Formatted Files

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CSV Files, Serialization, and Sequential vs. Random Access

Review of Writing Files

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- `myFile = open("filename.txt", "w")` – “w” = write a new file

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- `myFile.write("Any string you'd like to write")`
- `myFile.write(str(myVar))`
- `myFile.close()`
- `myFile = open("filename.txt", "a")` – “a” = append to existing file

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Review of Reading in Loop

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  for line in myFile:
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Use a `with` clause to have them automatically close:

```
myList = []
with open("filename.txt", "r") as myFile:
    for line in myFile:
        myList.append(line)
```

Review of Safe Reading

If an error occurs while reading, then your files won't be closed

Use a `with` clause to have them automatically close:

```
myList = []
with open("filename.txt", "r") as myFile:
    for line in myFile:
        myList.append(line)
```

https://docs.python.org/3/tutorial/inputoutput.html#reading-and-writing-files

Formatted Writing

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```
myList = [["a", "b", "c"], ["d", "e", "f"]]
```

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```
myList = [["a", "b", "c"], ["d", "e", "f"]]
myFile = open("filename.txt", "w")
```

Formatted Writing

```
myList = [["a", "b", "c"], ["d", "e", "f"]]
myFile = open("filename.txt", "w")
for row in myList:
    myFile.write(f"row[0],row[1],row[2]\n")
```

Formatted Writing

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myList = [["a", "b", "c"], ["d", "e", "f"]]
myFile = open("filename.txt", "w")
for row in myList:
    myFile.write(f"row[0],row[1],row[2]\n")
myFile.close()
```

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Formatted Reading

```
myList = []
myFile = open("filename.txt", "r")
for line in myFile:
    cols = line.strip().split(",")
```

Formatted Reading

```
myList = []
myFile = open("filename.txt", "r")
for line in myFile:
    cols = line.strip().split(",")
    myList.append([cols[0], cols[1], cols[2]])
```

Formatted Reading

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myList = []
myFile = open("filename.txt", "r")
for line in myFile:
    cols = line.strip().split(",")
    myList.append([cols[0], cols[1], cols[2]])
myFile.close()
```
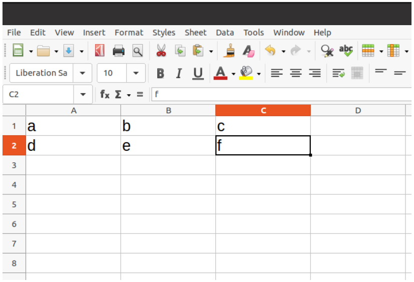

CSV Files

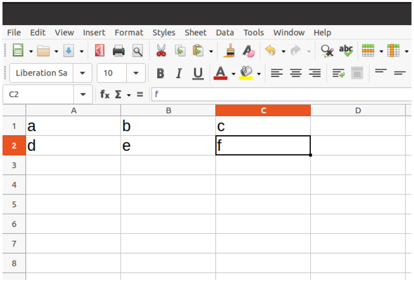
CSV Files


File Edit View Insert Format Styles Sheet Data Tools Window Help
Liberation Sa
10
C2
f

	A	B	C	D
1	a	b	c	
2	d	e	f	
3				
4				
5				
6				
7				
8				

A Spreadsheet

CSV Files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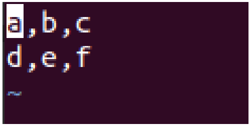
A Spreadsheet



```
a,b,c
d,e,f
~
```

A CSV file

Writing CSV Files

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```
import csv
```

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myList = [["a", "b", "c"], ["d", "e", "f"]]
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myList = [["a", "b", "c"], ["d", "e", "f"]]
with open("filename.txt", "w") as myFile:
```

Writing CSV Files

```
import csv
myList = [["a", "b", "c"], ["d", "e", "f"]]
with open("filename.txt", "w") as myFile:
    csvwriter = csv.writer(myFile)
```

Writing CSV Files

```
import csv
myList = [["a", "b", "c"], ["d", "e", "f"]]
with open("filename.txt", "w") as myFile:
    csvwriter = csv.writer(myFile)
    for row in myList:
        csvwriter.writerow(row)
```

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myList = [["a", "b", "c"], ["d", "e", "f"]]
with open("filename.txt", "r") as myFile:
    csvreader = csv.reader(myFile)
```

CSV Reading

```
import csv
myList = [["a", "b", "c"], ["d", "e", "f"]]
with open("filename.txt", "r") as myFile:
    csvreader = csv.reader(myFile)
    for row in csvreader:
        myList.append(row)
```

https://docs.python.org/3/library/csv.html

Object Serialization

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from person import Person
```

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from person import Person
dave = Person(name="Dave Davison", DOB="1/1/2001")
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To save an object, just save all of its attributes in a list

This is called *serializing* `import csv`

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from person import Person
dave = Person(name="Dave Davison", DOB="1/1/2001")
with open("dave.csv", "w") as fp:
```

Object Serialization

To save an object, just save all of its attributes in a list

This is called *serializing* `import csv`

```
from person import Person
dave = Person(name="Dave Davison", DOB="1/1/2001")
with open("dave.csv", "w") as fp:
    daveWriter = csv.writer(fp)
    daveWriter.write([dave.firstName, dave.lastName,
                      dave.birthDay, dave.birthMonth,
                      dave.birthYear])
```

The pickle module

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Python provides a std lib for serializing objects

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dave = Person(name="Dave Davison", DOB="1/1/2001")
with open("dave.pickle", "wb") as fp:
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```
import pickle
from person import Person
dave = Person(name="Dave Davison", DOB="1/1/2001")
with open("dave.pickle", "wb") as fp:
    pickle.dump(dave, fp, pickle.HIGHEST_PROTOCOL)
```

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with open("dave.pickle", "wb") as fp:
    pickle.dump(dave, fp, pickle.HIGHEST_PROTOCOL)

with open("dave.pickle", "rb") as fp:
    dave2 = pickle.load(fp)
```

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https://docs.python.org/3/library/pickle.html

Sequential Access

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```
myFile = open("sequentialFile.txt", "r")
```

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```
myFile = open("sequentialFile.txt", "r")
line1 = myFile.readline()
```

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line1 = myFile.readline()
line2 = myFile.readline()
line3 = myFile.readline()
```

Sequential Access

```
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line1 = myFile.readline()
line2 = myFile.readline()
line3 = myFile.readline()
line4 = myFile.readline()
```

Sequential Access

```
myFile = open("sequentialFile.txt", "r")
line1 = myFile.readline()
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line3 = myFile.readline()
line4 = myFile.readline()
myFile.close()
```

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Directly access lines in a file by their line number (out-of-order)

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line4 = linecache.getline("myfile.txt", 4)
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import linecache
line4 = linecache.getline("myfile.txt", 4)
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