Working with other files

JSON

JavaScript Object Notation

JSON

- ***JSON*** *(JavaScript Object Notation) is a lightweight data-interchange format. It is easy for humans to read and write. It is easy for machines to parse and generate.*
- Example: (like dict type)

```
{
    "name": “Hien Luong",
    "age": 18,
    "isActive": true
}
```

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Python and JSON

- import json

- JSON to Python

```
jsonData = '{"name": "Hien Luong", "age": 18}'
jsonToPython = json.loads(jsonData)
```

- Python to JSON

```
pythonDictionary = {
    'name':'Hien', 'age’:40, 'isEmployed':True
}
dictionaryToJson =
json.dumps(pythonDictionary)
```

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Python JSON functions

- Python JSON parsing function
  - obj = **load**(file)
  - obj = **loads**(string)
- Python JSON Serialization Functions
  - **dump**(obj, file)
  - str = **dumps**(obj)

Map Python type to json

Python	JSON
dict	object
list, tuple	array
str	string
int, float, int- & float-derived Enums	number
True	true
False	false
None	null

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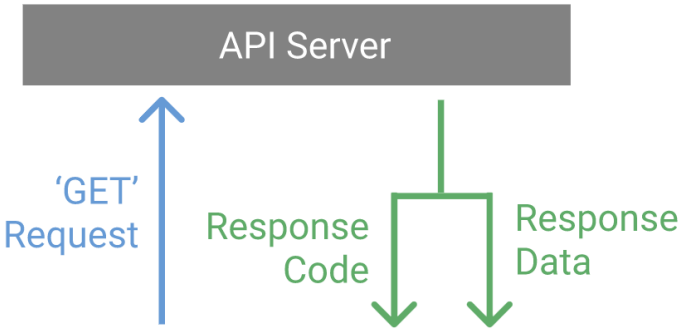
Map JSON to python

JSON	Python
object	dict
array	list
string	str
number (int)	int
number (real)	float
true	True
false	False
null	None

What is an API?

- An API, or Application Programming Interface, is a server that you can use to retrieve and send data to using code. APIs are most commonly used to retrieve data.



- Making API Requests in Python
  - `pip install requests`

Working With JSON from an API example

- Call API form https://dummyjson.com/, parse and store in json file

```
import json, requests

result = requests.get('https://dummyjson.com/products')
pythondict = result.json()

print(json.dumps(pythondict, indent=4))
print(list(pythondict.keys()))
```

Working with other files

Word (python-docx)

python-docx

- pip install python-docx

- https://python-docx.readthedocs.io/en/latest/
- https://buildmedia.readthedocs.org/media/pdf/python-docx/latest/python-docx.pdf

python-docx

- Import library:

```
from docx import Document
```

- Open existed file:

```
document = Document('existing-doc-file.docx’)
```

- Create new file:

```
document = Document()
```

- Save file (.docx):

```
document.save(filename)
```

python-docx

- document.add_heading(content, level)
  - Title: document.add_heading("This is a title part, level=0)
  - Level 1: document.add_heading("This is a heading 1", level=1)

- Paragraph:
  - p = document.add_paragraph(content)
  - Alignment:
    - from docx.enum.text import WD_PARAGRAPH_ALIGNMENT
    - p.alignment = WD_PARAGRAPH_ALIGNMENT.LEFT

python-docx

- Paragraph(tt):
  - Add sentences into paragraph:
    - sentence_element = p.add_run(str(content))
  - Set format bold/italic:
    - sentence_element.bold = bold
    - sentence_element.italic = italic
    - entence_element.underline = underline

python-docx

- Insert picture
- Insert table

Working with csv files

(Comma Separated Values)

csv module

Spread sheet and corresponding CSV file

Name	Exam1	Exam2	Final Exam	Overall Grade
Bill	75.00	100.00	50.00	**75.00**
Fred	50.00	50.00	50.00	**50.00**
Irving	0.00	0.00	0.00	**0.00**
Monty	100.00	100.00	100.00	**100.00**
Average				**56.25**

FIGURE 14.2 A simple spreadsheet from Microsoft Excel 2008.

```
Name,Exam1,Exam2,Final Exam,Overall Grade
Bill,75.00,100.00,50.00,75.00
Fred,50.00,50.00,50.00,50.00
Irving,0.00,0.00,0.00,0.00
Monty,100.00,100.00,100.00,100.00

Average,,,,56.25
```

csv file

- https://docs.python.org/3/library/csv.html
- Text file which each rows using (,), (;), or tab (\t) to separate value.
- Python support csv module:
  - csv.field_size_limit – return maximum field size
  - csv.get_dialect – get the dialect which is associated with the name
  - csv.list_dialects – show all registered dialects
  - csv.register_dialect - associate dialect with name
  - csv.unregister_dialect - delete the dialect associated with the name the dialect registry

csv module

- csv.reader – read data from a csv file
- csv.writer – write data to a csv file
- **csv.QUOTE_ALL** - Quote everything, regardless of type.
- **csv.QUOTE_MINIMAL** - Quote fields with special characters
- **csv.QUOTE_NONNUMERIC** - Quote all fields that aren't numbers value
- **csv.QUOTE_NONE** – Don't quote anything in output

Read csv

```
import csv
workbook_file = open('Workbook1.csv','r')
workbook_reader = csv.reader(workbook_file)

for row in workbook_reader:
    print(row)

workbook_file.close()
```

```
>>>
['Name', 'Exam1', 'Exam2', 'Final Exam', 'Overall Grade']
['Bill', '75.00', '100.00', '50.00', '75.00']
['Fred', '50.00', '50.00', '50.00', '50.00']
['Irving', '0.00', '0.00', '0.00', '0.00']
['Monty', '100.00', '100.00', '100.00', '100.00']
[]
['Average', '', '', '', '56.25']
>>>
```

Read file csv into Dictionary

```
import csv
with ('employee_birthday.txt', mode='r') as csv_file:
        csv_reader = csv.DictReader(csv_file)
        for row in csv_reader:
                print(f'\t{row["name"]} - {row[“age"]}.')
```

Write csv

```
import csv
with ('employee_file.csv', mode='w') as employee_file:
        employee_writer = csv.writer(employee_file, delimiter=',',
                                     quotechar='"', quoting=csv.QUOTE_MINIMAL)

        employee_writer.writerow(['John Smith', 'Accounting', 'November’])
        employee_writer.writerow(['Erica Meyers', 'IT', 'March'])
```

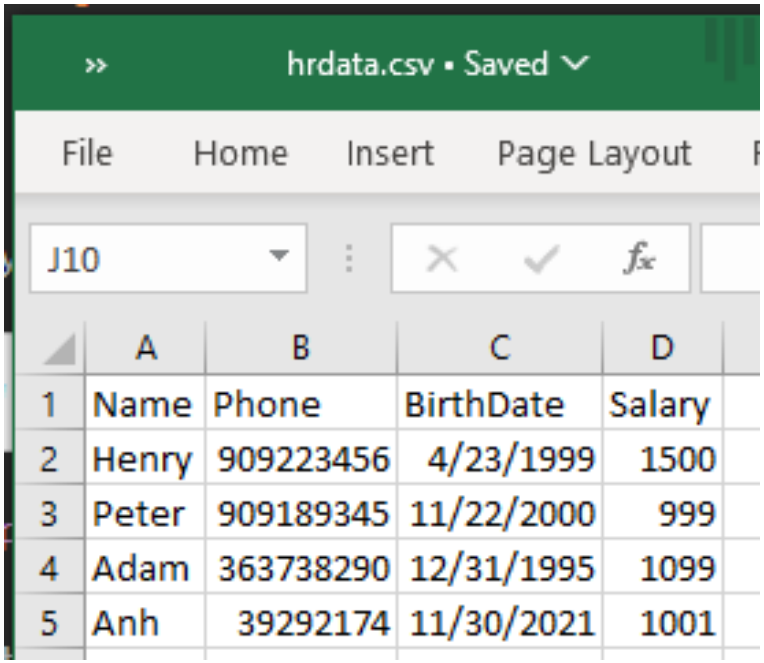
Write csv from Dict

```
import csv
with ('employee_file2.csv', mode='w') as csv_file:
        fieldnames = ['emp_name', 'dept']
        writer = csv.DictWriter(csv_file, fieldnames=fieldnames)
        writer.writeheader()
        writer.writerow({'emp_name': 'John Smith', 'dept': 'Accounting'})
        writer.writerow({'emp_name': 'Erica Meyers', 'dept': 'IT'})
```

Xử lý csv trong thư viện Pandas

```
import pandas
df = pandas.read_csv('hrdata.csv',
index_col='Name')
print(df)
```

```
import pandas
df = pandas.read_csv('hrdata.csv',
index_col='Name',
parse_dates=['Birth Date'])
print(df)
```



	A	B	C	D
1	Name	Phone	BirthDate	Salary
2	Henry	909223456	4/23/1999	1500
3	Peter	909189345	11/22/2000	999
4	Adam	363738290	12/31/1995	1099
5	Anh	39292174	11/30/2021	1001

Xử lý csv trong thư viện Pandas

```
df = pandas.read_csv('hrdata.csv',
            index_col='Employee',
            parse_dates=['Hired'],
            header=0,
            names=['Employee', 'Hired', 'Salary', 'Sick Days’])

# Process data

# Write new file
df.to_csv('hrdata_modified.csv')
```

Excel file

Working excel file with openpyxl

- **There are many libraries for working (read/write) with Excel file**
- **Openpyxl library:**
  - **pip install openpyxl**
  - **https://openpyxl.readthedocs.io/en/stable**

Write data to excel file excel with openpyxl

```
# File excel (Workbook), trong file sẽ có nhiều Worksheet,
# trong worksheet có nhiều cell
from openpyxl import Workbook

wb = Workbook()

# Tạo worksheet có tên NIIE
ws = wb.create_sheet("NIIE", 1)

ws["A1"] = "Viện Đào tạo Quốc tế"        # Ghi ô "A1"

ws.append([2, 3, 4])                     # Thêm dòng mới

wb.save("DemoOpenpyxl.xlsx")             # Lưu file
```

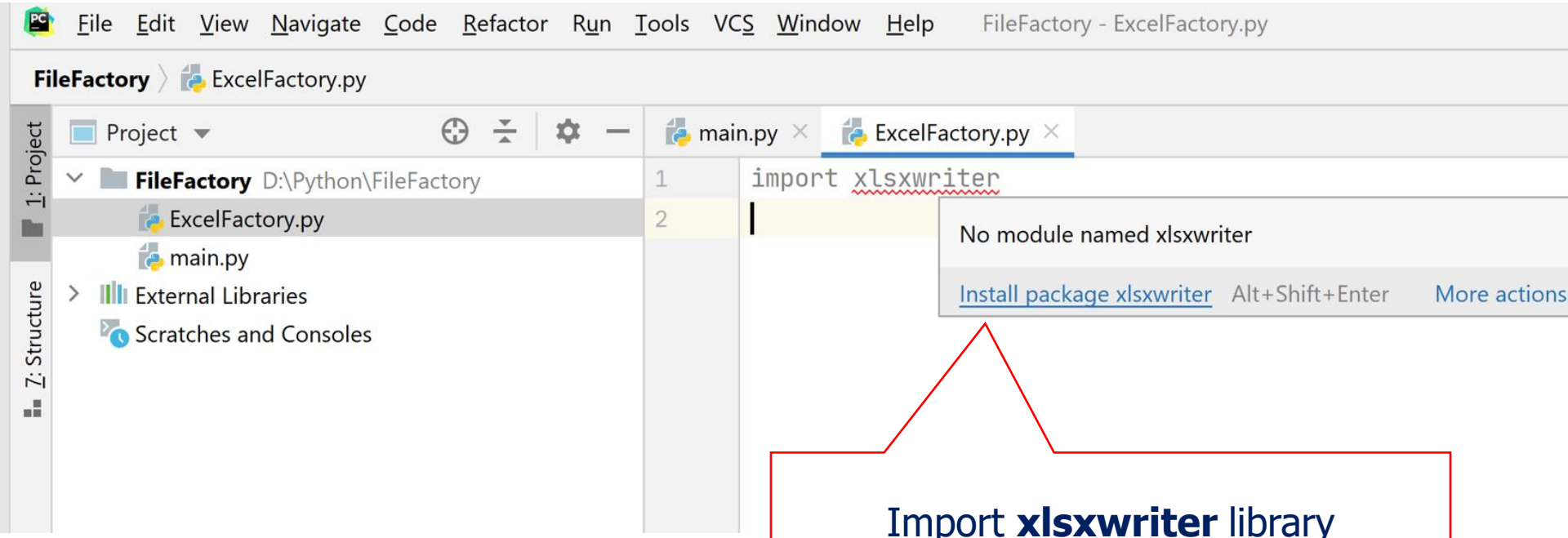
Read data from excel file

```
from openpyxl import load_workbook
wb = load_workbook('demo.xlsx')
print (wb.sheetnames)
ws = wb[wb.sheetnames[0]]
for row in ws.values:
   for value in row:
     print(value,"\t",end='')
   print("")
```

Working excel file with xlsxwriter

- https://xlsxwriter.readthedocs.io/

```
import xlsxwriter
```



Import **xlsxwriter** library
Hover mouse into line **import**
→Choose Install package xlsxwriter

Working excel file with xlsxwriter

```
import xlsxwriter

# Tạo một file excel cùng 1 sheet
workbook = xlsxwriter.Workbook('demo.xlsx')
worksheet = workbook.add_worksheet()

# thiết lập các cột cho file
worksheet.set_column('A:A', 5)
worksheet.set_column('B:B', 15)
worksheet.set_column('C:C', 20)
worksheet.set_column('D:D', 15)
worksheet.set_column('E:E', 15)

# định dạng tiêu đề cột in đậm
bold = workbook.add_format({'bold': True})

# thêm dòng tiêu đề và định dạng in đậm
worksheet.write('A1', 'STT',bold)
worksheet.write('B1', 'MÃ SẢN PHẨM',bold)
worksheet.write('C1', 'TÊN SẢN PHẨM',bold)
worksheet.write('D1', 'Số LƯỢNG',bold)
worksheet.write('E1', 'ĐƠN GIÁ',bold)
```

```
#thêm một dòng dữ liệu
worksheet.write('A2',1)
worksheet.write('B2','SP1')
worksheet.write('C2', 'Coca')
worksheet.write('D2', '15')
worksheet.write('E2', '15000')
#thêm một dòng dữ liệu
worksheet.write('A3',2)
worksheet.write('B3','SP2')
worksheet.write('C3', 'Pepsi')
worksheet.write('D3', '20')
worksheet.write('E3', '18000')

#Chèn Logo vào
worksheet.insert_image('B5', 'HIENLTH.png')

workbook.close()
```

Chạy phần mềm và vào thư mục phần mềm xem file Excel sẽ có kết quả như mong muốn

File Edit View Navigate Code Refactor Run Tools VCS Window Help FileFactory - ExcelOpenpyxl.py

FileFactory 〉 ExcelOpenpyxl.py

Project

main.py | ExcelFactory.py | ReadExcelFile.py | ExcelPandas.py | ExcelOpenpyxl.py

- FileFactory D:\Python\FileFacto
  - demo.xlsx
  - ExcelFactory.py
  - ExcelOpenpyxl.py
  - ExcelPandas.py
  - logo_UEL.png
  - main.py
  - ReadExcelFile.py
- External Libraries
- Scratches and Consoles

```python
from openpyxl import load_workbook
wb = load_workbook('demo.xlsx')
print (wb.sheetnames)
ws = wb[wb.sheetnames[0]]
for row in ws.values:
    for value in row:
        print(value,"\t",end='')
    print("")
```

for row in ws.values

Run: ExcelOpenpyxl

```
C:\Python39\python.exe D:/Python/FileFactory/ExcelOpenpyxl.py
['Sheet1']
STT     MÃ SẢN PHẨM     TÊN SẢN PHẨM    SỐ LƯỢNG    ĐƠN GIÁ
1   SP1     Coca    15  15000
2   SP2     Pepsi   20  18000
```

PyQRCode

- pip install PyQRCode
- https://pythonhosted.org/PyQRCode

```
import pyqrcode

# String which represent the QR code
s = "https://www.youtube.com/c/HIENLTHChannel"

# Generate QR code
qr = pyqrcode.create(s)

# Create and save the png file naming
qr.svg("myyoutube.svg", scale=8)

qr.png("myyoutube.png", scale=8)
```