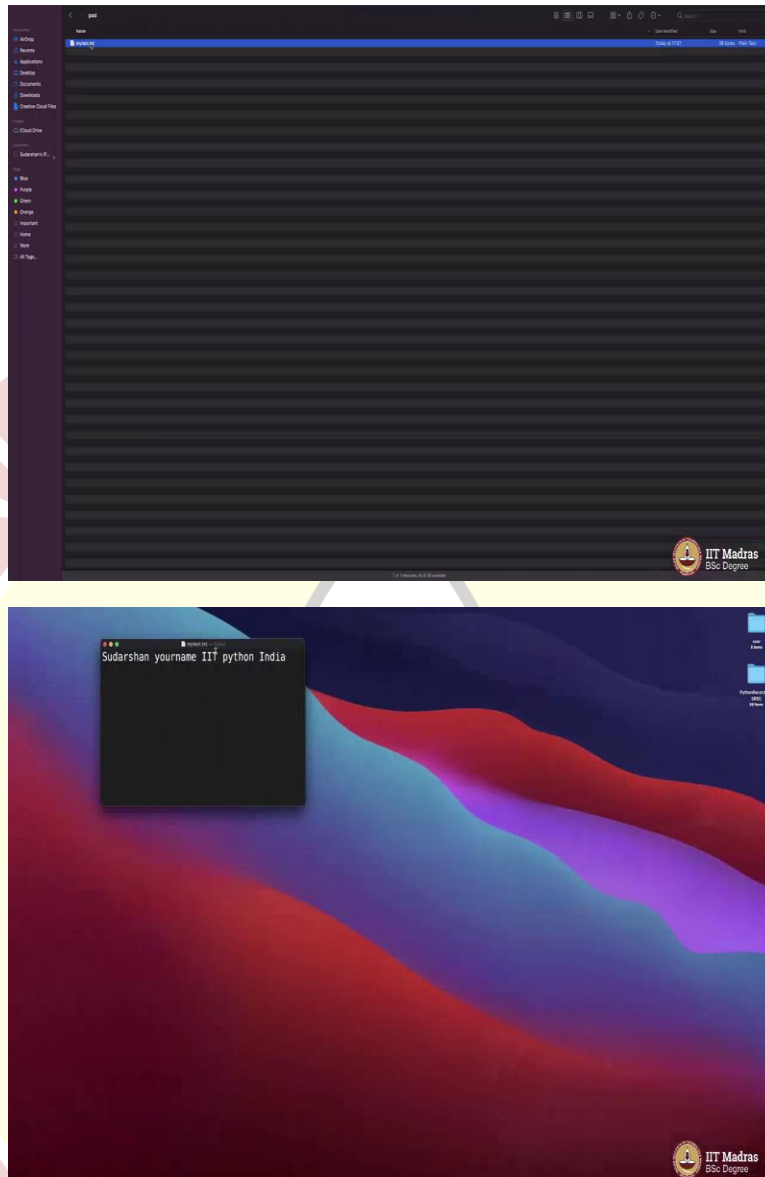
In [5]: f.write('!!! ')
Out[5]: 4

In [6]: f.write('python ')
Out[6]: 7

In [7]: f.write('India ')
Out[7]: 6

In [8]: f.close() ←
In [9]:
```





So, we have an IPython shell here. Depending upon what operating system you are using, a command like present working directory, you should put an exclamation to use the command of your operating system, terminal command. I hope you are familiar with these things. If not, take a look at a small YouTube video. There are loads on terminal commands.

So, this will tell you the directory you are in. I am in users, SRS Iyengar pod. This is a directory I am in. And this directory is currently empty. I have opened the file. This is currently empty. There is nothing in it. Just in case you are using Windows, you may want to use the command `cd` that will show you the current directory.

So, now, I am in this directory. What I will now try to do is I will create a file here in this directory and try to put something in that file. It may appear like a completely useless exercise. But this is to teach you a concept. And with time, you will realize how useful this file handling will be. So, now let me create a file in this directory, which is today as of now empty. The directory's name is pod. It is here.

So, what I do, as I simply say `f equals open`, I will give the name of a file. It can be anything. I will say my text. And give some extension of your choice, maybe I will say `txt`. You can put whatever you want here. And then I will say `w`. In a moment, you will understand what this is. `w` stands for write to this file by opening it and assign this entire task to the simple symbol `f`.

What is this? This is a Python's way of saying, open a text file by name this and in the writing mode. Open a text file like this in the writing, open it and assign that to `f`, as simple as that. So, what we will do is we will go ahead and see what we can do once we create a variable `f` like this. It may sound Greek and Latin to you at this point of time, but do not worry with time it will, you will be very, very comfortable. In fact, this is the easiest part of Python. One or two lines of coding and there you are. You know what is file handling.

So, look at this `f dot write`. What shall I put, of course, my name. I am self obsessed. So, and then maybe your name, whatever that is. And then I will write `IIT`. I am giving space after a word, you will see the reason. And then I will say `Python`. And then I will say `India`. And after this, once you are done, you close the file by saying `f dot close`.

And you know what happens? Let me go back to the directory and then see, look my `text dot txt` is created here. Why did it get created, because I created it here, you see. And I have input all these things. And you will see those things here. Let me double click on it. You see, let me zoom it so that it is clear to you. Do you see?

You have `Sudarshan`, because you stated `Sudarshan` there, where was it, `Sudarshan`, and then you stated your name, and then `IIT` and then `Python` and then `India` with spaces in between. You did that. You see, you put space in between. If you were to not put space, it will come continuously. There will be no space here. All these things will be one next to the other, as simple as this.

So, let us dissect it for a minute. So, what is this line? This line is simply you are creating a file. You are opening it in, what is called the writable mode, that is what w represents. With some time you will realize what is this w doing there. Assign this entire story to the variable f. And then I say use f and write the word Sudarshan, use f and write the word your name to it, use f and write IIT to it.

If you are seeing, there are some numbers getting created here. They are simply the bytes that you are writing. IIT space is four characters. So, it shows four characters there. Python is seven characters, it shows seven here. India space is six characters, it shows six here. And finally you close it. And the file gets closed and it gets written as well. So, now, what if I want to, what, I will do one thing now. I will clear this.

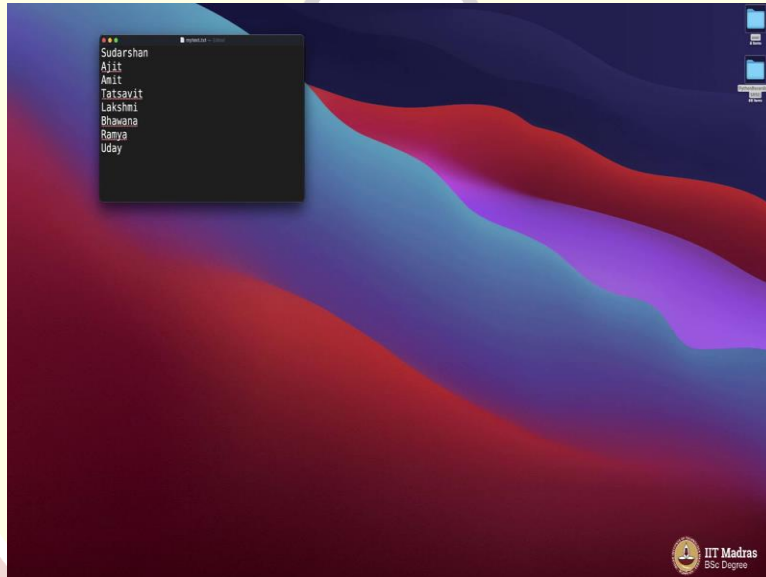
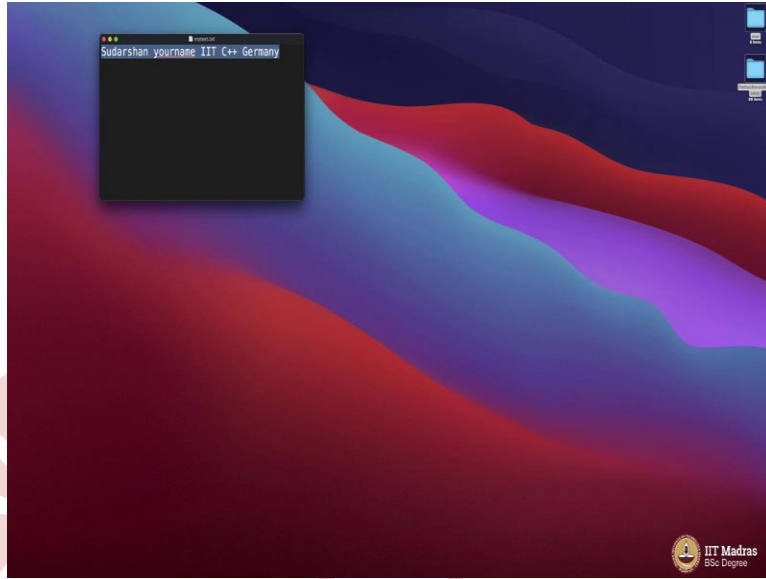
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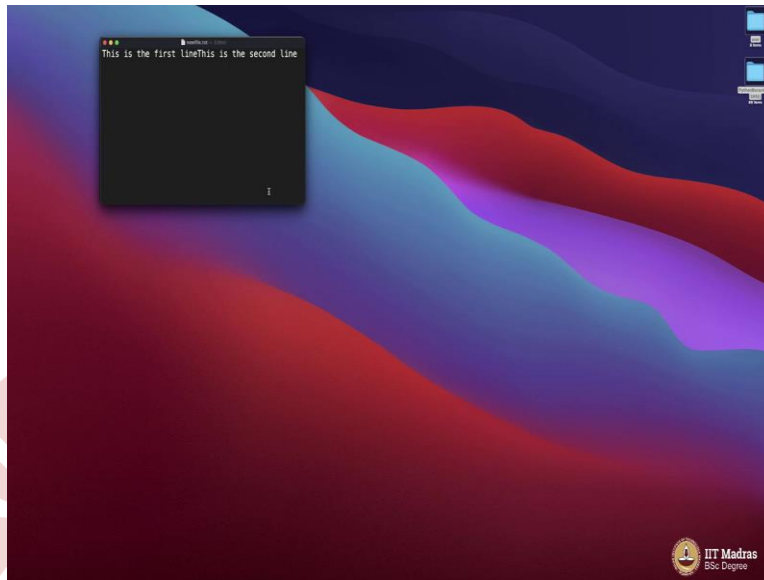
```
In [10]: x=open('mytext.txt','w')
In [11]: s=x.read()
In [12]: print(s)
Sudarshan yourname IIT python India
In [13]: type(s)
Out[13]: str
In [14]: x.close()
In [15]: s=x.read()

ValueError                                Traceback (most recent call last)
<ipython-input-15-a15f4068bc72> in <module>
----> 1 s=x.read()

ValueError: I/O operation on closed file.

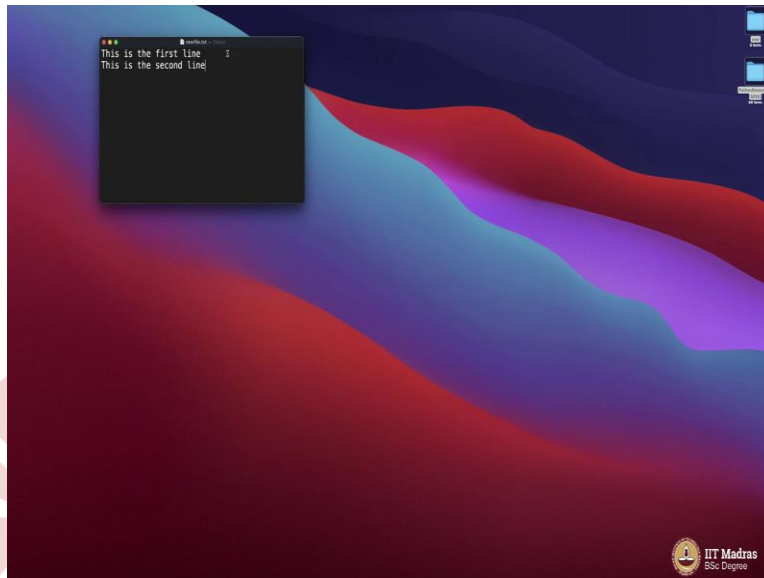
In [16]:
```





```
In [17]: x=open('mytext.txt','r')
In [18]: s=x.read()
In [19]: print(s)
Sudarshan yourname IIT C++ Germany
In [20]: x=open('mytext.txt','r')
In [21]: s=x.read()
In [22]: print(s)
Sudarshan
Ajit
Amit
Tatsavit
Lakshmi
Bhawana
Ramya
Uday
In [23]: f=open('newfile.txt','w')
In [24]: f.write('This is the first line')
Out[24]: 22
In [25]: f.write('This is the second line')
Out[25]: 23
In [26]: f.close()
In [27]: f=open('newfile.txt','w')
In [28]: f.write('This is the first line')
```

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In [21]: s=x.read()
In [22]: print(s)
Sudarshan
Ajit
Tatsavit
Lakshmi
Bhawana
Ranya
Uday

In [23]: f=open('newfile.txt','r')
In [24]: f.write('This is the first line')
Out[24]: 22

In [25]: f.write('This is the second line')
Out[25]: 23

In [26]: f.close()

In [27]: f=open('newfile.txt','w')
In [28]: f.write('This is the first line')
Out[28]: 22

In [29]: f.write('\n')
Out[29]: 1

In [30]: f.write('This is the second line')
Out[30]: 23

In [31]: f.close()
In [32]:

```

Handwritten notes on the right side of the code block:

- r: reading
- w: Writing
- a: ??

And I want to read from this file what all is there. So, you can do that by simply saying, let us say, variable x is equal to, you can also use f here, open, file name, what was that, my text dot txt in reading mode. You are not writing to the file. You are reading from the file. The moment you say that, boom, it accepts. Now, x will simply be, what will your x be. Your x will simply be this, this particular open this text in read mode. What all can you do with x? Let us see.

I can say, s equals x read. That is it. Let me say, print s. You see, the entire thing comes here. Whatever is in the file comes and gets attached to this string. It is a string. So, you see, type of s, I hope you understand what this type of s. Type of s is string. This entire thing which was in the file comes as a string and sits here. Let me say x close. It is over now. You cannot do anything

with x right now. If you say s equals x read, it will throw an error. I am sorry. It will throw an error here. It does not know what is x now, because x is closed. The file is closed. Pretty clear, but then let me do something here.

Let me remove India on Python here. Let me put C plus, plus and then let us say Germany here. Just for fun and I save it. Now, here is a file my text dot txt, which contains, what does it contain? It contains Sudarshan, your name, IIT, C plus, plus, Germany. I have input this manually into this file.

Now, if I come here, and I do the same operation, x equals open, let me clear the screen so that it is easy on your eyes, x equals open my text dot txt in read mode, and then I say s equals x read and then I say print s, you guessed it as much, whatever was in the file comes and gets displayed here. Sudarshan, your name, IIT, C plus, plus, Germany, that is exactly what I input to the file. So, with this, the world is yours. You can write a big file here, a very big file here, and then read it.

Let me try doing that right now. Let me type Sudarshan. Let me type Ajit, Amit, Tatsavit, Lakshmi, Bhawana, Ramya and so on, Uday and so on. So, I have not written next to each other. I have written one per line. I will save it and then come back and try the same old trick x equals open my text dot txt r and then say s equals x read. I will say print s. It will show me all of them in different lines like this. Is that clear? So, this is what we mean by file handling. We can write to the file. We can read from the file. But then how do I write to the file with these lines like this?

Let me create a new file right now, f equals open, I will say new file dot txt, right format, new file. This is a different file from this, done. And then I will say f write, this is the first line. And then I say f write, this is the second line. And then say f close. Can you guess what will happen right now? Will this come in the first line? Will this come in the second line?

Actually, not, just because you stated it first line, second line, it does not come to the first line or second line. Let us go and investigate what comes. New file dot txt is created. I double click on it. It says, this is my text dot txt that is not required right now. Let us look at this. This is the first line, this is the second line, continuously it comes like this.

How do you take it to the next line? That is very easy. What we will now do is we will close these things. And maybe I have closed the file. So, I will come here, my new file, I will delete it, will delete it and create a new one. So, what do I do, `f equals open new file dot txt write mode, f write, this is the first line.`

And after this, what you should do is you should write `backslash n`. What this stands for? This stands for a new line. The moment you put `backslash n`, `backslash n` will not get written to the file. This is an instruction to the file that please go to the new line. And then I will say, write, this is the second line. And then I will close the file.

Let me go back and then check what happens. My new file, see, it has come to the second line. So, now you understand file handling very well. I mean, this is all you need to know about file handling the bare minimum basics. Of course, as and always, Python has a lot of built in functions. You can do more with those inbuilt functions.

So, let us go ahead and see what all extra can we do with file handling in about a minute's time. I hope this was visible. I did not zoom it. So, you see the new line character here. `Backslash n` does not appear here. You see, moment is a `backslash n` automatically it takes it to the next line in the file. There is the instruction you are giving to Python in handling the file.

So, practice with just whatever I have taught you. Please note, the second parameter here tells you whether you are opening the file in the writing mode or the reading mode. Reading means there is an existing file already. If you were to put reading mode a here, `r` means reading there is a file already, `w` means you are writing to the file by creating a new file. There is something called `a` also here. Can I leave it to you to figure out? What will happen if you were to put `a` here? Let there will be some homework too. Let me not teach you everything.

So, if `append` you can probably guess what is the difference between `w` and `a`. Try doing it. If you cannot do it, then we will give it as an exercise question so that you have to do it in your, as part of your exercise problem assignment. Thank you. So, let us go to the next video and do more of file handling.