Input/output

Computing & Information Sciences

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Input/output types

- Files.
  - Text.
  - Binary.
- Databases.
  - SQL and NoSQL.
- Network connections.
  - Text and binary components.

Input/output formats

Python libraries exist for other common file formats.

- CSV (Comma-separated values)
  - Used to store data in tables.
- JSON (JavaScript Object Notation)
  - Web service communication and NoSQL database storage.
- XML
  - Java web services and some file formats (Office).
- Pickles
  - Python binary file format.

File operations

- Create file path.
- Test if file exists.
- Test if directory exists.
- Check file size.

File paths

```python
import os.path

file_path = os.path.join("my_dir", "my-file.txt")
```

- Different standards on different operating systems.
    - Windows - c:\users\someuser
    - Linux and Mac - /home/someuser

File exists

```python
import os.path

exists = os.path.isfile("my-file.txt")
```

- Returns True if the file exists.

File size

```python
import os.path

file_size = os.path.getsize("my-file.txt")
```

- Returns the size in Bytes.

Write a text file

```python
output_file = open("written-file.txt", "w")
output_file.write("A text string" + "\n")
output_file.close()
```

Read a text file

```python
input_file = open("written-file.txt", "r")
content = input_file.read()   # Read all lines of the file.
content = content.strip()     # Remove trailing new line.
print(content)
input_file.close()
```

Write to a CSV file

```python
import csv

output_file = open("my-file.csv", "w", newline='')
csv_writer = csv.writer(output_file, delimiter=',', quotechar='"',
                        quoting=csv.QUOTE_NONNUMERIC)
csv_writer.writerow(["Host", "IP"])
csv_writer.writerow(["localhost", "127.0.0.1"])
output_file.close()
```

my-file.csv

```
"Host","IP"
"localhost","127.0.0.1"
```

Read from a CSV file

```python
import csv

input_file = open("my-file.csv", "r", newline='')
csv_reader = csv.reader(input_file, delimiter=',', quotechar='"')
for row in csv_reader:
    print(row)
input_file.close()
```

Output

```
['Host', 'IP']
['localhost', '127.0.0.1']
```

Write to a JSON file

Can write lists, dictionaries, float, int, string and Boolean types.

```python
import json

hosts = {}
hosts["localhost"] = "127.0.0.1"
output_file = open("my-file.json", "w", encoding="utf-8")
json.dump(hosts, output_file, ensure_ascii=False, indent=4)
output_file.close()
```

my-file.json

```json
{
    "localhost": "127.0.0.1"
}
```

Read from a JSON file

Can read lists, dictionaries, float, int, string and Boolean types.

```python
import json

input_file = open("my-file.json", "r", encoding="utf-8")
json_data = json.load(input_file)
input_file.close()
print(json_data)
```

Output

```
{'localhost': '127.0.0.1'}
```