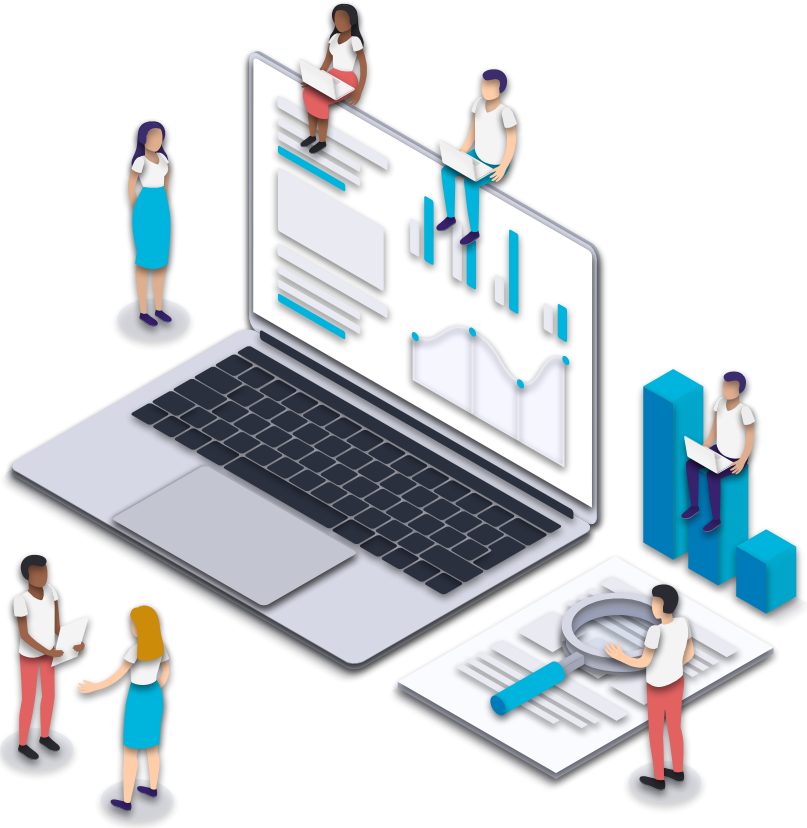
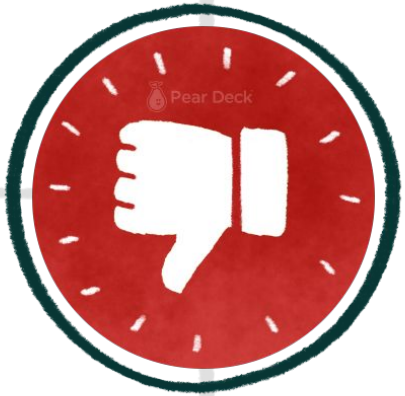


Writing Files

Table of Contents

1 Writing to File with `.write()` Method

How was the pre-class content of the “*writing to files*”?



Students, drag the icon!

Explain the difference between modes "a" and "w"

Students, write your response!

Writing to File with `.write()` Method (review)

- As we mentioned earlier, we can **overwrite** a text to a file using `'w'` mode, which means that every time we use `'w'`, the content of the file is deleted and new content is written. If there isn't any file then it will be created automatically.

Tips:

- Note that data in the other type that we intend to write to the file must be converted to **string type** before the writing process.

Writing to File with `.write()` Method (review)

- Let's create and write string data to a file. We're going to use `.write()` method for writing :

```
1  with open("dummy_file.txt", 'w', encoding="utf-8") as file:
2  # we create and open the file
3
4      file.write('This is the first line of my text file')
5      # writes str data into file
6
7  with open("dummy_file.txt", 'r', encoding="utf-8") as file:
8      print(file.read())  # reads the content of the 'dummy_file'
```

What is the output? Try to figure out in your mind...

Writing to File with `.write()` Method (review)

- It gives an output what we entered using `.write()` method.

```
1  with open("dummy_file.txt", 'w', encoding="utf-8") as file:
2  # we create and open the file
3
4      file.write('This is the first line of my text file')
5      # writes str data into file
6
7  with open("dummy_file.txt", 'r', encoding="utf-8") as file:
8      print(file.read())  # reads the content of the 'dummy_file'
```

```
1  This is the first line of my text file
2
```

Writing to File with `.write()` Method (review)

- Now let's repeat the process and see what happens. This time the file (**dummy_file**) exists :

```
with open("dummy_file.txt", 'w', encoding="utf-8") as file:
    file.write('This is the new line for my dummy_file')
    # we write new str data into it

with open("dummy_file.txt", 'r', encoding="utf-8") as file:
    print(file.read())  # reads the content of the 'dummy_file'
```

Writing to File with `.write()` Method (review)

- Now let's repeat the process and see what happens. This time the file (**dummy_file**) exists :

```
1  with open("dummy_file.txt", 'w', encoding="utf-8") as file:
2      file.write('This is the new line for my dummy_file')
3      # we write new str data into it
4
5  with open("dummy_file.txt", 'r', encoding="utf-8") as file:
6      print(file.read())  # reads the content of the 'dummy_file'
```

What is the output? Try to figure out in your mind...

Students, write your response!

Writing to File with `.write()` Method (review)

- Now let's repeat the process and see what happens. This time the file (**dummy_file**) exists :

```
with open("dummy_file.txt", 'w', encoding="utf-8") as file:
    file.write('This is the new line for my dummy_file')
    # we write new str data into it

with open("dummy_file.txt", 'r', encoding="utf-8") as file:
    print(file.read())  # reads the content of the 'dummy_file'
```

```
This is the new line for my dummy_file

```

Writing to File with `.write()` Method (review)

- When you write strings to a file using the `.write()` method, the string data is written exactly as it is.
- Whenever you use `.write()` method, each string joined together into one. Therefore you have to put newline characters (`\n`), separators or spaces, etc. manually if you want.
- Consider the following example :

Writing to File with `.write()` Method (review)

- Let's **write** 5 sentences into the **`dummy_file.txt`** file we created before and then **read** the content of that file.

```
1  with open("dummy_file.txt", 'w', encoding="utf-8") as file:
2      file.write('My first sentence')
3      file.write('My second sentence,')
4      file.write('My third sentence\n')
5      file.write('My fourth sentence ')
6      file.write('My last sentence')
7
8  with open("dummy_file.txt", 'r', encoding="utf-8") as file:
9      print(file.read())
```

What is the output? Try to figure out in your mind...

Students, write your response!

Writing to File with `.write()` Method (review)

- The output is as follows :

```
with open("dummy_file.txt", 'w', encoding="utf-8") as file:
    file.write('My first sentence')
    file.write('My second sentence,')
    file.write('My third sentence\n')
    file.write('My fourth sentence ')
    file.write('My last sentence')

with open("dummy_file.txt", 'r', encoding="utf-8") as file:
    print(file.read())
```

```
My first sentenceMy second sentence,My third sentence
My fourth sentence My last sentence

```

Writing to File with `.write()` Method (review)

- **Task :**
  - Now, think of that we have a **`list`** of fruit names.
  - Let's write them to a file named **`fruits.txt`** each on separate lines one after another.
  - Read and display the entire content,
  - Read and display the content in a **`list`** form.

```
1  fruits = ['Banana', 'Orange', 'Apple', 'Strawberry', 'Cherry']
2
```

Writing to File with `.write()` Method (review)

- The code snippet can be as follows :

```
1  fruits = ['Banana', 'Orange', 'Apple', 'Strawberry', 'Cherry']
2
3  with open("fruits.txt", 'w', encoding="utf-8") as file:
4      for basket in fruits:
5          file.write(basket + '\n')  # adds a newline character to each
               string
6
7  with open("fruits.txt", 'r', encoding="utf-8") as file:
8      print(file.read())
9
10 with open("fruits.txt", 'r', encoding="utf-8") as file:
11     print(file.readlines())  # reads and displays entire lines in a list
```

What is the output? Try to figure out in your mind...

Writing to File with `.write()` Method (review)

- Here the output is :

```
Banana
Orange
Apple
Strawberry
Cherry

['Banana\n', 'Orange\n', 'Apple\n', 'Strawberry\n', 'Cherry\n']

```

Writing to File with `.write()` Method

- **Task :**
  - Now, think of that we have a **`list`** of flower names.
  - Let's write them to a file named **`flowers.txt`** each on separate lines one after another and separated by an empty line.

```
1 flowers = ['Jasmine', 'Rose', 'Lily', 'Daisy', 'Tulip']
2
```

Writing to File with `.write()` Method

- The code snippet can be as follows :

```
1  flowers = ['Jasmine', 'Rose', 'Lily', 'Daisy', 'Tulip']
2
3  with open("flowers.txt", 'w', encoding="utf-8") as file:
4      for basket in flowers:
5          file.write(basket + "\n\n")
6
7  with open("flowers.txt", 'r', encoding="utf-8") as file:
8      print(file.read())
9
```

What is the output? Try to figure out in your mind...

Writing to File with `.write()` Method

- The output is as follows :

```
1 flowers = ['Jasmine', 'Rose', 'Lily', 'Daisy', 'Tulip']
2
```

Output

```
Jasmine

Rose

Lily

Daisy

Tulip
```

2 Writing to File with `.writelines()` Method

Make connections

How are these two methods connected?

Type your answers.

`.readlines()`

`.writelines()`

Students, write your response!

Writing to File with `.writelines()` Method (review)

- There is another method for writing data to the files. It is `.writelines()` method. Unlike `.write()` method, `.writelines()` takes the iterable sequence of strings and writes them to the file.
- The difference between these two methods is just similar to the logic of difference between `.read()` and `.readlines()`.

Writing to File with `.writelines()` Method (review)

- Let's use the same **`list`** of the fruits again but this time in a little bit different way. We should choose the line separators ourselves without using **`for`** loop. Let's see how we do it :

```
1  fruits = ['Banana\n', 'Orange\n', 'Apple\n', 'Strawberry\n', 'Cherry\n']
2
3  with open("fruits.txt", 'w', encoding="utf-8") as file:
4      file.writelines(fruits)  # takes an iterator for writing
5
6  with open("fruits.txt", 'r', encoding="utf-8") as file:
7      print(file.read())
8
9  with open("fruits.txt", 'r', encoding="utf-8") as file:
10     print(file.readlines())
```

Writing to File with `.writelines()` Method (review)

- The output looks like :

```
Banana
Orange
Apple
Strawberry
Cherry

['Banana\n', 'Orange\n', 'Apple\n', 'Strawberry\n', 'Cherry\n']

```

Writing to File with `.writelines()` Method

- **Task :**
  - Use the same **`list`** of flower names,
  - Modify the **`list`** for use,
  - Overwrite them to the same **`flowers.txt`** file each on separate lines one after another.

```
1 flowers = ['Jasmine', 'Rose', 'Lily', 'Daisy', 'Tulip']
2
```

Writing to File with `.writelines()` Method

- The code snippet and the output can be as follows :

```
1  flowers = ['Jasmine\n', 'Rose\n', 'Lily\n', 'Daisy\n', 'Tulip']
2
3  with open("flowers.txt", 'w', encoding="utf-8") as file:
4      file.writelines(flowers)  # takes "flowers" as an iterator
5
6  with open("flowers.txt", 'r', encoding="utf-8") as file:
7      print(file.read())
8
```

Output

```
Jasmine
Rose
Lily
Daisy
Tulip
```

3

Appending to File with `'a'`

Appending to File with `'a'` (review)

- Unlike the previous writing mode (`'w'`), in most cases when we want to add new content to a file, deleting the existing content is undesirable.
- Therefore, there is a need for another mode that both keeps the existing content of the file and saves the new content to the continuation of the file. **In Python, we meet this need with `'a'` mode** which stands for **append**.

Appending to File with `'a'` (review)

- **Task :**
  - Let's add `'melon'` to our existing **`fruits.txt`** file as the last line,
  - Read and display the entire file content,
  - Read and display the entire file content line by line in a **`list`** form.

Appending to File with `'a'` (review)

- The code snippet and the output are as follows:

```
1  with open("fruits.txt", 'a', encoding="utf-8") as file:
2      file.write('Melon\n')  # adds Melon to the end of the text
3
4  with open("fruits.txt", 'r', encoding="utf-8") as file:
5      print(file.read())
6
7  with open("fruits.txt", 'r', encoding="utf-8") as file:
8      print(file.readlines())
```

```
1  Banana
2  Orange
3  Apple
4  Strawberry
5  Cherry
6  Melon
7
8  ['Banana\n', 'Orange\n', 'Apple\n', 'Strawberry\n', 'Cherry\n', 'Melon\n']
9
```

Appending to File with `'a'`

- **Task :**
  - Let's add `'orchid'` to our existing `flowers.txt` file as the last line,
  - Read and display the entire file content.

Appending to File with `'a'`

- The code snippet and the output are as follows:

```
1  with open("flowers.txt", 'a', encoding="utf-8") as file:
2      file.write("\nOrchid")
3
4  with open("flowers.txt", 'r', encoding="utf-8") as file:
5      print(file.read())
6
```

Since we didn't put a newline char (**\n**) at the end of the **Tulip** in the previous **"w"** operation, now we put **\n** here to place the **Orchid** as the last line.

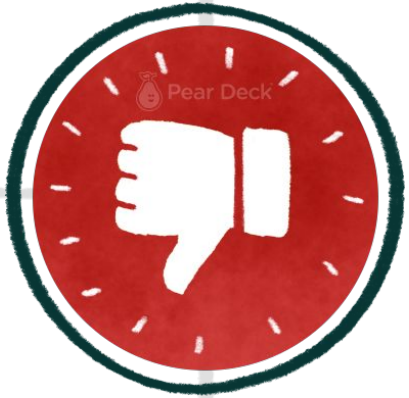
Output

```
Jasmine
Rose
Lily
Daisy
Tulip
Orchid
```

Did you find this lesson interesting and challenging?

Too hard

Just right

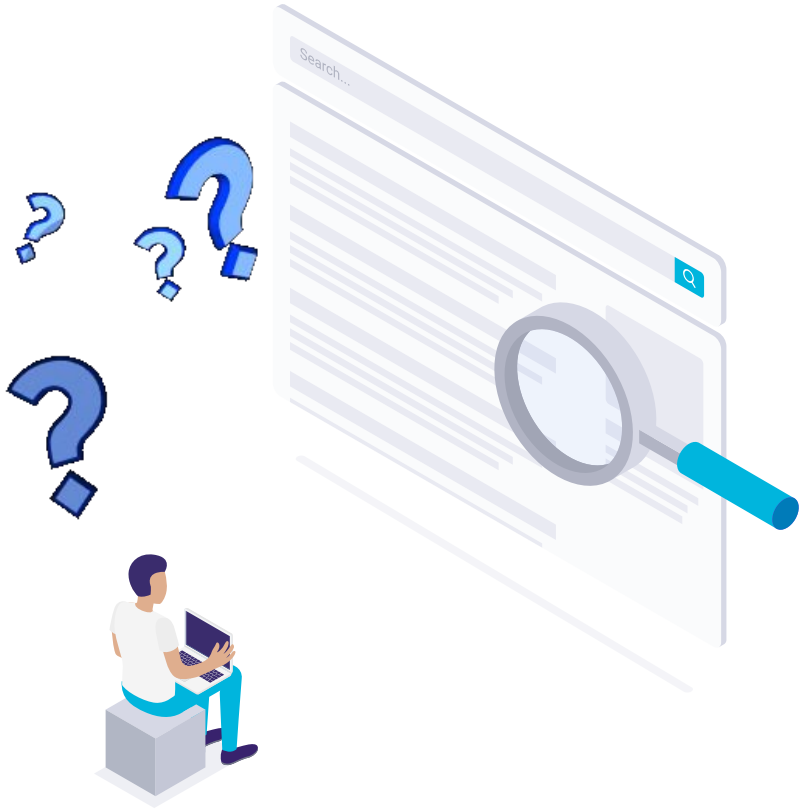


Too easy

Students, drag the icon!

THANKS!

Any questions?



Working with the CSV Files

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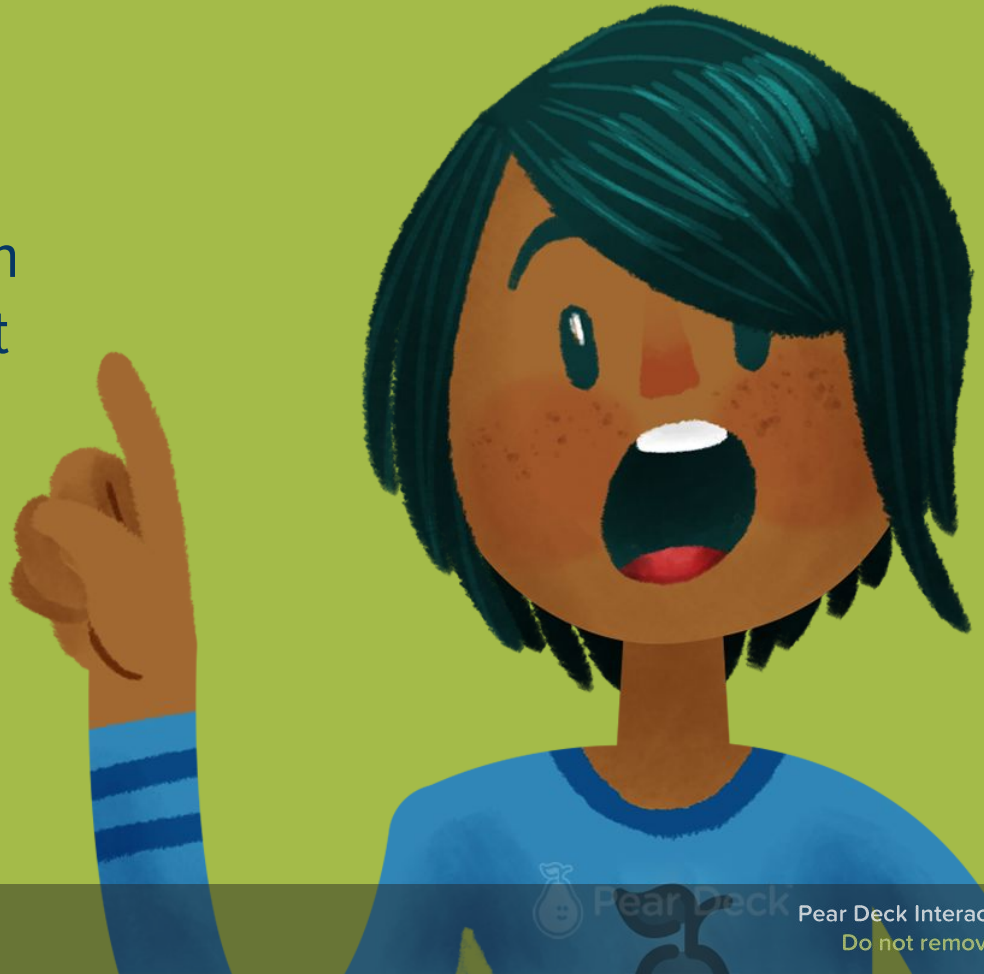
File formats...

What did you learn from pre-class content about CSV files?



Students, write your response!

What is a CSV File?

CSV ⇨ **C**omma **S**eparated **V**alues

- Actually, it's a plain text like **.txt** files. Normally, CSV files use a **comma** to separate each specific data value. When you **save** the plain text file that you create by using a simple text editor (such as Notepad in Windows OS) as a **.csv** extension, then you create a CSV file.

What is a CSV File?

- A CSV file is basically a table made up of rows and columns. The structure of a simple CSV file is as follows :

```
column 1,     column 2,     column 3
row1_column1, row1_column2, row1_column3
row2_column1, row2_column2, row2_column3
row3_column1, row3_column2, row3_column3
```

What is a CSV File?

- It represents a table of data.

```
column 1,column 2,column 3
row1_column1, row1_column2, row1_column3
row2_column1, row2_column2, row2_column3
row3_column1, row3_column2, row3_column3
```

column1	column2	column3
row1_column1	row1_column2	row1_column3
row2_column1	row2_column2	row2_column3
row3_column1	row3_column2	row3_column3

What is a CSV File?

- Now, let's create our first CSV file. We can use the previous txt file named **`fruits.txt`**. As usual, save this file with a **.csv** extension into directory where Anconda3/Python installed.

`fruits.csv`

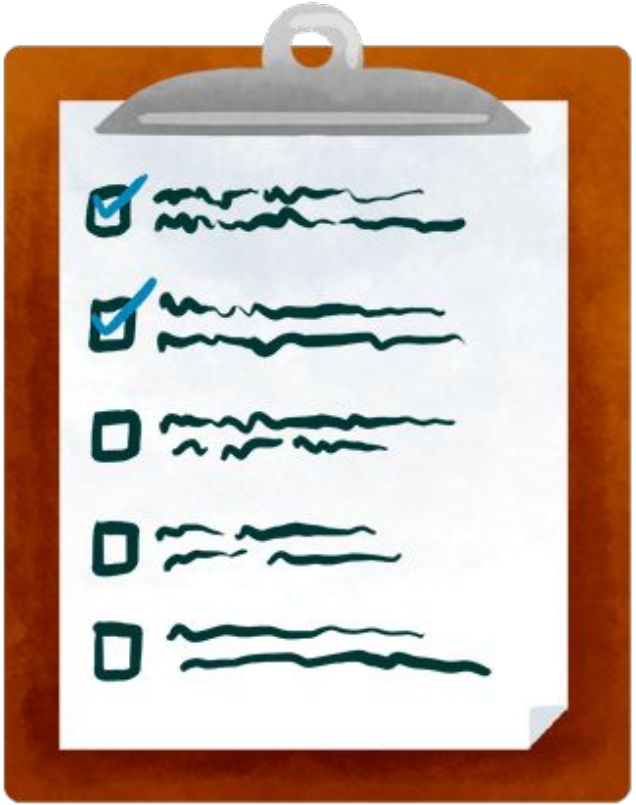
```
no,fruit,amount
1,Banana,4 lb
2,Orange,5 lb
3,Apple,2 lb
4,Strawberry,6 lb
5,Cherry,3 lb
```

2

Reading Methods of the CSV Files

Reading Methods of the CSV Files

1. You can use the ordinary way of reading using `open()` function and `.read()` method just you learned in the previous lesson.
2. You can use `csv` Module.
3. You can use the **Pandas** library for which created data analysis purposes. It is highly recommended for big data analysis.



CSV Files reading methods

*List the **reading methods** of **CSV Files** stated in the previous slide.*

Students, write your response!

3

Ordinary Reading Method of CSV Files

Ordinary Reading Method of CSV Files (review)

- Let's read the **fruits.csv** file we created.

```
1 with open("fruits.csv", 'r', encoding="utf-8") as file:
2     print(file.read())
```

What is the output? Try to figure out in your mind...

Ordinary Reading Method of CSV Files (review)

- Let's read the **fruits.csv** file we created in the previous lesson.

```
with open("fruits.csv", 'r', encoding="utf-8") as file:
    print(file.read())
```

```
no,fruit,amount
1,Banana,4 lb
2,Orange,5 lb
3,Apple,2 lb
4,Strawberry,6 lb
5,Cherry,3 lb

```

Ordinary Reading Method of CSV Files

- **Task :**
  - Create a **csv** file named **people.csv** consisting of **5** member of your family or friends,
  - The file should include **4 columns** (row number, first name, last name, ages) and **5 rows** (excluding the caption).
  - Read and display the content of **people.csv** file in an ordinary method.

Ordinary Reading Method of CSV Files

- **The file sample :**

people.csv

```
row num,first name,last name,ages
1,John,Doe,22
2,lara,bold,12
3,Adam,Smith,46
4,Henry,smithson,40
5,Mosely,Britt,51
```

Ordinary Reading Method of CSV Files

- The code snippet and the output are as follows :

```
1 with open("people.csv", "r", encoding="utf-8") as file:
2     print(file.read())
3
```

output

```
row num,first name,last name,ages
1,John,Doe,22
2,lara,bold,12
3,Adam,Smith,46
4,Henry,smithson,40
5,Mosely,Britt,51
```

4

Reading the CSV Files with `csv` Module

Reading the CSV Files with `csv` Module (review)

- Since the content of the CSV files is displayed in a more readable and regular format with this method, this method is more preferred than the previous one.
- **First**, we should load `csv` **module**. **Second**, we will use `csv.reader()` function in a `for` loop to read the CSV file.

Reading the CSV Files with `csv` Module (review)

- Examine the following example carefully :

```
1  import csv  # loads csv module
2
3  with open("fruits.csv", 'r', newline = '', encoding = 'utf-8') as file:
4      csv_rows = csv.reader(file)  # reader() function takes each
5                                   # row (lines) into a list
6      for row in csv_rows:
7          print(row)
```

Reading the CSV Files with `csv` Module (review)

- Examine the following example carefully :

```
1  import csv  # loads csv module
2
3  with open("fruits.csv", 'r', newline = '', encoding = 'utf-8') as file:
4      csv_rows = csv.reader(file)  # reader() function takes each
5                                   # row (lines) into a list
6      for row in csv_rows:
7          print(row)
```

```
1  ['no', 'fruit', 'amount']
2  ['1', 'Banana', '4 lb']
3  ['2', 'Orange', '5 lb']
4  ['3', 'Apple', '2 lb']
5  ['4', 'Strawberry', '6 lb']
6  ['5', 'Cherry', '3 lb']
7
```

Reading the CSV Files with `csv` Module

Tips:

- If `newline=''` is not specified, newlines embedded inside quoted fields will not be interpreted correctly, and on platforms that use `\r\n` linendings on write an extra `\r` will be added.
- It is best practice and always safe to specify `newline=''`, since the `csv` module does its own newline handling.

Reading the CSV Files with `csv` Module (review)

- The default value of the `delimiter` parameter of the `csv.reader()` function is `","`. Thus, we can display each comma-separated element as separate **strings**.
- At this time let's use the `delimiter=","` parameter and see the same result as the previous one.

```
csv.reader(file, delimiter = ",")
```

Reading the CSV Files with `csv` Module (review)

- We get the same output as the previous one :

```
1  import csv
2
3  with open("fruits.csv", 'r', newline = '', encoding = 'utf-8') as file:
4      csv_rows = csv.reader(file, delimiter= ",")  # gives the same output as the
           previous one
5
6      for row in csv_rows:
7          print(row)
```

```
1  ['no', 'fruit', 'amount']
2  ['1', 'Banana', '4 lb']
3  ['2', 'Orange', '5 lb']
4  ['3', 'Apple', '2 lb']
5  ['4', 'Strawberry', '6 lb']
6  ['5', 'Cherry', '3 lb']
7
```

Reading the CSV Files with `csv` Module

- **Task :**
  - Considering the **people.csv,** read and display the content of **it** using `csv` module.

Reading the CSV Files with `csv` Module

- The reading code and the output are as follows :

```
1  import csv
2
3  with open("people.csv", 'r', encoding = 'utf-8') as file:
4      csv_rows = csv.reader(file)
5
6      for row in csv_rows:
7          print(row)
8
```

output

```
['row num', 'first name', 'last name', 'ages']
['1', 'isabella', 'bold', '22']
['2', 'lara', 'bold', '12']
['3', 'solomon', 'bold', '46']
['4', 'adam', 'smithson', '40']
['5', 'mose', 'smithson', '51']
```

Reading the CSV Files with `csv` Module (review)

- We can also display each row in the **`list`** as a single **`string`**.
- If we determine a character that is not included in the **CSV file** and allocate this character as the value of **`delimiter`**, we can print all lines of the CSV file as **`list`**s as a single **`string`** element.
- For the **`delimiter`** parameter, let's pick **`":"`** which is not in the CSV file.

Reading the CSV Files with `csv` Module

- Let's take a look at this pre-class example :

```
1  import csv
2
3  with open("fruits.csv", 'r', newline = '', encoding = 'utf-8') as file:
4      csv_rows = csv.reader(file, delimiter = ':')  # we specified a char ":" that is
           not used
5                                                    # in the csv file as a value of
                                                 delimiter
6      for row in csv_rows:
7          print(row)
```

What is the output? Try to figure out in your mind...

Students, write your response!

Reading the CSV Files with `csv` Module

- Let's take a look at this pre-class example :

```
1  import csv
2
3  with open("fruits.csv", 'r', newline = '', encoding = 'utf-8') as file:
4      csv_rows = csv.reader(file, delimiter = ':')  # we specified a char ":" that is
           not used
5                                                    # in the csv file as a value of
                                                 delimiter
6      for row in csv_rows:
7          print(row)
```

```
1  ['no,fruit,amount']
2  ['1,Banana,4 lb']
3  ['2,Orange,5 lb']
4  ['3,Apple,2 lb']
5  ['4,Strawberry,6 lb']
6  ['5,Cherry,3 lb']
7
```

we get each row as a single string in a `list`

Reading the CSV Files with `csv` Module

- **Task :**
  - Considering the **people.csv,** read and display the content of **it** using `csv` module.
  - At this time display each row **as a single string** in a `list`.

Reading the CSV Files with `csv` Module

- The reading code and the output are as follows :

```
1  import csv
2
3  with open("people.csv", 'r', encoding = 'utf-8') as file:
4      csv_rows = csv.reader(file, delimiter = '-')  # it doesn't contain "-" char
5
6      for row in csv_rows:
7          print(row)
8
```

output

```
['row num,first name,last name,ages']
['1,isabella,bold,22']
['2,lara,bold,12']
['3,solomon,bold,46']
['4,adam,smithson,40']
['5,mose,smithson,51']
```

THANKS!

Any questions?