GDG VIT Vellore

OPEN SOURCE DEVELOPMENT FOR GOOGLE APPLICATIONS

Course Code : EXC1081
(2 credit course)

Semester End Project

Topic: INTERNATIONAL SPACE STATION DETAILS

A project by :
Sahil Deshpande (16BCE0724)

Submitted To :
GDG VIT Vellore

VIT UNIVERSITY
(Estd. u/s 3 of UGC Act 1956)
VELLORE ▪ CHENNAI
www.vit.ac.in

ABSTRACT

The International Space Station(ISS) is constantly orbiting the earth. It is very important and useful to know the position of the ISS at any given point of time. This project aims to retrieve data from an online website, understand the data and use it to find the names of the people aboard the ISS and also find its position. Using its position, the ISS will be mapped to a graph(world map) to visualize the ISS over the earth. We shall implement this project in python 3.x.

INTRODUCTION

This project focuses on displaying information about the ISS. As we do not know the details of the ISS ourselves, we use an API to make a call to the website that holds the information and get the details of the ISS. The response is then collected and stored so that it can be displayed whenever. On obtaining the latitude and longitude of the ISS, we call a plotting function to display the position of the ISS on the world map. In addition to the plotting of the ISS location, the current time and date are also displayed so that we know at what date and time the ISS spotted at those coordinates.

METHODOLOGY

In order to find the names of the people on the ISS and its position, we called the two APIs to retrieve the information.

API to find names of people on ISS = 'http://api.open-notify.org/astros.json'
API to find coordinates of ISS = ="http://api.open-notify.org/iss-now.json"

The response from these APIs are in JSON format. Therefore while retrieving the data using json package to understand the response. The particular attribute of the JSON format response can then be stored in a separate variable.

json.loads() converts the input string into a list

The turtle package is imported to plot the position of the ISS on a graph(world map).
turtle.Screen() creates a graphics window
turtle.Turtle() creates a new turtle

The time.ctime() function from the time package is used to get the current date and time.

Python Code

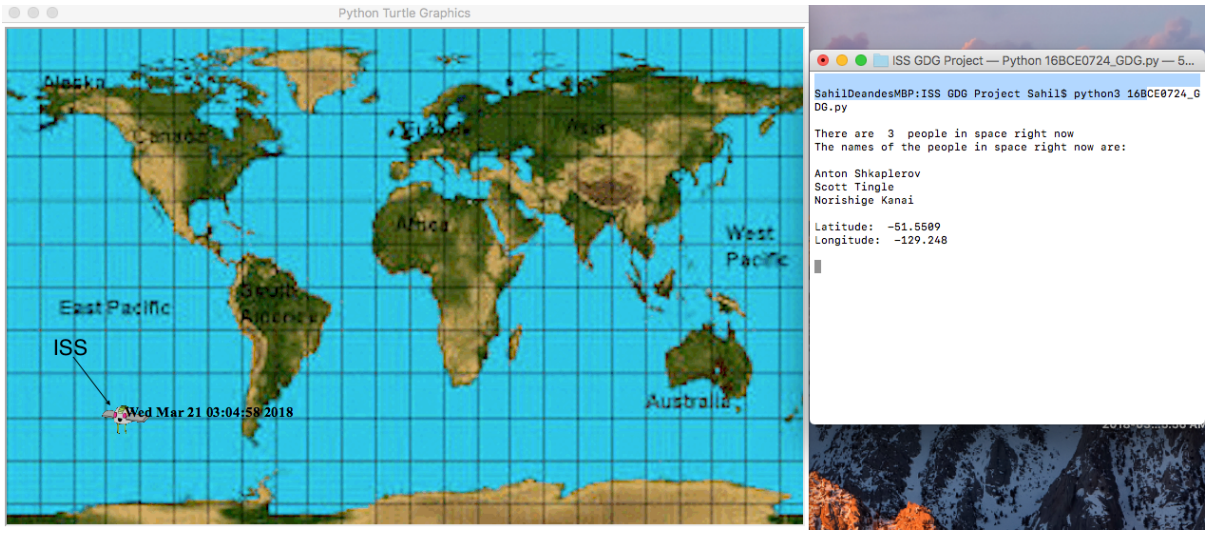
```
import json
import turtle as tr
import urllib.request
import time

#To get the names of the people on the ISS
api1='http://api.open-notify.org/astros.json'
response=urllib.request.urlopen(api1)
result=json.loads(response.read())
print('\nThere are ',result['number'],' people in space right now')
print('The names of the people in space right now are: \n')
iss_people=result['people']
for i in iss_people:
        print(i['name'])

#To get the geogrophical coordinates of the ISS
api2="http://api.open-notify.org/iss-now.json"
```

```
response=urllib.request.urlopen(api2)
result=json.loads(response.read())
location=result['iss_position']
latitude=float(location['latitude'])
longitude=float(location['longitude'])
print('\nLatitude: ',latitude)
print('Longitude: ',longitude,'\n')

#Setting up the display on the screen
display=tr.Screen()

#Fitting the screen according to the image dimensions
display.setup(850,533)

#Setting latitudes and longitudes on the map
display.setworldcoordinates(-180,-90,180,90)

#Setting World Map as the background image
display.bgpic('world_map.gif')
display.register_shape('marker.gif')
iss_tur=tr.Turtle()
iss_tur.shape('marker.gif')
iss_tur.setheading(90)
iss_tur.penup()
iss_tur.goto(longitude,latitude)
style=('Times New Roman',15,'bold')

#Display date and time
iss_tur.write(time.ctime(),font=style)

#Random input taken to prevent map from closing immediately
i=input()
```

RESULTS

```python
import json
import turtle as tr
import urllib.request
import time

#To get the names of the people on the ISS
api1='http://api.open-notify.org/astros.json'
response=urllib.request.urlopen(api1)
result=json.loads(response.read())
print('\nThere are ',result['number'],' people in space right now')
print('The names of the people in space right now are: \n')
iss_people=result['people']
for i in iss_people:
    print(i['name'])

#To get the geogrophical coordinates of the ISS
api2="http://api.open-notify.org/iss-now.json"
response=urllib.request.urlopen(api2)
result=json.loads(response.read())
location=result['iss_position']
latitude=float(location['latitude'])
longitude=float(location['longitude'])
print('\nLatitude: ',latitude)
print('Longitude: ',longitude,'\n')

#Setting up the display on the screen
display=tr.Screen()

#Fitting the screen according to the image dimensions
display.setup(850,533)

#Setting latitudes and longitudes on the map
display.setworldcoordinates(-180,-90,180,90)

#Setting World Map as the background image
display.bgpic('world_map.gif')
display.register_shape('marker.gif')
iss_tur=tr.Turtle()
iss_tur.shape('marker.gif')
iss_tur.setheading(90)
iss_tur.penup()
iss_tur.goto(longitude,latitude)
style=('Times New Roman',15,'bold')

#Display date and time
iss_tur.write(time.ctime(),font=style)

#Random input taken to prevent map from closing immediately
i=input()
```

On implementing the above python code, we got the following as output



The terminal display the names of the people aboard the ISS right now. The mapping of the ISS is done according to the latitudes and longitudes received from the API. The time at which the position of the ISS is also mentioned.

CONCLUSION

From the given APIs it was possible to get the names of the people on the International Space Station and even find its location by specific its latitude and longitude. Using the coordinates of the ISS, we were successfully able to map the coordinates of the ISS on a graph(world map).

The position of the ISS was noted from time to time. It was observed that the ISS travels at a very fast velocity as it kept shifting positions on the map in a matter of minutes.

REFERENCES

1. http://interactivepython.org/runestone/static/thinkcspy/PythonTurtle/OurFirstTurtleProgram.html

2. https://www.dataquest.io/blog/python-api-tutorial/

3. https://docs.python.org/2/library/time.html