

Hunter College Open Data Showcase



Format

- Hands-on activities, intermixed with short explanations.



Format



- Hands-on activities, intermixed with short explanations.
- You're welcome to work ahead (links on table tents).

Format



- Hands-on activities, intermixed with short explanations.
- You're welcome to work ahead (links on table tents).
- Our goals: for you to

Format



- Hands-on activities, intermixed with short explanations.
- You're welcome to work ahead (links on table tents).
- Our goals: for you to
 - ▶ explore NYC OpenData,

Format



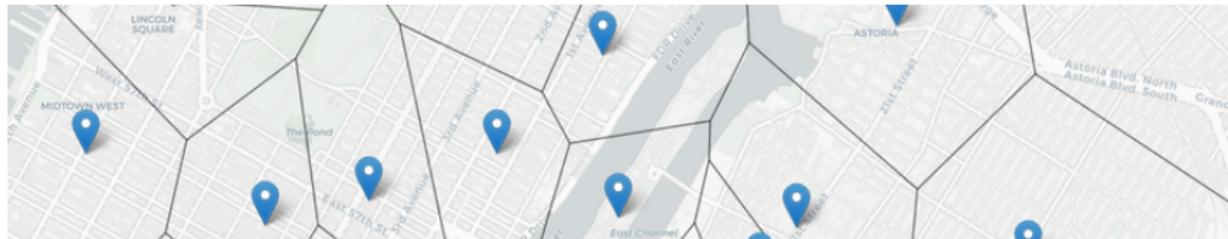
- Hands-on activities, intermixed with short explanations.
- You're welcome to work ahead (links on table tents).
- Our goals: for you to
 - ▶ explore NYC OpenData,
 - ▶ see how much fun Python is,

Format



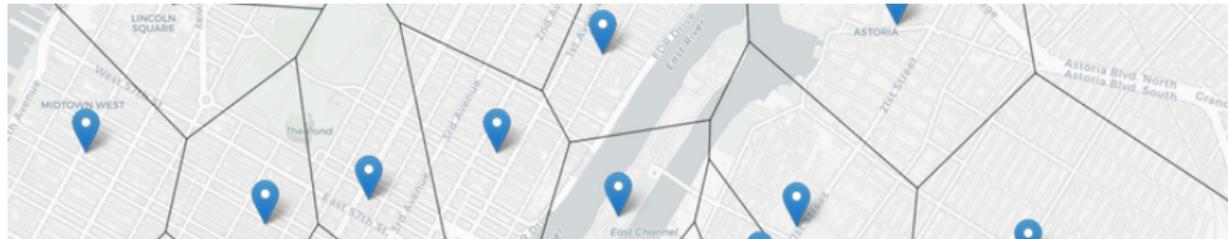
- Hands-on activities, intermixed with short explanations.
- You're welcome to work ahead (links on table tents).
- Our goals: for you to
 - ▶ explore NYC OpenData,
 - ▶ see how much fun Python is,
 - ▶ interact with our fabulous computer science students.

Hunter College Open Data Showcase



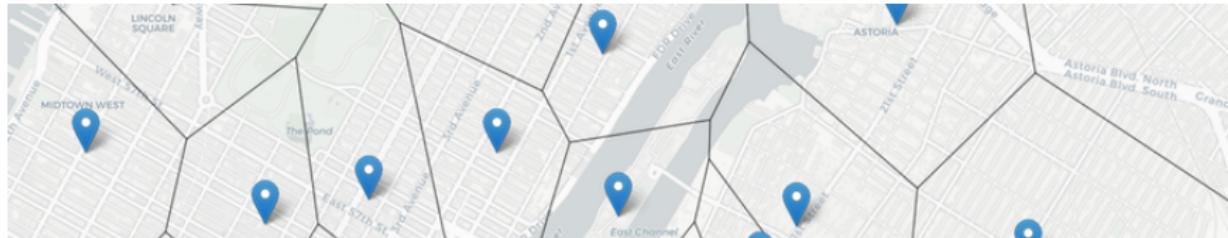
- Welcome, introductions, & logistics,

Hunter College Open Data Showcase



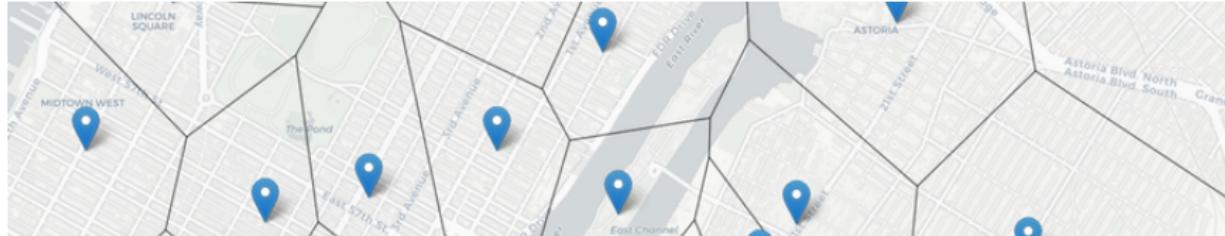
- Welcome, introductions, & logistics,
- Getting started with Python: GIS data of NYC libraries,

Hunter College Open Data Showcase



- Welcome, introductions, & logistics,
- Getting started with Python: GIS data of NYC libraries,
- Using structured data: who gets the most parking tickets, and

Hunter College Open Data Showcase



- Welcome, introductions, & logistics,
- Getting started with Python: GIS data of NYC libraries,
- Using structured data: who gets the most parking tickets, and
- If time, making HTML maps of WIFI locations and 311 calls.

Introductions

Joint event:

- Hunter College Computer Science,
- Hunter College Undergraduate Admissions, and
- The Mayor's Office for Data Analytics.



Katherine St. John
Professor
Computer Science



William Sakas
Professor & Chair
Computer Science



Joe Fantozzi, Jr.
Deputy Director
Undergraduate
Admissions



Stewart Weiss
Professor
Computer Science



Dominic Mauro
Assistant General Counsel
NYC Dept of
Information Technology
& Telecommunications

Teaching Assistants & Volunteers



- We have over 600 computer science majors at Hunter College.

Teaching Assistants & Volunteers



- We have over 600 computer science majors at Hunter College.
- With us today: the amazing teaching assistants and volunteers are computer science majors and minors.

Teaching Assistants & Volunteers



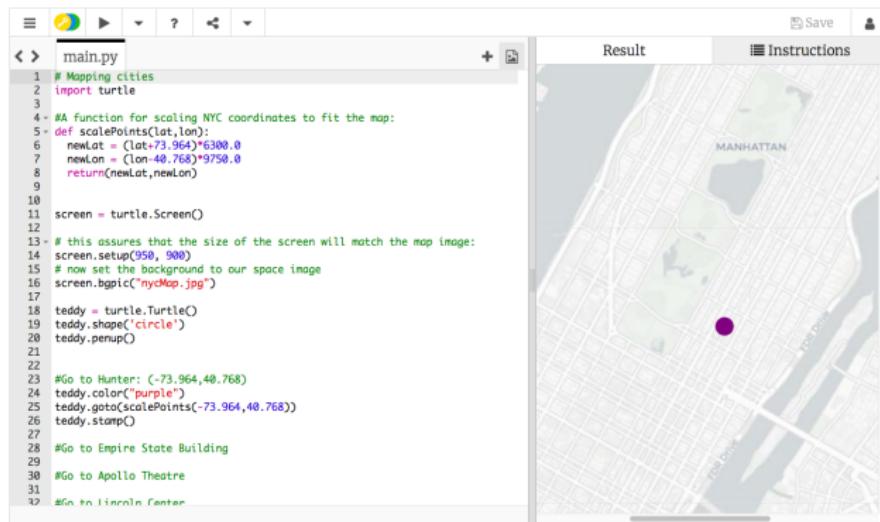
- We have over 600 computer science majors at Hunter College.
- With us today: the amazing teaching assistants and volunteers are computer science majors and minors.
- Thanks to the Undergraduate Teaching Assistants Program and the Hunter Women in Computer Science Club!

Introductions: Your Turn



- Introduce yourself to two others (that you have not met before).
- If you are just arriving, you can exchange your ID for a computer. Access info on the table tents.

First Activity: Getting Started



The screenshot shows a Python code editor with a script named `main.py`. The code uses the `turtle` module to draw a purple circle at the Empire State Building's coordinates on a map of Manhattan. The map is titled "Result" and shows the New York City skyline with the Empire State Building highlighted.

```
main.py
1 # Mapping cities
2 import turtle
3
4 # A Function for scaling NYC coordinates to fit the map:
5 def scalePoints(lat,lon):
6     newLat = (lat+73.964)*6300.0
7     newLon = (lon-48.768)*9750.0
8     return(newLat,newLon)
9
10 screen = turtle.Screen()
11
12 # this assures that the size of the screen will match the map image:
13 screen.setup(950, 900)
14 # now set the background to our space image
15 screen.bgpic("nyMap.jpg")
16
17 teddy = turtle.Turtle()
18 teddy.shape("circle")
19 teddy.penup()
20
21
22 #Go to Hunter: (-73.964,48.768)
23 teddy.color("purple")
24 teddy.goto(scalePoints(-73.964,48.768))
25 teddy.stamp()
26 teddy.st()
27
28 #Go to Empire State Building
29
30 #Go to Apollo Theatre
31
32 #Go to Lincoln Center
```

- Using Python `turtle`: A simple, whimsical graphics package.

First Activity: Getting Started

The screenshot shows a Python code editor with a script named `main.py`. The code uses the `turtle` module to draw on a map of Manhattan. A purple dot is drawn at the coordinates (-73.964, 40.768), which corresponds to the Hunter College location. The map also shows the Empire State Building and the Apollo Theatre.

```
main.py
1 # Mapping cities
2 import turtle
3
4 # A Function for scaling NYC coordinates to fit the map:
5 def scalePoints(lat,lon):
6     newLat = (lat+73.964)*6300.0
7     newLon = (lon-48.768)*9750.0
8     return(newLat,newLon)
9
10 screen = turtle.Screen()
11
12 # this assures that the size of the screen will match the map image:
13 screen.setup(950, 900)
14 # now set the background to our space image
15 screen.bgpic("nyMap.jpg")
16
17 teddy = turtle.Turtle()
18 teddy.shape("circle")
19 teddy.penup()
20
21
22 #Go to Hunter: (-73.964,40.768)
23 teddy.color("purple")
24 teddy.goto(scalePoints(-73.964,40.768))
25 teddy.stamp()
26
27
28 #Go to Empire State Building
29
30 #Go to Apollo Theatre
31
32 #Go to Lincoln Center
```

- Using Python `turtle`: A simple, whimsical graphics package.
Dates back to Logos Turtles in the 1960s.

First Activity: Getting Started

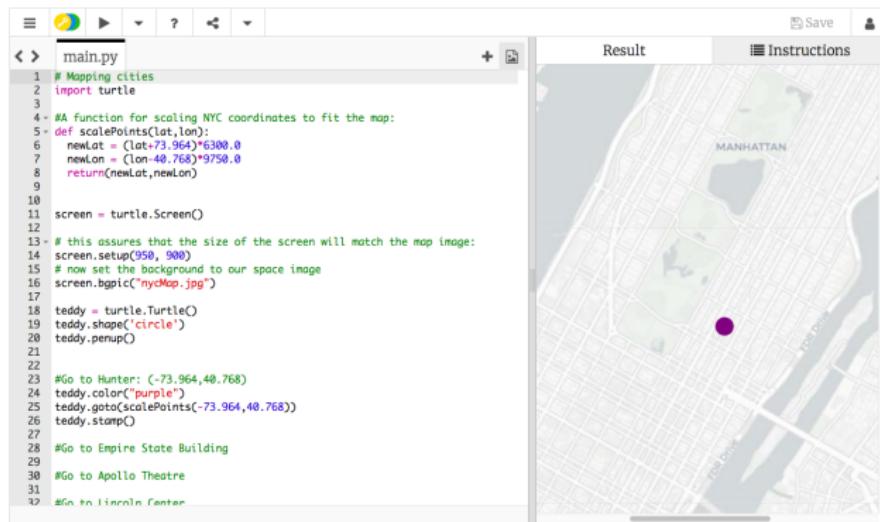
The screenshot shows a Python code editor interface. On the left, the code file 'main.py' is displayed with the following content:

```
1 # Mapping cities
2 import turtle
3
4 # A Function for scaling NYC coordinates to fit the map:
5 def scalePoints(lat,lon):
6     newLat = (lat+73.964)*6300.0
7     newLon = (lon-48.768)*9750.0
8     return(newLat,newLon)
9
10 screen = turtle.Screen()
11
12 # this assures that the size of the screen will match the map image:
13 screen.setup(950, 900)
14 # now set the background to our space image
15 screen.bgpic("nyMap.jpg")
16
17 teddy = turtle.Turtle()
18 teddy.shape("circle")
19 teddy.penup()
20
21
22 #Go to Hunter: (-73.964,48.768)
23 teddy.color("purple")
24 teddy.goto(scalePoints(-73.964,48.768))
25 teddy.stamp()
26
27
28 #Go to Empire State Building
29
30 #Go to Apollo Theatre
31
32 #Go to Lincoln Center
```

On the right, the 'Result' tab shows a map of Manhattan, New York City. A purple dot marks the location of Hunter College at approximately (-73.964, 48.768). The map also shows the Empire State Building, Apollo Theatre, and Lincoln Center.

- Using Python `turtle`: A simple, whimsical graphics package.
Dates back to Logos Turtles in the 1960s.
- Plotting GIS coordinates

First Activity: Getting Started

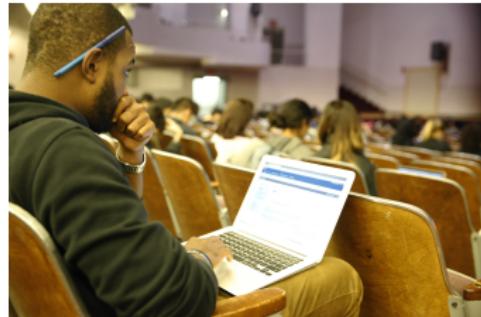


The screenshot shows a Python code editor with a file named 'main.py'. The code uses the 'turtle' module to draw a purple circle at specific coordinates on a map of Manhattan. The map is titled 'Result' and shows the New York City skyline with labels like 'MANHATTAN', 'ONE WORLD TRADE CENTER', and 'FDR DRIVE'. A purple dot is placed on the map at the coordinates (-73.964, 40.768).

```
main.py
1 # Mapping cities
2 import turtle
3
4 # A Function for scaling NYC coordinates to fit the map:
5 def scalePoints(lat,lon):
6     newLat = (lat+73.964)*6300.0
7     newLon = (lon-40.768)*9750.0
8     return(newLat,newLon)
9
10 screen = turtle.Screen()
11
12 # this assures that the size of the screen will match the map image:
13 screen.setup(950, 900)
14 # now set the background to our space image
15 screen.bgpic("nyMap.jpg")
16
17 teddy = turtle.Turtle()
18 teddy.shape("circle")
19 teddy.penup()
20
21
22 #Go to Hunter: (-73.964,40.768)
23 teddy.color("purple")
24 teddy.goto(scalePoints(-73.964,40.768))
25 teddy.stamp()
26
27
28 #Go to Empire State Building
29
30 #Go to Apollo Theatre
31
32 #Go to Lincoln Center
```

- Using Python `turtle`: A simple, whimsical graphics package.
Dates back to Logos Turtles in the 1960s.
- Plotting GIS coordinates
- NYC OpenData: locations of libraries

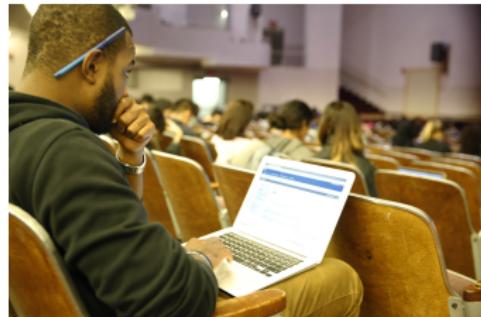
In Pairs or Triples: Getting Started



- Login info on table tents.



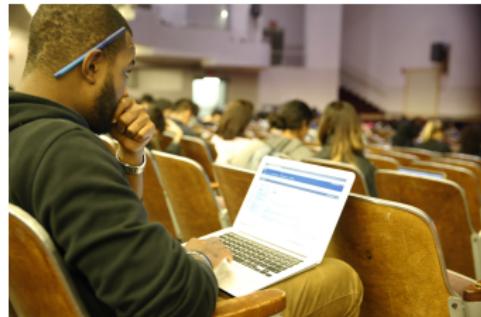
In Pairs or Triples: Getting Started



- Login info on table tents.
- Launch browser (left hand menu).



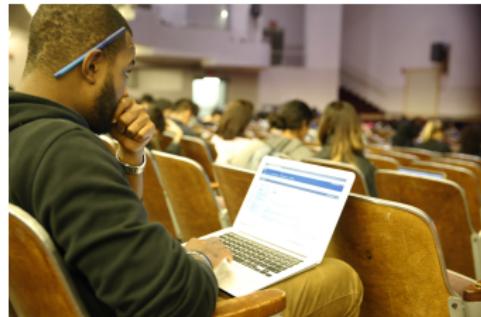
In Pairs or Triples: Getting Started



- Login info on table tents.
- Launch browser (left hand menu).
- First activity completely on-line.



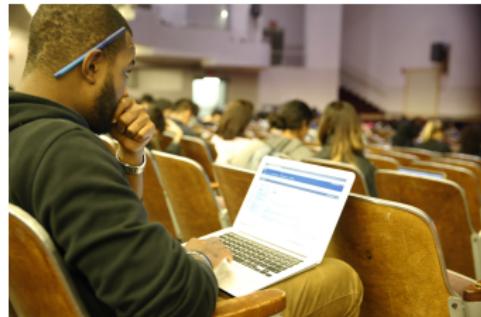
In Pairs or Triples: Getting Started



- Login info on table tents.
- Launch browser (left hand menu).
- First activity completely on-line.
- Alternate whose typing, so, all get a chance.



In Pairs or Triples: Getting Started



- Login info on table tents.
- Launch browser (left hand menu).
- First activity completely on-line.
- Alternate whose typing, so, all get a chance.
- Work at your own speed (all material is available on-line for later).

Recap: Python, Turtles, and OpenData

The screenshot shows a code editor window with a Python script named `main.py` on the left and its execution result on the right.

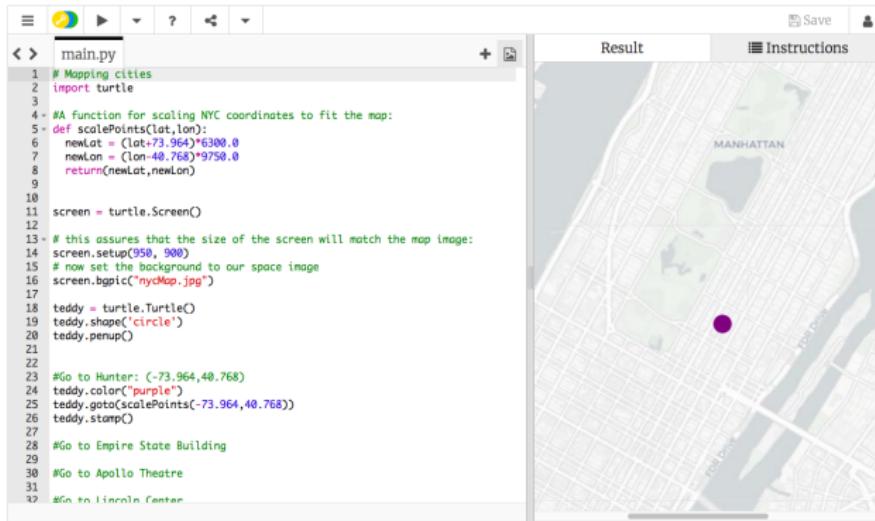
Code (main.py):

```
1 # Mapping cities
2 import turtle
3
4 # A function for scaling NYC coordinates to fit the map:
5 def scalePoints(lat,lon):
6     newLat = (lat+73.964)*6300.0
7     newLon = (lon-40.768)*9750.0
8     return(newLat,newLon)
9
10 screen = turtle.Screen()
11
12 # this assures that the size of the screen will match the map image:
13 screen.setup(950, 900)
14 # now set the background to our space image
15 screen.bgpic("nycMap.jpg")
16
17 teddy = turtle.Turtle()
18 teddy.shape('circle')
19 teddy.penup()
20
21
22 #Go to Hunter: (-73.964,40.768)
23 teddy.color("purple")
24 teddy.goto(scalePoints(-73.964,40.768))
25 teddy.stamp()
26
27 #Go to Empire State Building
28
29 #Go to Apollo Theatre
30
31 #Go to Lincoln Center
32
```

Result: The execution result shows a map of Manhattan, New York City. A purple dot is placed on the map at the coordinates corresponding to Hunter College, located near the intersection of First Avenue and 8th Street.

- Wrote simple Python programs with the `turtle` package.

Recap: Python, Turtles, and OpenData

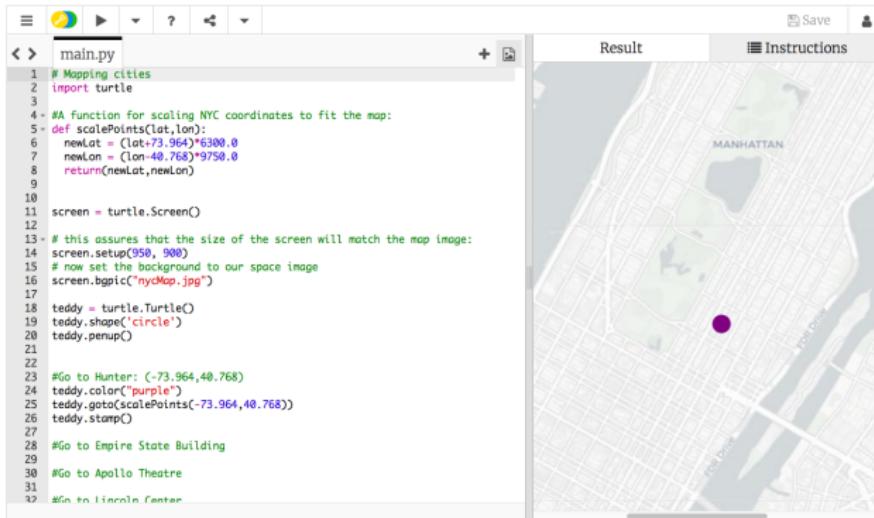


The screenshot shows a code editor with a Python script named `main.py` and a result window displaying a map of Manhattan. The code in `main.py` uses the `turtle` module to draw a purple circle at the coordinates (-73.964, 40.768), which corresponds to the Empire State Building.

```
1 # Mapping cities
2 import turtle
3
4 # A function for scaling NYC coordinates to fit the map:
5 def scalePoints(lat,lon):
6     newLat = (lat+73.964)*6300.0
7     newLon = (lon-40.768)*9750.0
8     return(newLat,newLon)
9
10 screen = turtle.Screen()
11
12 # this assures that the size of the screen will match the map image:
13 screen.setup(950, 900)
14 # now set the background to our space image
15 screen.bgpic("nycMap.jpg")
16
17 teddy = turtle.Turtle()
18 teddy.shape('circle')
19 teddy.penup()
20
21
22 #Go to Hunter: (-73.964,40.768)
23 teddy.color("purple")
24 teddy.goto(scalePoints(-73.964,40.768))
25 teddy.stamp()
26 teddy.stomp()
27
28 #Go to Empire State Building
29
30 #Go to Apollo Theatre
31
32 #Go to Lincoln Center
```

- Wrote simple Python programs with the `turtle` package.
- Plotted GIS coordinates.

Recap: Python, Turtles, and OpenData



The screenshot shows a code editor window with a Python script titled "main.py". The script uses the "turtle" module to draw on a map of New York City, specifically Manhattan. It includes functions for scaling coordinates and plotting them as a purple circle. The resulting map shows the Manhattan grid with a purple dot located near the Empire State Building area.

```
main.py
1 # Mapping cities
2 import turtle
3
4 # A function for scaling NYC coordinates to fit the map:
5 def scalePoints(lat,lon):
6     newLat = (lat+73.964)*6300.0
7     newLon = (lon-40.768)*9750.0
8     return(newLat,newLon)
9
10 screen = turtle.Screen()
11
12 # this assures that the size of the screen will match the map image:
13 screen.setup(950, 900)
14 # now set the background to our space image
15 screen.bgpic("nycMap.jpg")
16
17 teddy = turtle.Turtle()
18 teddy.shape('circle')
19 teddy.penup()
20
21
22 #Go to Hunter: (-73.964,40.768)
23 teddy.color("purple")
24 teddy.goto(scalePoints(-73.964,40.768))
25 teddy.stamp()
26 teddy.stomp()
27
28 #Go to Empire State Building
29
30 #Go to Apollo Theatre
31
32 #Go to Lincoln Center
```

- Wrote simple Python programs with the `turtle` package.
- Plotted GIS coordinates.
- Used NYC OpenData library locations for the map.

Introduction to Python

- We will be writing programs— commands to the computer to do something.



Introduction to Python

- We will be writing programs— commands to the computer to do something.
- A **programming language** is a stylized way of writing those commands.



Introduction to Python

- We will be writing programs— commands to the computer to do something.
- A **programming language** is a stylized way of writing those commands.
- If you can write a logical argument or persuasive essay, you can write a program.



Introduction to Python



- We will be writing programs— commands to the computer to do something.
- A **programming language** is a stylized way of writing those commands.
- If you can write a logical argument or persuasive essay, you can write a program.
- Python is popular for its ease-of-use, flexibility, and extensibility.

Introduction to Python



- We will be writing programs— commands to the computer to do something.
- A **programming language** is a stylized way of writing those commands.
- If you can write a logical argument or persuasive essay, you can write a program.
- Python is popular for its ease-of-use, flexibility, and extendibility.
- The next activity goes into step-by-step details of getting Python running locally.

Introduction to Python



- We will be writing programs— commands to the computer to do something.
- A **programming language** is a stylized way of writing those commands.
- If you can write a logical argument or persuasive essay, you can write a program.
- Python is popular for its ease-of-use, flexibility, and extendibility.
- The next activity goes into step-by-step details of getting Python running locally.
- Then, it details using the popular data analysis package, pandas, with NYC OpenData (parking tickets).

Accessing Structured Data: NYC Open Data

Open Data for All New Yorkers

Where can you find public Wi-Fi in your neighborhood? What kind of tree is in front of your office? Learn about where you live, work, eat, shop and play using NYC Open Data.

Search Open Data for things like 311, Buildings, Crime



- Freely available source of data.

Accessing Structured Data: NYC Open Data

Open Data for All New Yorkers

Where can you find public Wi-Fi in your neighborhood? What kind of tree is in front of your office? Learn about where you live, work, eat, shop and play using NYC Open Data.

Search Open Data for things like 311, Buildings, Crime

The slide features a blue header with white text. Below the header is a white rectangular area containing text and a search bar. To the right of this is a cluster of speech bubbles with various icons. At the bottom right is a row of four stylized human figures. The overall design is clean and modern, emphasizing the accessibility and variety of NYC open data.

- Freely available source of data.
- Maintained by the NYC data analytics team.

Accessing Structured Data: NYC Open Data

Open Data for All New Yorkers

Where can you find public Wi-Fi in your neighborhood? What kind of tree is in front of your office? Learn about where you live, work, eat, shop and play using NYC Open Data.

Search Open Data for things like 311, Buildings, Crime



- Freely available source of data.
- Maintained by the NYC data analytics team.
- We will use several different ones today: library locations, parking tickets, wifi locations, and 311 calls.

Accessing Structured Data: NYC Open Data

Open Data for All New Yorkers

Where can you find public Wi-Fi in your neighborhood? What kind of tree is in front of your office? Learn about where you live, work, eat, shop and play using NYC Open Data.

Search Open Data for things like 311, Buildings, Crime

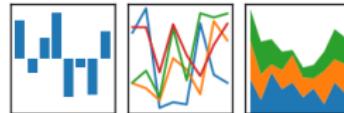
The slide features a blue background with white text and icons. It includes a search bar and a call-to-action button. A decorative graphic of speech bubbles with icons is positioned above the silhouettes.

- Freely available source of data.
- Maintained by the NYC data analytics team.
- We will use several different ones today: library locations, parking tickets, wifi locations, and 311 calls.

Structured Data

pandas

$$y_{it} = \beta' x_{it} + \mu_i + \epsilon_{it}$$

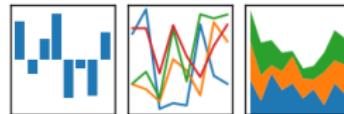


- Common to have data structured in a spread sheet.

Structured Data

pandas

$$y_{it} = \beta' x_{it} + \mu_i + \epsilon_{it}$$



- Common to have data structured in a spread sheet.
- The text file version is called **CSV** for comma separated values.

Structured Data

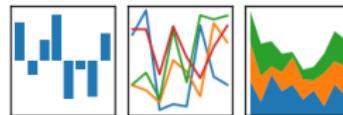


- Common to have data structured in a spread sheet.
- The text file version is called **CSV** for comma separated values.
- Each row is a line; columns are separated by commas.

Structured Data

pandas

$$y_{it} = \beta' x_{it} + \mu_i + \epsilon_{it}$$



- Common to have data structured in a spread sheet.
- The text file version is called **CSV** for comma separated values.
- Each row is a line; columns are separated by commas.
- We will use the popular Python Data Analysis Library (**Pandas**).

Structured Data



- Common to have data structured in a spread sheet.
- The text file version is called **CSV** for comma separated values.
- Each row is a line; columns are separated by commas.
- We will use the popular Python Data Analysis Library (**Pandas**).

Hands-On Activity: Parking Tickets



- Using Python locally.



Hands-On Activity: Parking Tickets



- Using Python locally.
- Accessing NYC OpenData.



Hands-On Activity: Parking Tickets



- Using Python locally.
- Accessing NYC OpenData.
- Using the pandas (data analysis) library.



Hands-On Activity: Parking Tickets



- Using Python locally.
- Accessing NYC OpenData.
- Using the pandas (data analysis) library.
- Who get the most parking tickets?

OpenData & Open Source Initiatives at Hunter



- Hunter is innovating the integration of NYC OpenData and open source software into the curriculum, at many levels.

OpenData & Open Source Initiatives at Hunter



- Hunter is innovating the integration of NYC OpenData and open source software into the curriculum, at many levels.
- Part of the Teaching Open Source Initiative.

folium

- folium: a module for making HTML maps.

Folium



folium

Folium



- folium: a module for making HTML maps.
- It's a Python interface to the popular leaflet.js.

Folium



- folium: a module for making HTML maps.
- It's a Python interface to the popular leaflet.js.
- Outputs .html files which you can open in a browser.

Folium



- folium: a module for making HTML maps.
- It's a Python interface to the popular leaflet.js.
- Outputs .html files which you can open in a browser.
- An extra step:

Folium



- folium: a module for making HTML maps.
- It's a Python interface to the popular leaflet.js.
- Outputs .html files which you can open in a browser.
- An extra step:

Write code. → *Run program.* → *Open .html in browser.*

Hands-On Activity: HTML Map of WIFI Locations



- Using the `folium` mapping package.



Hands-On Activity: HTML Map of WIFI Locations



- Using the `folium` mapping package.
- Accessing NYC OpenData.



Hands-On Activity: HTML Map of WIFI Locations



- Using the `folium` mapping package.
- Accessing NYC OpenData.
- Make an interactive map of WIFI locations in NYC.

Thank You for Joining Us!



Interested in knowing more?

- We analyze OpenData from our very first courses.

Thank You for Joining Us!



Interested in knowing more?

- We analyze OpenData from our very first courses.
- Want to learn more? Come join us for:
CSci 127: Introduction to Computer Science
(Fall 2018: Lectures T, 9:45-11am, recitations across the week).

Thank You for Joining Us!



Interested in knowing more?

- We analyze OpenData from our very first courses.
- Want to learn more? Come join us for:
CSci 127: Introduction to Computer Science
(Fall 2018: Lectures T, 9:45-11am, recitations across the week).
- Return computers to retrieve your IDs.