Python One Cool Cat (Meow Facts) Tkinter Tutorial

Contents

Time required: 60 minutes

- Comment each line of code as show in the tutorials and other code examples.
- Follow all directions carefully and accurately.
- Think of the directions as minimum requirements.

Public API's

NOTE: You don't have to use the API in this tutorial, you can use any API you wish.

There are hundreds of public API's available. This website contains a list of some of them.

https://github.com/public-apis/public-apis

Meow Facts API

Meow Facts is a simple API with only item returned, a random Meow Fact.

We are going to create a Python program to get a Meow Fact and display it.

Before we do that, we have a few new concepts to go through.

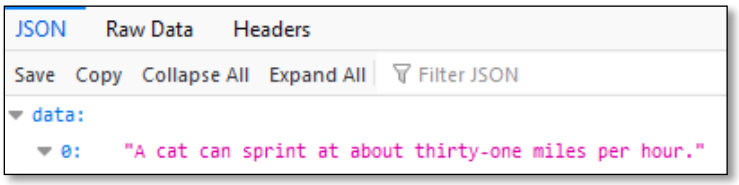
What is JSON?

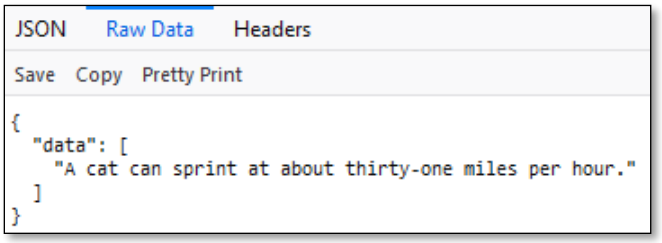
The Meow Facts is a free https-based joke API which provides a JSON response.

Raw API data is typically in a text file in JSON or XML format. For our API projects, we will use JSON.

JavaScript Object Notation (JSON) is an open standard file and data interchange format. It uses human-readable text to store and transmit data objects consisting of attribute–value pairs and array data types.

Go to https://meowfacts.herokuapp.com/ to see some raw JSON data in two different formats.





This JSON is a list inside of a dictionary. You work from the outside in.

1. Access the dictionary key: (“data”)
2. Access the list inside the dictionary: (“data”)[0]

meow_facts.get(“data”)[0]

What is a Dictionary?

A dictionary is a list of items. Dictionaries are mutable, they can be changed.

Here is a Python list that contains the number of days in the months of the year.

```
days = [31, 28, 31, 30, 31, 30, 31, 31, 30, 31, 30, 31]
```

If we want the number of days in January, use `days[0]`. December is `days[11]` or `days[-1]`.

Here is a dictionary of the days in the months of the year:

```
days = {'January':31, 'February':28, 'March':31, 'April':30, 'May':31,
       'June':30, 'July':31, 'August':31, 'September':30, 'October':31,
       'November':30, 'December':31}
```

To get the number of days in January, we use `days['January']`.

One benefit of using dictionaries is the code is more readable. We don't have to figure out which index in the list a given month is at.

Unlike other sequences, items in dictionaries are unordered. The first item in a list named spam would be `spam[0]`. There is no "first" item in a dictionary. The dictionary does remember the order of entry. While the order of items matters for determining whether two lists or tuples are the same, it does not matter in what order the key-value pairs are typed in a dictionary.

Dictionary Basics

Parameter	Details
`Key`	The desired key to lookup
`value`	The value to set or return

Tutorial: Meow Facts

Install the Python Requests Library

To retrieve information from API's, we expand the functionality of default Python. Requests is a Python Library that lets you send HTTP/1.1 requests, add headers, form data, multipart files, and parameters with Python dictionaries. It lets you access the response data in the same way.

Requests are synchronous. Only one HTTP call can be made at a time.

In Windows, go to a command prompt.

```
pip install requests
```

The command should either install requests or confirm that it is already installed.

Developing a Web API Program

A good way to start developing a Python Web API program is to keep it simple until you can get is to work. After you have figured out how to access the json data, time to put that into a program.

Create the following program named **meow_facts.py** which demonstrates how to access a Web API data with Python.

Right Click the URL below, Click Copy Link location. Paste this into your program to avoid typo's.

https://meowfacts.herokuapp.com/

```python
"""
    Name: meowfacts_cli.py
    Author: William A Loring
    Created: 04/18/21
    Purpose: Get random cat facts from https://meowfacts.herokuapp.com
"""

# Install requests module
# pip install requests
# Import requests module
import requests

# URL for mewfacts API
URL = "https://meowfacts.herokuapp.com/"

# Get requests object from URL
response = requests.get(URL)
# Print response for troubleshooting
# Comment out this line when the program is working
print(response)

# Convert requests json requests object to Python dictionary
meowfacts = response.json()

# Comment out this line when the program is working
print()
# Print dictionary for troubleshooting
# Comment out this line when the program is working
print(meowfacts)

# Print just the data using dictionary created from API Json
print()
print(meowfacts.get("data")[0])
```

Example run:

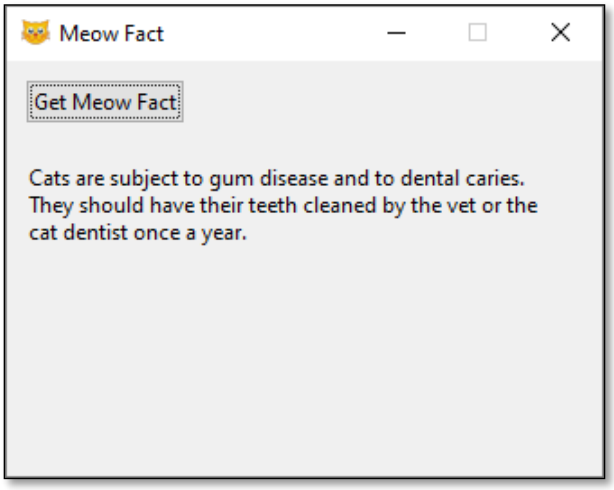
```
<Response [200]>

{'data': ["Siamese kittens are born white because of the heat inside the mother'
s uterus before birth. This heat keeps the kittens' hair from darkening on the p
oints."]}

Siamese kittens are born white because of the heat inside the mother's uterus be
fore birth. This heat keeps the kittens' hair from darkening on the points.
```

This is a very simple example of an API call.

Time for Meow Facts GUI



Let's jazz up our program with a little Object Oriented TKinter.

A Good Icon

The most important part of creating a GUI program is getting just the right icon for the program. Icon Archive has a lot of open-source icon (ico) files you can use in your program.

https://iconarchive.com/

The Code

Once you have a good framework of a program established, it is easy to change it to another API.

```python
"""
Name: meowfacts_gui.py
Author: William Loring
Created: 05/01/2021
Purpose: Get a random meowfact
"""

from tkinter import *
from tkinter.ttk import *
import requests


class MeowFactsGUI:
    # URL API endpoint as a class constant
    # It belongs to the class, not the object
    URL = "https://meowfacts.herokuapp.com"

    def __init__(self):
        # Create Tkinter GUI
        self.root = Tk()
        self.root.title("Meow Fact")
        self.root.geometry("330x230+250+250")
        self.root.iconbitmap("cat2.ico")

        self.create_widgets()
        mainloop()
```

get_data()

```python
    # ------------------ GET AND DISPLAY API DATA ------------------------ #
    def get_data(self, *args):
        # Use the requests.get() function to get API data
        response = requests.get(MeowFactsGUI.URL)

        # Convert the JSON data into a Python dictionary
        data = response.json()
        # Get the data key which returns the value
        # Then get the first item in the list
        meow_fact = data.get("data")[0]
        self.lbl_display.configure(text=meow_fact)
```

create_widgets()

```
    # ---------------------------- CREATE WIDGETS ------------------------ #
    def create_widgets(self):
        # Set the wraplength property to wrap the text at 300 pixels
        self.lbl_display = Label(wraplength=300, justify="left")

        self.btn_get_data = Button(text="Get Meow Fact", command=self.get_data)

        self.btn_get_data.grid(row=0, column=0, sticky=W)
        self.lbl_display.grid(row=1, column=0, sticky=W)

        # Set padding for all widgets
        for child in self.root.winfo_children():
            child.grid_configure(padx=10, pady=10)

        # Bind both enter key to the get_data method
        # When either Enter key is pressed,
        # the get_data method will be fired
        # <Return> - Enter key on main keyboard
        # <KP_Enter> - Enter key on number pad/key pad
        # <ESC> - Escape key to close program
        self.root.bind("<Escape>", self.quit)
        self.root.bind("<Return>", self.get_data)
        self.root.bind("<KP_Enter>", self.get_data)

    # ---------------------------- QUIT PROGRAM ---------------------------- #
    def quit(self, *args):
        self.root.quit()
        self.root.destroy()


# Create program object to start program
meowfacts_gui = MeowFactsGUI()
```

You can use this program as a template to develop your own API programs.

Assignment Submission

1. Attach the program files.
2. Attach screenshots showing the successful operation of the program.
3. Submit in Blackboard.