

**Starter:** How do I output the `species` values for each of the dictionaries?

```
animals = [  
    {'species': 'zebra', 'name': 'Penelope'},  
    {'species': 'penguin', 'name': 'Jenn'},  
    {'species': 'elephant', 'name': 'Harris'},  
    {'species': 'flamingo', 'name': 'Florence'},  
]
```



Python Session 5

This session

1. Files
2. Pip package manager
3. APIs

## Reading/Writing Files

## Writing to a file

```
In [1]: with open('people.txt', 'w+') as text_file:  
        people = 'Joanne \nSusan \nAmina'  
  
        text_file.write(people)
```

## Reading from a file

```
In [2]: with open('people.txt', 'r') as text_file:
        contents = text_file.read()

        print(contents)
```

Joanne  
Susan  
Amina

**Exercise 5.1:** Create a to-do list program that writes user input to a file

The program should:

- Ask the user to input a new to-do item
- Read the contents of the existing to-do items
- Add the new to do item to the existing to-do items
- Save the updated to-do items

You will need to manually create a new file called `todo.txt` in the same folder as your program before you start

## Solution

```
In [3]: new_item = input('Enter a to-do item: ')

with open('todo.txt', 'r') as todo_file:
    todo = todo_file.read()

todo = todo + new_item + '\n'

with open('todo.txt', 'w+') as todo_file:
    todo_file.write(todo)
```

Enter a to-do item: Walk the dog



## **Working With CSV Files**

## Writing a CSV

```
In [4]: import csv

field_names = ['name', 'age']

data = [
    {'name': 'Jill', 'age': 32},
    {'name': 'Sara', 'age': 28},
]

with open('team.csv', 'w+') as csv_file:
    spreadsheet = csv.DictWriter(csv_file, fieldnames=field_names)

    spreadsheet.writeheader()
    spreadsheet.writerows(data)
```

## Reading a CSV

```
In [5]: import csv

with open('team.csv', 'r') as csv_file:
    spreadsheet = csv.DictReader(csv_file)

    headers = spreadsheet.fieldnames
    print(headers)

    for row in spreadsheet:
        print(dict(row))
```

```
['name', 'age']
{'name': 'Jill', 'age': '32'}
{'name': 'Sara', 'age': '28'}
```

**Exercise 5.2:** This program is supposed to read data about trees from a file to find the shortest tree. Complete the program adding code to open `trees.csv`.

The `trees.csv` file included with your student guides. Save the csv file in the same folder as your Python program.

**Extension:** Find the tallest tree and print its height

```
In [ ]: spreadsheet = # Add code to open the csv file

headers = spreadsheet.fieldnames
print(headers)

heights = []

for row in spreadsheet:
    tree_height = row['height']
    heights.append(tree_height)

shortest_height = min(heights)
print(shortest_height)
```

## Solution

```
In [7]: import csv

with open('trees.csv', 'r') as csv_file:
    spreadsheet = csv.DictReader(csv_file)

    headers = spreadsheet.fieldnames
    print(headers)

    heights = []

    for row in spreadsheet:
        tree_height = row['height']
        heights.append(tree_height)

shortest_height = min(heights)
print(shortest_height)
```

```
['id', 'height', 'species', 'age']
```

```
107
```

## Extension solution

```
In [8]: import csv

with open('trees.csv', 'r') as csv_file:
    spreadsheet = csv.DictReader(csv_file)

    headers = spreadsheet.fieldnames
    print(headers)

    heights = []

    for row in spreadsheet:
        tree_height = row['height']
        heights.append(tree_height)

shortest_height = min(heights)
print(shortest_height)

tallest_height = max(heights)
print(tallest_height)
```

```
['id', 'height', 'species', 'age']
```

```
107
```

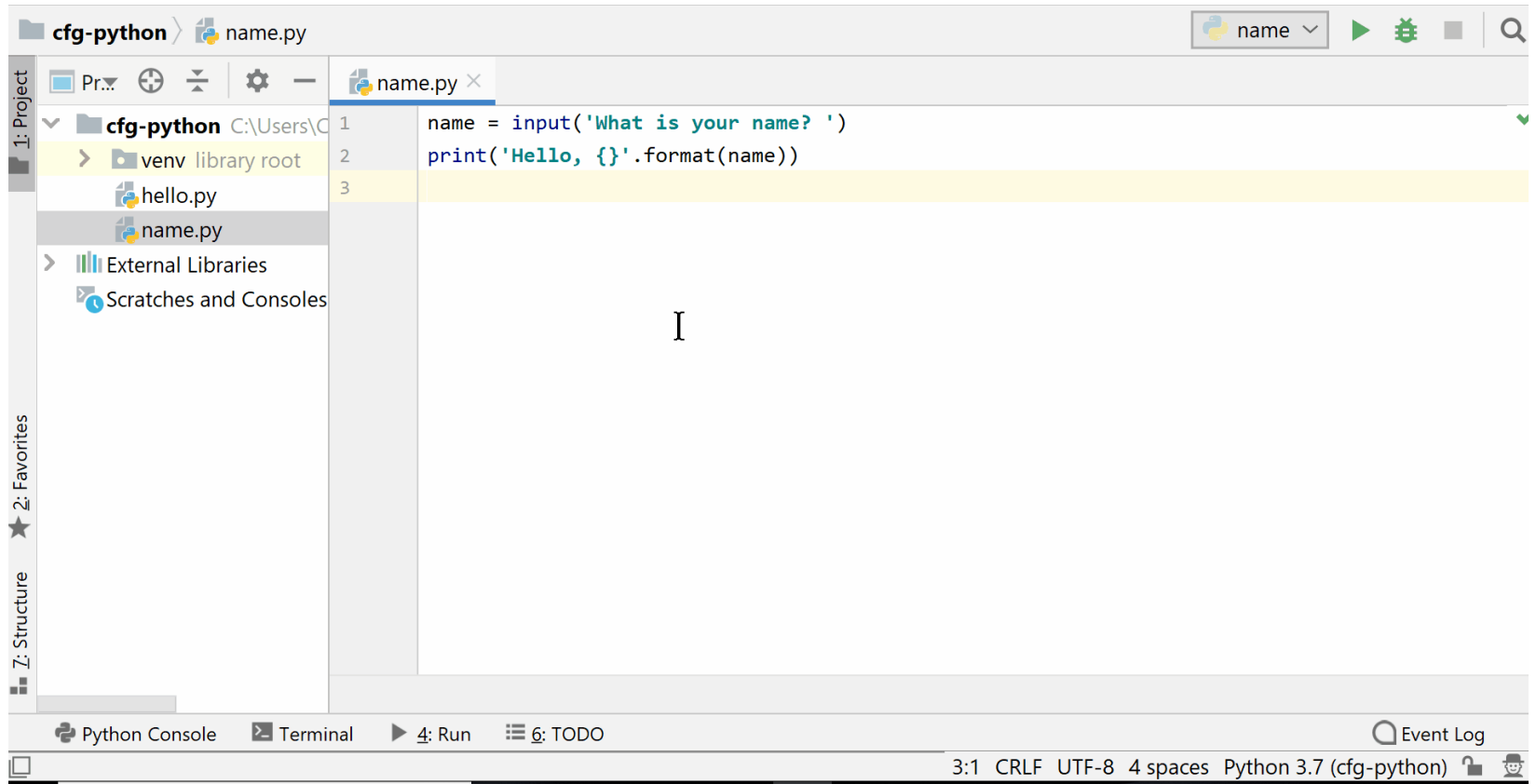
```
998
```

**Python Pip**

**pip:** A package manager used to install libraries that other people have written



pip is used via the terminal (command-line)



Install the requests library using pip

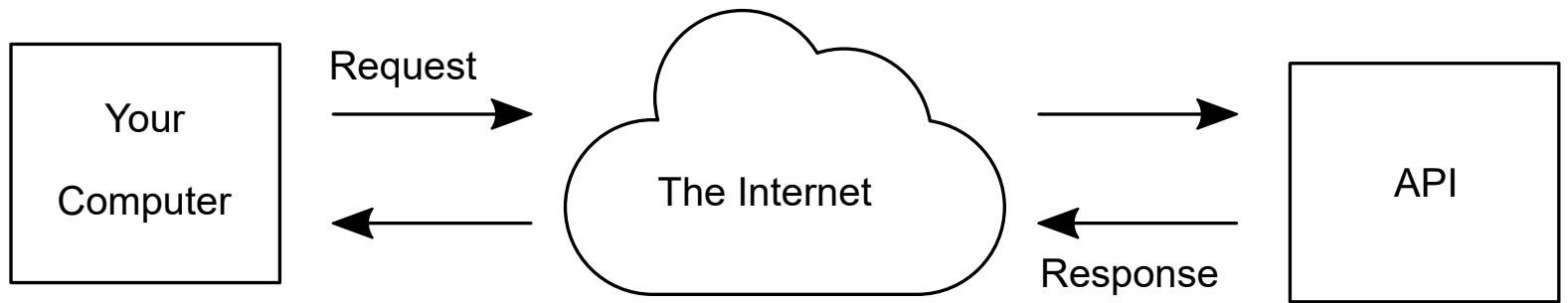
command-line

```
pip install requests
```

**APIs: Reading Stuff**

**Application Programming Interface (API):** A way for different programs to interact. For example they can send data to one another.

Web APIs allow you to interact with other programs over the internet.



**API Request:** When your program asks an API for some or to complete a specific action

**API Response:** The result of your request from the API

The Cat API is an API to get Cats

[thecatapi.com](https://thecatapi.com/) (<https://thecatapi.com/>).

We're going to use it to get information about the dozens of cat breeds

Save this as `cat_breeds.py`

```
In [ ]: import requests
        from pprint import pprint

        url = 'https://api.thecatapi.com/v1/breeds'

        response = requests.get(url)
        print(response)

        breeds = response.json()
        pprint(breeds)
```



Reponse status codes:

Status Code	Name	Explanation
200	OK	The request worked
404	Not found	Couldn't find the url you requested
400	Bad request	The request you made isn't understood

**Exercise 5.3:** Get the *name* and *origin* of all cat breeds and print the output

Extension: Print if the breed is typically intelligent ( `intelligence` is equal to or greater than 4 )

## Solution

```
In [ ]: import requests

url = 'https://api.thecatapi.com/v1/breeds'

response = requests.get(url)
print(response)

breeds = response.json()

for breed in breeds:
    print('Name: {}'.format(breed['name']))
    print('Origin: {}'.format(breed['origin']))
    print()
```

## Extension Solution

```
In [ ]: import requests

url = 'https://api.thecatapi.com/v1/breeds'

response = requests.get(url)
print(response)

breeds = response.json()

for breed in breeds:
    print('Name: {}'.format(breed['name']))
    print('Origin: {}'.format(breed['origin']))
    if breed['intelligence'] >= 4:
        print('Intelligent')
    print()
```

## Save to files

```
In [1]: import requests

url = 'https://api.thecatapi.com/v1/images/search?format=src'

response = requests.get(url)
with open('cat.png', 'wb+') as f:
    f.write(response.content)
```



**Recap**

This session

1. Files
2. Pip package manager
3. APIs



**Question 1:** What is a web API?

**Question 2:** What is the purpose of pip and PyPI?

**Question 3:** Explain what this code does:

```
In [ ]: import requests

url = 'https://api.thecatapi.com/v1/breeds'
response = requests.get(url)
data = response.json()

print(data['description'])
```

**Homework:** Session 5 homework questions on the mini-site

Look at the project suggestions in your project guide and think about which one you might like to work on