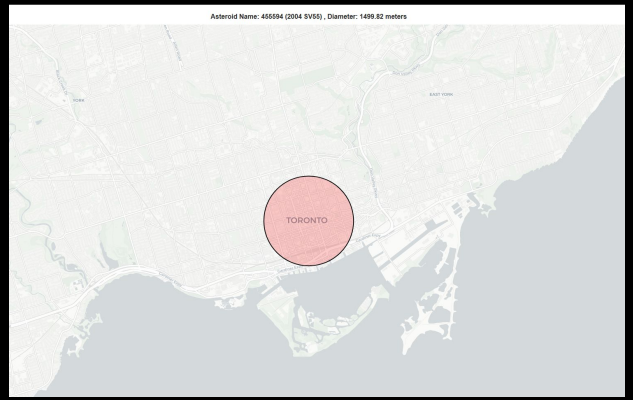
```
C:\Users\d_ils>python
Python 3.7.4 (tags/v3.7.4:e09359112e, Jul  8 2019, 19:29:22) [MSC v.1916 32 bit (Intel)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> help("the secret to the universe")
No Python documentation found for 'the secret to the universe'.
Use help() to get the interactive help utility.
Use help(str) for help on the str class.

>>>
```

>>> NASA's NEO Checker



Fun App
Python for beginner/intermediate

Alpha Coding

Before Starting

You are going to be given a broken program.

Try not to get overwhelmed by the things you don’t recognize.

The goal for this project is to work around what you don’t know to solve a problem. To do this, we will make use of:

- Identifying what we know
- Understanding the types of errors
- Testing educated guesses

These tools will help you explore on your own side projects!

Resources

Download and install once:

Folium (for the map) : https://python-visualization.github.io/folium/installing.html

Requests (to use the api) : https://python-visualization.github.io/folium/installing.html

(Optional) Get your very own NASA API key to use real NASA data:

https://api.nasa.gov/

What is it *supposed* to do?

Useful Terms

NEO's:

NEO's are near-earth objects, mainly asteroids.

API's:

API's are just the way people with data have setup letting you get access to it.

Explanation

The Program:

The program asks you for a date, it then checks NASA's real database for all the NEO's that have their closest ever distance to earth on that date. It prints them all to a numbered list in the terminal.

Then if you choose to visualize one, it will open a browser tab and draw a circle the size of it over Toronto on the map.

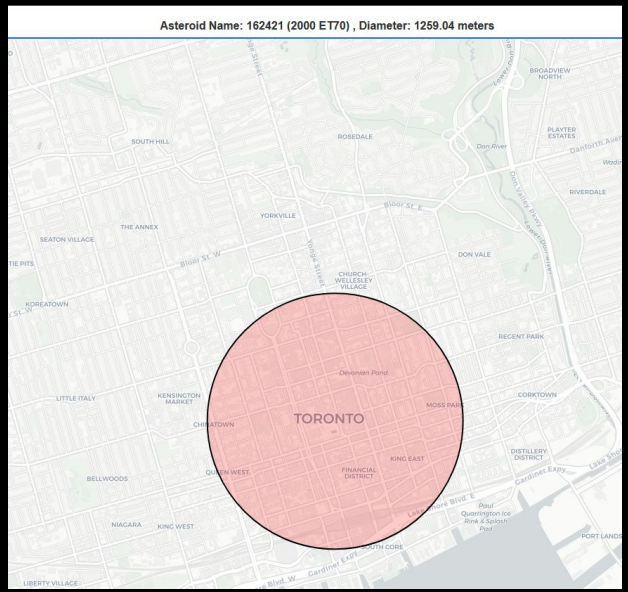
What is it *supposed* to do?

```
Input a date in the format YYYY-MM-DD Including the dashes (ex 2023-01-21). Leave blank for today:


Asteroids closest to earth on 2023-02-22:

1. 86450 (2000 CK33):
        Diameter = 555.33m - 1241.77m
        Velocity = 45323.05 km/h
        Miss Distance = 0.43 AU
        Possibly Dangerous = False
2. 162421 (2000 ET70):
        Diameter = 563.06m - 1259.04m
        Velocity = 57312.14 km/h
        Miss Distance = 0.28 AU
        Possibly Dangerous = True
3. 455594 (2004 SV55):
        Diameter = 670.74m - 1499.82m
        Velocity = 137812.26 km/h
        Miss Distance = 0.40 AU
        Possibly Dangerous = False
```

```
Would you like to visualize an asteroid? y/n:
y
Which one? Input either its number in the list or max for biggest:
2
```



Error Types to Watch Out For!

TypeError

Using the wrong type of data for the job.

Example:
Trying to do math on a word like “seven” < 10

NameError

Python didn’t understand a variable name you used

Example:
print(message) without doing message = “words”

IndexError

You tried to look at an index that doesn’t exist

Example:
my_list = [1,2,3]
print(my_list[3])

Logic Error

You got no errors, python understood perfectly. But the result isn’t what you wanted!

This won’t appear in the terminal.

General Debugging Tips

Identify the problem

Narrow down the cause of the problem in the code

Consider what you already know / what you can learn easily

Use context to make educated guesses about what you don't understand.

Make and test solution!

<u>Ask precise questions!</u>

If you use google, try to avoid including the parts of code specific to what you are doing.

Instead of :

"What does my_text.upper() do?"

Try :

"python .upper() method"

Instructor Notes

Errors:

Lat/Long Swapped - logic error **ZOOM OUT**
You will find you are in antarctica.

‘toronto_cords' is not defined - NameError

index = int(display_choice) - IndexError: list index out of range, needs -1

name.append should be appending the variable not a string “name” - logic error

index = display_choice - Type Error, wrong type of data we can’t use words like numbers

General Notes:

-Miss Distance is the distance the object will miss the earth by.

-Demo api key is limited to 30/IP per hour, requesting a real one is instant

- You will probably need to explain 1 AU
Is from here to the sun

-The circle is just the size vs toronto, not impact area or size. ~10km wide on impact wipes out life.

- 2024-10-13 is the date the biggest NEO is listed