We'll be starting shortly!

To help us run the workshop smoothly, please kindly:

- Switch off screen sharing and mute your microphone
- Submit all questions using the Q&A function
- If you have an urgent request, please use the "Raise Hand" function

Thank you!

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Data Science 101

Session 4

About Coding Lab

- Founded by an MIT Graduate who worked in Silicon Valley
- Global Tech advisory team based in New York, Japan and Singapore
- We have Campuses in Japan, Australia and Singapore
- We offer coding classes starting from age 4 to adulthood

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Features and Partners

PSA The World's Port of Call

CISCO

NUS National University of Singapore

Zendesk

UBISOFT

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Features and Partners

Shopee

Ministry of Education SINGAPORE

THE STRAITS TIMES

zaobao.sg 早晚全新

INFOCOMM MEDIA DEVELOPMENT AUTHORITY

企業経営の新潮流を読み解く Bizコンパス

YOUNG PARENTS

mediacorp

BRAND'S

CGTN

Sassy Mama

parentsworld

And many more...

{<oding:lab}

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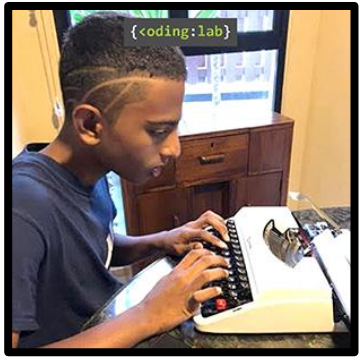
Meet our Students

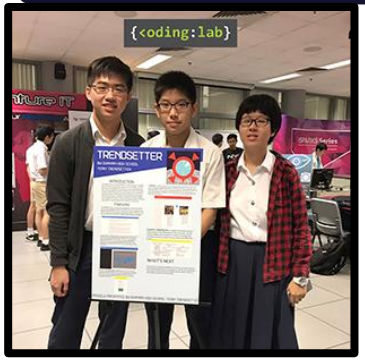
Sarah, 18
Honourable Mention, NOI 2018

Team ajdisjd
1st Place, iCode 2019

Elijah, 14
Youngest Medalist, NOI 2019



Surya, 14
Created a stock rating algorithm



Team Trendsetter
Best Presentation Award

More schools we have taught at:

EtonHouse International School • Pre-School

Modern Montessori International

eunoia JUNIOR COLLEGE

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Session Overview

- Playing with real world data
  - Data.gov
  - Kaggle
  - News sites
  - Wikipedia

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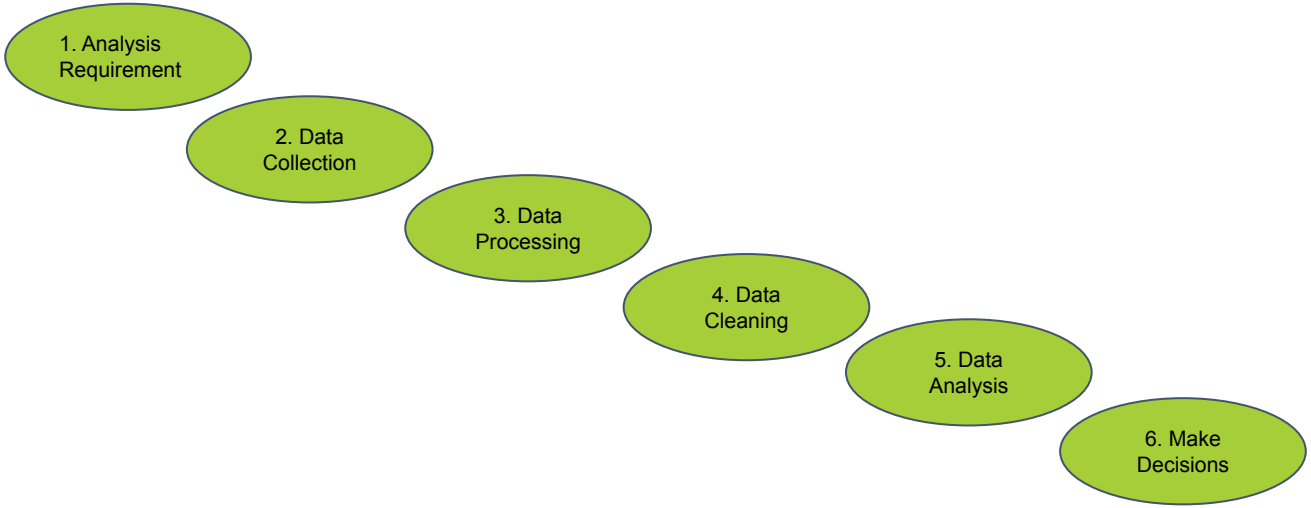
Data Analytics Process Overview



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Introduction to Data Extraction

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What is Data Extraction

- Process of retrieving data from various sources
  - Perform analysis on collected datas
- Most of it is poorly organised and unstructured
- Data extraction makes it possible to consolidate, process, and refine necessary information

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Why is Data Extraction important

- Collecting necessary data for analysis
  - Eg, conducting research regarding marketing techniques
- Improving accuracy
  - Gaining new insights from multiple resources become coming to conclusion

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How is data extraction applicable to us?

- Gain insights into real world problems
- Draw conclusions regarding the relationship between two datasets/variables
- We will be focusing on data available from two sources for this course
  - Data.gov.sg
  - Kaggle.com

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Request function

- Before we extract data from websites, we need to make use of the built in method request
- As the name suggests, the method abstracts the complexities of making request behind a simple API
  - Allowing users to simply access the data for usage
- The method uses basic HTTP(Hypertext Transfer Protocol) to enable communications between clients and servers
- We are going to focus on ‘get’

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Request.get

- We first need to install request on Google Colab before importing it

```
1   pip install requests
2
3   import requests
```

- The most common HTTP method is GET, which tells your program you would like to retrieve data from a specific source
- E.g. Try typing the following

```
1   requests.get('https://api.github.com')
```

{<oding:lab}

Response Object

- Response inspects the result of the request which contains a lot of information about the source
- The first bit of information you can get is the status code
  - A 200 status indicates that the request was successful
  - A 404 status indicated an error where the url was not found
- The code below should return a 200 status code

```
1   response = requests.get('https://api.github.com')
2
3   response.status_code
```

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Response.content

- The response of a request contains much more useful data and information beneficial for analysis
- To access the information, we simply make use of .content

```
1  response = requests.get('https://api.github.com')
2
3  response.content
```

{<oding:lab}

Response.json()

- To access every value in the object by keys, we can store the data in a dictionary
- The return output of response.json() is a dictionary, which allows easier extraction of data

Response Function (Demo/Practice - 1)

- There are many interesting API online
- Search one up from the website and retrieve the status code and content of the request

Checkpoint 1

- Every student must be able to:
  - Understand what requests method does
  - Able to print out the content of the requested API

- For students who are waiting, try the following:
  - What other information can you gather from the response?
  - Search up and share your findings with the class

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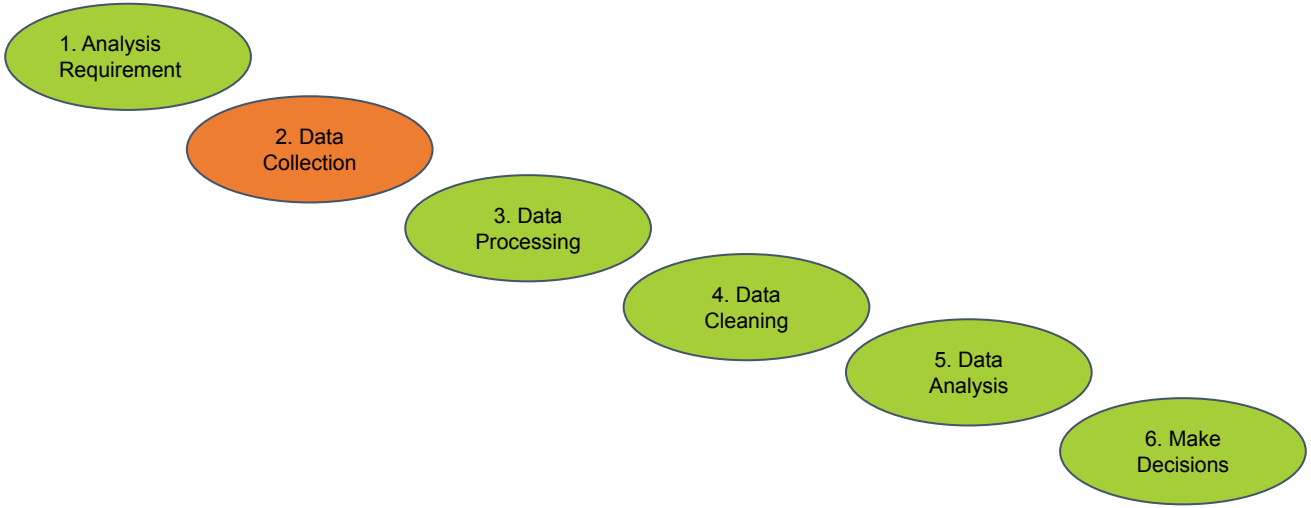
Data.gov.sg - Data Collection



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API (Application Programming Interface)

- Allow applications or website to communicate with one another
- Extract data from a particular website
- An API is not a database
  - It is an access point to an app that can access a database
- In order to get the information we want
  - We send API request detailing the information we want

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What is Data.gov.sg

- A government portal which contains publicly available datasets
- Relevant datasets can be extracted for analysis and research
- Charts and articles are actively used to facilitate easier understanding
- We are going to access the real time API on the website
  - Traffic congestion
  - Weather

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Real time API

- Real time datasets such as traffic condition and weather can be easily accessed
- Knowing how to write the function is crucial to extract data from anywhere on the web
- You will be learning how to write the function for extraction of information from data.gov.sg
    - We are going to extract the data in JSON format first then store them into a Dataframe

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Function to extract data (1/2)

- Start by writing a function which takes in the api URL available on the website
- Then we would request to get the apiURL and verify that it is true
  - For security purpose to ensure sensitive information sent across the Internet is encrypted
  - Eg, if you look at the left end of URL bar, it should be a secured connection or strangers are able to access the information

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Function to extract data (2/2)

- .raise_for_status() helps check whether a request is successful
  - If the request fails, it returns an error

```
1  def getJSONData (apiURL):
2      response = requests.get(
3          apiURL,
4          verify = True,  # Verify SSL certificate
5      )
6      response.raise_for_status() # optional but good practice in case the call fails
7      return(response.json())
```

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Main function

- Once the extraction is done, the main codes would be fairly easy
- We simply require the apiURL to be accepted by our function and print out the result

```
1   apiURL = "https://api.data.gov.sg/v1/environment/air-temperature/"
2   dataFromDataGov = getJSONData(apiURL)
3
4   print(dataFromDataGov)
```

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Extraction of Data (Demo/Practice - 2)

- Make use of what we have learnt, extract one of Real-time APIs available on data.gov.sg
- Observe how the data is stored
  - Dictionaries or lists?
- Try putting the data into a Dataframe, is it possible?

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Checkpoint 2

- Every student must be able to:
  - Extract data from Data.gov.sg
  - Store the data in JSON format
- For students who are waiting, try the following:
  - Try finding other API available on kaggle.com and extract the data

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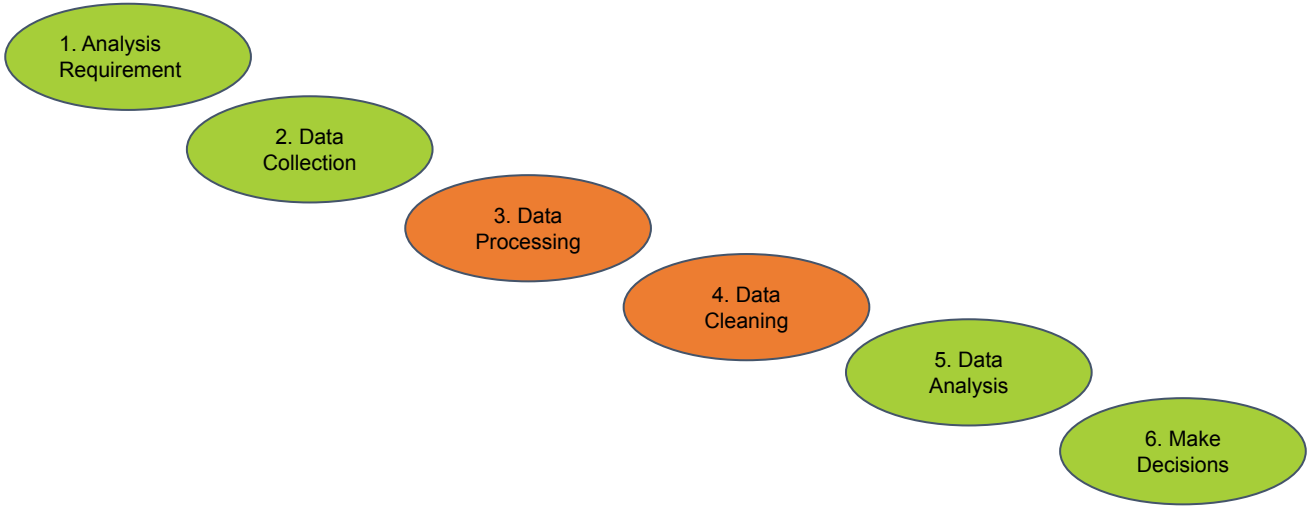
Data.gov.sg - Data Filtering



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Unorganised Data

- Observe the output of our code
- We have successfully extracted the data from the website but the data is a mess!
  - It contains multiple nested dictionaries and lists
  - There is no way to store the data in a Dataframe
  - Hence we need to extract the data step by step

Nested dictionaries

- How do we access the data in a nested dictionary?

```
1   nested_dict = { 'dictA': {'key_1': 'value_1'},
2                   'dictB': {'key_2': 'value_2'}}
3
4   for k, v in nested_dict.items():
5     if k == 'dictA':
6       print(v)
```

- Recall there are keys and values in a dictionary

{<oding:lab}

First dictionary

- Accessing the first dictionary only returns you 3 keys
  - ‘Metadata’ , ‘items’ and ‘api info’

```
for k, v in dataFromDataGov.items(): #metadata, items,  api info
  print(k)
```

- The metadata contains the most relevant information and to extract the dictionary ‘metadata’,

```
for k, v in dataFromDataGov.items(): #metadata, items,  api info
  if k == 'metadata':
    print(v)
```

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Second dictionary

- The second dictionary contains even more information and we follow the same codes to extract the desired values based on our interested key
- Observe that currently we are accessing a list instead of a dictionary, thus the extraction process changes slightly

```
for key , value in v.items():
    if key =='stations':
        print(value[0])
```

{<oding:lab}

Storing data in Dataframe

- After much filtering and getting our desired data, we now want to store it into a dataframe
  - First normalize the json data into a flat table
  - Use Dataframe.from_dict to convert the data into a dataframe
  - The orient simply means the orientation of the table

```
df = pd.DataFrame.from_dict(json_normalize(value), orient='columns')
df
```

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Extracting data and storing in Dataframe(Demo/Practice 3)

- Access the apiURL- Taxi Availability
- Extract the data and store the coordinates of the taxis in a dataframe
    - Make sure to extract the information properly as we will be using the data later for analysis

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Checkpoint 3

- Every student must be able to:
  - Extract specific data from a massive dataset
  - Understand how to extract information from a list and dictionary
- For students who are waiting, try the following:
  - Access other apiURL from the website and extract specific data

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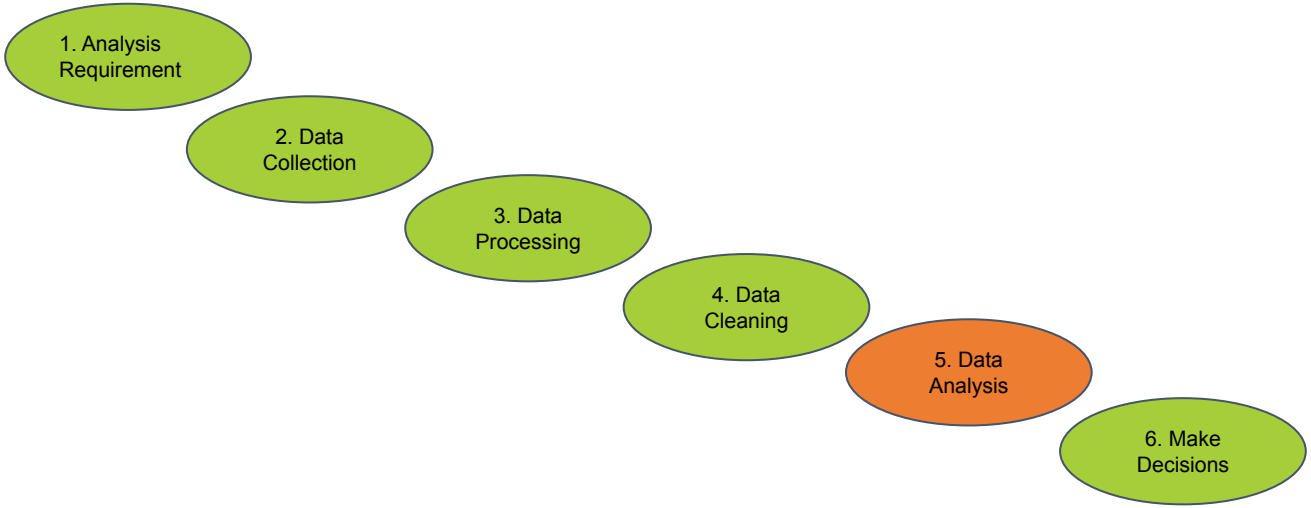
Data.gov.sg - Data Analysis



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What do we do after extraction?

- We have extracted the coordinates of taxis for our demo practice earlier, what's next?
- Data is still considered useless if we do not know understand what is the purpose of extraction
    - Thus we use data visualisation tools to bring purpose to our extracted data

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Taxi Availability in Singapore

- The data shows the coordinates of taxis all around Singapore, with such a massive amount of numbers, it is difficult to gauge the quantity
- We can plot the data in a scatter plot with plotly
  - Recall in Session 1 how we plot graphs on plotly
  - Plotting a scatter is almost the same as plotting any other graphs

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Scatter plot of data

- The x axis would be the longitude while the y axis is the latitude
- We can then plot the diagram out

```
27  import plotly.express as px
28  plot = px.scatter(df,'longitude','latitude',)
29  plot
```

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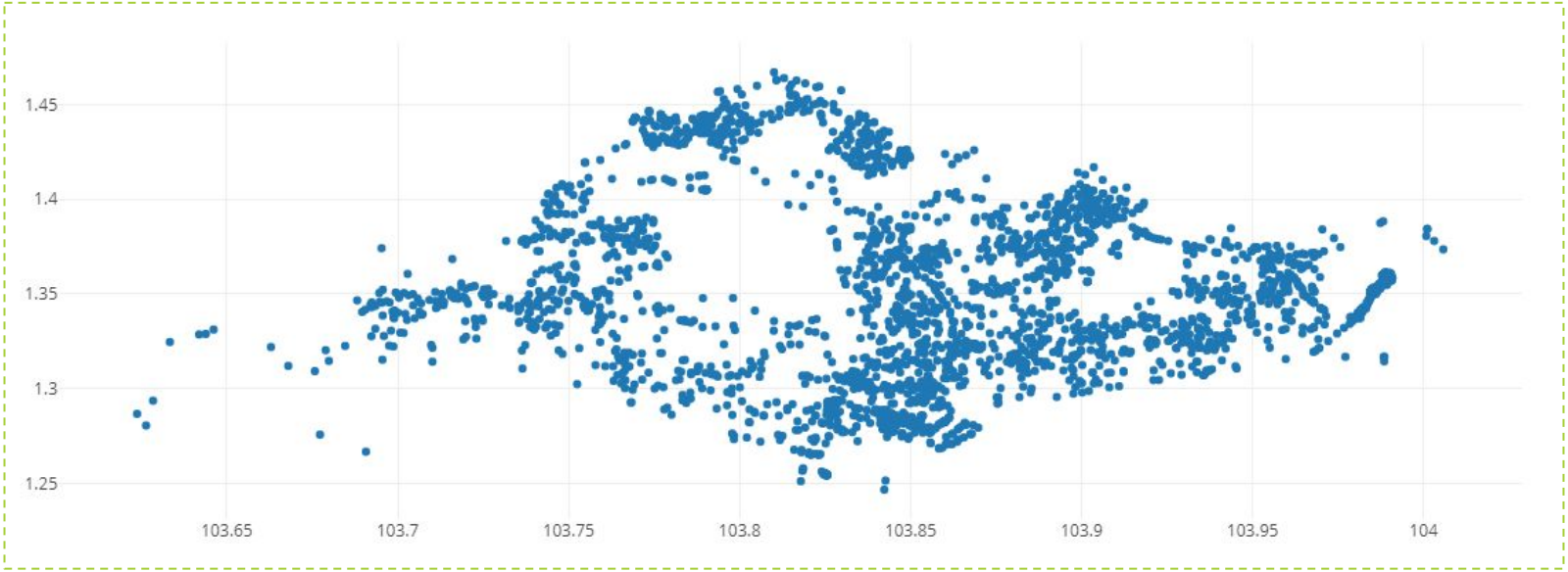
Data visualisation output



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Drawing conclusions

- Observe the scatter plot
  - What can you conclude from this scatter plot?
    - Is taxi availability an issue in Singapore?
    - Which area has a shortage or taxis?
- Know what your data means is useful when it comes to drawing certain conclusion and thus finding solution to solve the issue

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Data Visualisation (Demo/Practice - 4)

- The file ‘laptops.csv’ is a dataset for 1300 laptop models found on kaggle.com
- Find out which company earned the most from sales of laptop
- Follow the guidelines if you are unsure what to do
  - Extract the file and store it in a dataframe
  - Which plot should we use for a clearer visualisation of data?

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Checkpoint 4

- Every student must be able to:
  - Plot extracted data into graph using plotly

- For students who are waiting, try the following:
  - Explore other datasets from kaggle.com and plot data out using plotly

{<oding:lab}

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Kaggle.com

{<oding:lab}

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Kaggle Overview

- A platform for data science enthusiasts to interact and compete in solving real-life problems
- Public data platform - many datasets available
- Subsidiary of Google LLC

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Interesting Datasets on Kaggle

- Spotify dataset
  - https://www.kaggle.com/yamaerenay/spotify-dataset-19212020-160k-tracks
- Coursera courses
  - https://www.kaggle.com/siddharthm1698/coursera-course-dataset
- Covid-19
  - https://www.kaggle.com/imdevskp/corona-virus-report

{<oding:lab}

Kaggle Walkthrough

- Using the Covid-19 dataset from the link in the previous slide
  - Sign in to Kaggle and download dataset
- 3 files inside
  - covid_19_clean_complete.csv
  - usa_county_wise.csv
  - worldometer_data.csv

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Scenario

- Say we want to write a program that will plot the number of confirmed infections by country according to a date selected by the user
- We will be using covid_19_clean_complete.csv

Read csv with pandas

- Read csv with pandas
  - Rename ‘Country/Region’ to ‘Country’
    - So we can call df.Country later. Special characters are excluded from this

```
1  import pandas as pd
2
3  data = pd.read_csv('covid_19_clean_complete.csv')
4  df = pd.DataFrame(data)
5  df = df.rename(columns={'Country/Region': 'Country'})
6  df
```

{<oding:lab}

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Pandas DataFrame

	Province/State	Country	Lat	Long	Date	Confirmed	Deaths	Recovered	WHO Region
0	NaN	Afghanistan	33.000000	65.000000	1/22/20	0	0	0	emro
1	NaN	Albania	41.153300	20.168300	1/22/20	0	0	0	euro
2	NaN	Algeria	28.033900	1.659600	1/22/20	0	0	0	afro
3	NaN	Andorra	42.506300	1.521800	1/22/20	0	0	0	euro
4	NaN	Angola	-11.202700	17.873900	1/22/20	0	0	0	afro
...	...	...	...	...	...	...	...	...	...
36300	NaN	Sao Tome and Principe	0.186360	6.613081	6/6/20	499	12	68	afro
36301	NaN	Yemen	15.552727	48.516388	6/6/20	482	111	0	emro
36302	NaN	Comoros	-11.645500	43.333300	6/6/20	141	2	67	afro
36303	NaN	Tajikistan	38.861034	71.276093	6/6/20	4453	48	0	euro
36304	NaN	Lesotho	-29.609988	28.233608	6/6/20	4	0	2	afro

36305 rows × 9 columns

{<oding:lab}

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Filter by Date and Country

- Write a simple program that filters the dataframe by date and

```
1  date = input("Select a date in mm/dd/yy format. \nE.g. 3/20/20 for 20th March or 3/3/20 for 3rd March: ")
2  date = [date]
3  countries = input("Enter a list of countries of interest, separated by commas: ")
4  country_list = countries.split(',')
5  country_and_date_df = df[df.Country.isin(country_list) & df.Date.isin(date)]
6  country_and_date_df
```

{<oding:lab}

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Sample Output

```
Select a date in mm/dd/yy format.
E.g. 3/20/20 for 20th March or 3/3/20 for 3rd March: 6/6/20
Enter a list of countries of interest, separated by commas: Italy,Malaysia,Singapore,Spain,United Kingdom
```

	Province/State	Country	Lat	Long	Date	Confirmed	Deaths	Recovered	WHO Region
36177	NaN	Italy	43.0000	12.0000	2020-06-06	234801	33846	165078	euro
36193	NaN	Malaysia	2.5000	112.5000	2020-06-06	8303	117	6635	wpro
36236	NaN	Singapore	1.2833	103.8333	2020-06-06	37527	25	24559	wpro
36241	NaN	Spain	40.0000	-4.0000	2020-06-06	241310	27135	150376	euro
36257	Bermuda	United Kingdom	32.3078	-64.7505	2020-06-06	141	9	114	euro
36258	Cayman Islands	United Kingdom	19.3133	-81.2546	2020-06-06	164	1	93	euro
36259	Channel Islands	United Kingdom	49.3723	-2.3644	2020-06-06	563	46	512	euro
36260	Gibraltar	United Kingdom	36.1408	-5.3536	2020-06-06	175	0	155	euro
36261	Isle of Man	United Kingdom	54.2361	-4.5481	2020-06-06	336	24	312	euro
36262	Montserrat	United Kingdom	16.7425	-62.1874	2020-06-06	11	1	10	euro
36263	NaN	United Kingdom	55.3781	-3.4360	2020-06-06	284868	40465	0	euro
36288	Anguilla	United Kingdom	18.2206	-63.0686	2020-06-06	3	0	3	euro
36289	British Virgin Islands	United Kingdom	18.4207	-64.6400	2020-06-06	8	1	7	euro
36290	Turks and Caicos Islands	United Kingdom	21.6940	-71.7979	2020-06-06	12	1	11	euro
36296	Falkland Islands (Malvinas)	United Kingdom	-51.7963	-59.5236	2020-06-06	13	0	13	euro

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Plotting a Graph

- Use plotly to plot bargraphs

```
1  import plotly.express as px
2
3  px.bar(country_and_date_df, x = "Country", y = "Confirmed")
```

```
1  px.bar(country_and_date_df, x = "Country", y = "Deaths")
```

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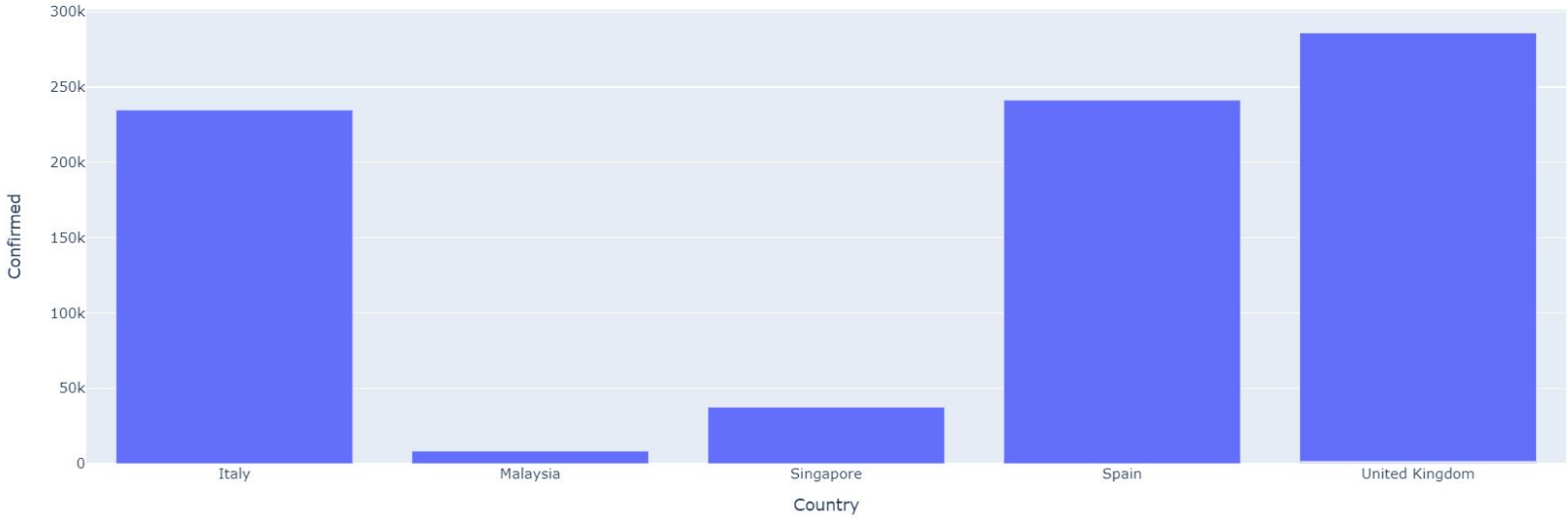
Graph of Confirmed Cases by Country



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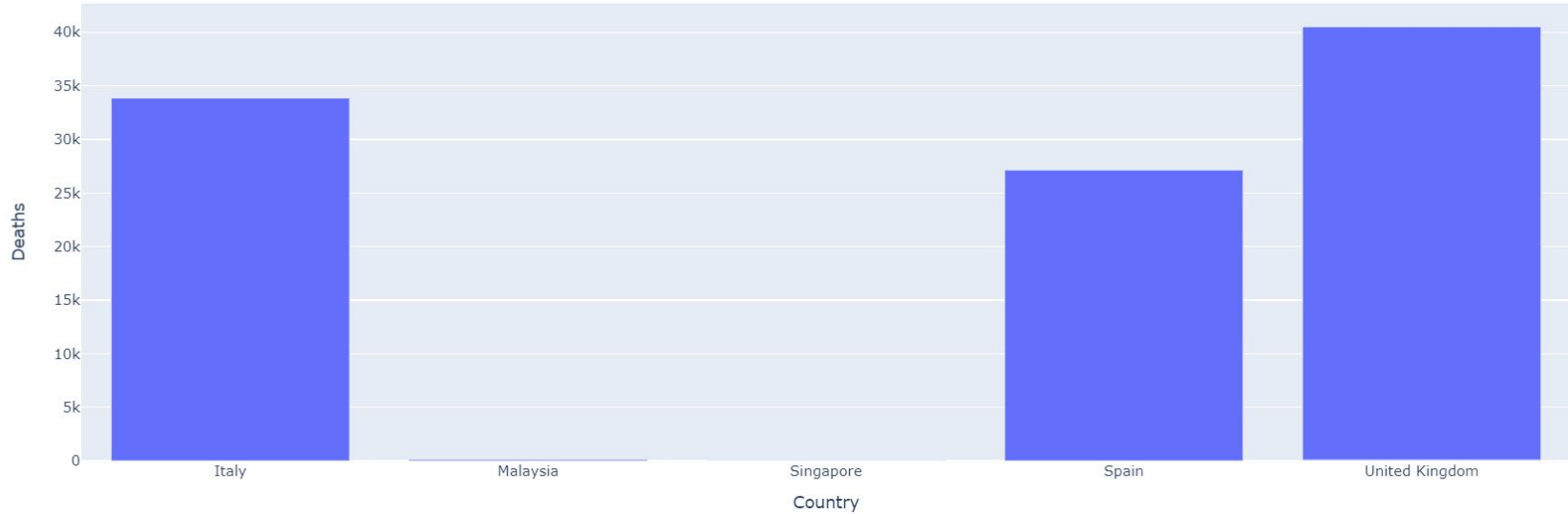
Graph of Death Count by Country



{<oding:lab}

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Kaggle Data (Demo/Practice - 5)

- Download covid_19_clean_complete.csv from Kaggle
  - https://www.kaggle.com/imdevskp/corona-virus-report
- Write a program that will plot the number of confirmed infections according to a date selected by the user
- Create a suitable data frame and plot out the respective graphs showing the number of confirmed cases and deaths

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Checkpoint 5

- Every student must be able to:
  - Plot extracted data into graph using plotly

- For students who are waiting, try the following:
  - Create a program that allows the user to view covid data from a specific country over a range of dates

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Viewing Covid Data from one Country

- Say now we want to view data from one country
  - But over a range of dates to see how the country is coping with the virus
- We can create a program that asks the user for the date range, and the country of interest

{<oding:lab}

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Country by Date Range: Sample Code

- Using pd.to_datetime to convert a column to date type
  - For easy filtering of dates

```
start_date = input("Select a start date in mm/dd/yy format: ")
end_date = input("Select a start date in mm/dd/yy format: ")
country = input("Select a country: ")
df['Date'] = pd.to_datetime(df['Date'])
date_range_df = df[(df['Date'] >= start_date) & (df['Date'] <= end_date)]
country_date_range_df = date_range_df[date_range_df['Country'] == country]
country_date_range_df
```

{<oding:lab}

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Country by Date Range: Sample Output

```
Select a start date in mm/dd/yy format: 3/1/20
Select a start date in mm/dd/yy format: 6/1/20
Select a country: Singapore
```

	Province/State	Country	Lat	Long	Date	Confirmed	Deaths	Recovered	WHO Region
10531	NaN	Singapore	1.2833	103.8333	2020-03-01	106	0	72	wpro
10796	NaN	Singapore	1.2833	103.8333	2020-03-02	108	0	78	wpro
11061	NaN	Singapore	1.2833	103.8333	2020-03-03	110	0	78	wpro
11326	NaN	Singapore	1.2833	103.8333	2020-03-04	110	0	78	wpro
11591	NaN	Singapore	1.2833	103.8333	2020-03-05	117	0	78	wpro
...	...	...	...	...	...	...	...	...	...
33851	NaN	Singapore	1.2833	103.8333	2020-05-28	33249	23	18294	wpro
34116	NaN	Singapore	1.2833	103.8333	2020-05-29	33860	23	19631	wpro
34381	NaN	Singapore	1.2833	103.8333	2020-05-30	34366	23	20727	wpro
34646	NaN	Singapore	1.2833	103.8333	2020-05-31	34884	23	21699	wpro
34911	NaN	Singapore	1.2833	103.8333	2020-06-01	35292	24	22466	wpro

93 rows × 9 columns

{<oding:lab}

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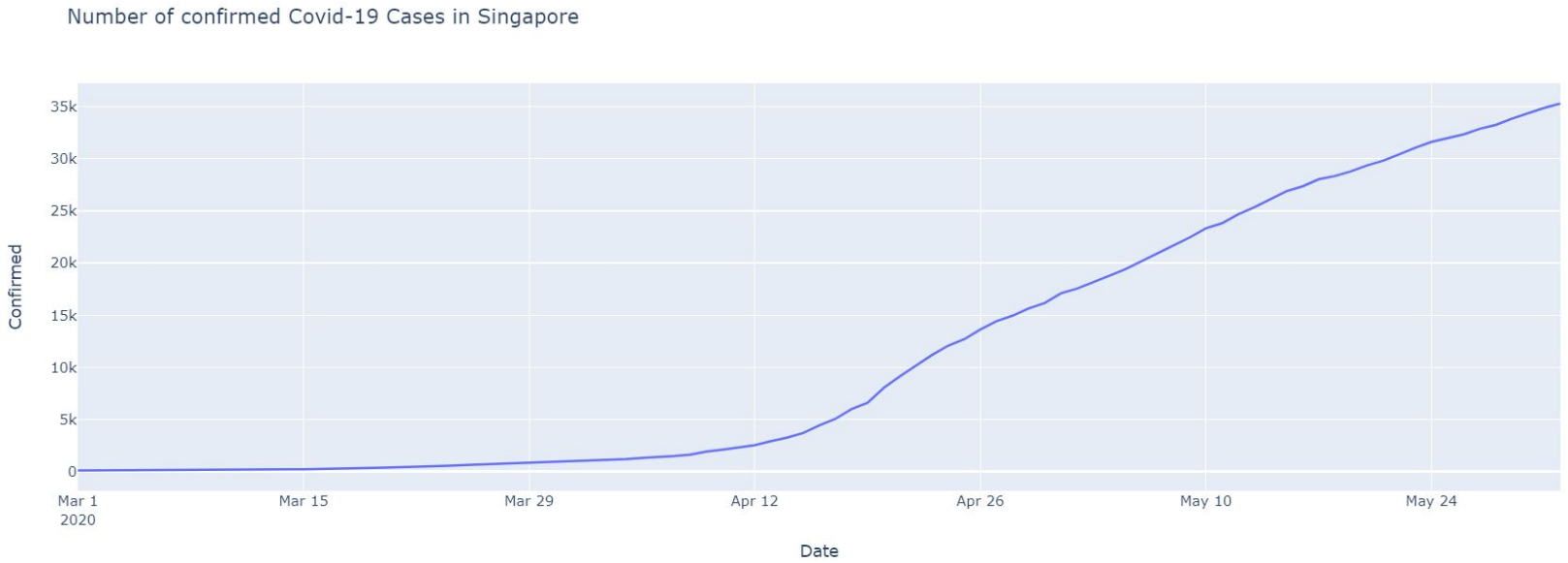
Line Graph: Sample Code

- Plot a line graph showing the number of cases over time

```
1  import plotly.express as px
2  graph = px.line(country_date_range_df, x = "Date", y = "Confirmed")
3  graph.show()
```

Line Graph: Sample Output



{<oding:lab}

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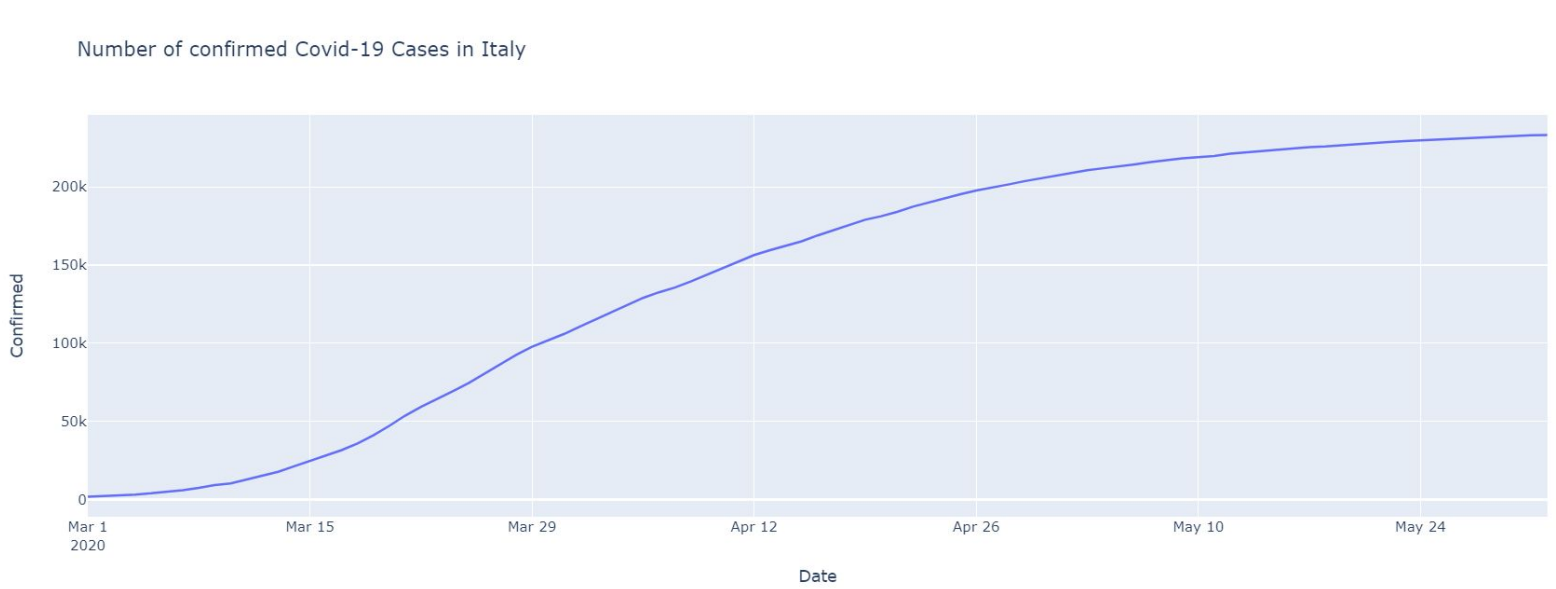
Country by Date Range (Demo/Practice - 6)

- Write a program that asks the user for the date range, and the country of interest
- Extract the relevant data frame and plot a suitable graph

Demo/Practice - 6: Sample Output



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Checkpoint 6

- Every student must be able to:
  - Write a program to extract data based on a date range
  - Plot a line graph using the extracted data

- For students who are waiting, try the following:
  - Create a program that compares data from different countries over a date range in one graph

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Multiple Countries in one Graph: Input Code

- Sample Code for input program

```
start_date = input("Select a start date in mm/dd/yy format: ")
end_date = input("Select a start date in mm/dd/yy format: ")
country = input("Select countries, separated by commas: ")
country_list = country.split(',')
df['Date'] = pd.to_datetime(df['Date'])
date_range_df = df[(df['Date'] >= start_date) & (df['Date'] <= end_date)]
country_date_range_df = date_range_df[date_range_df.Country.isin(country_list)]
country_date_range_df
```

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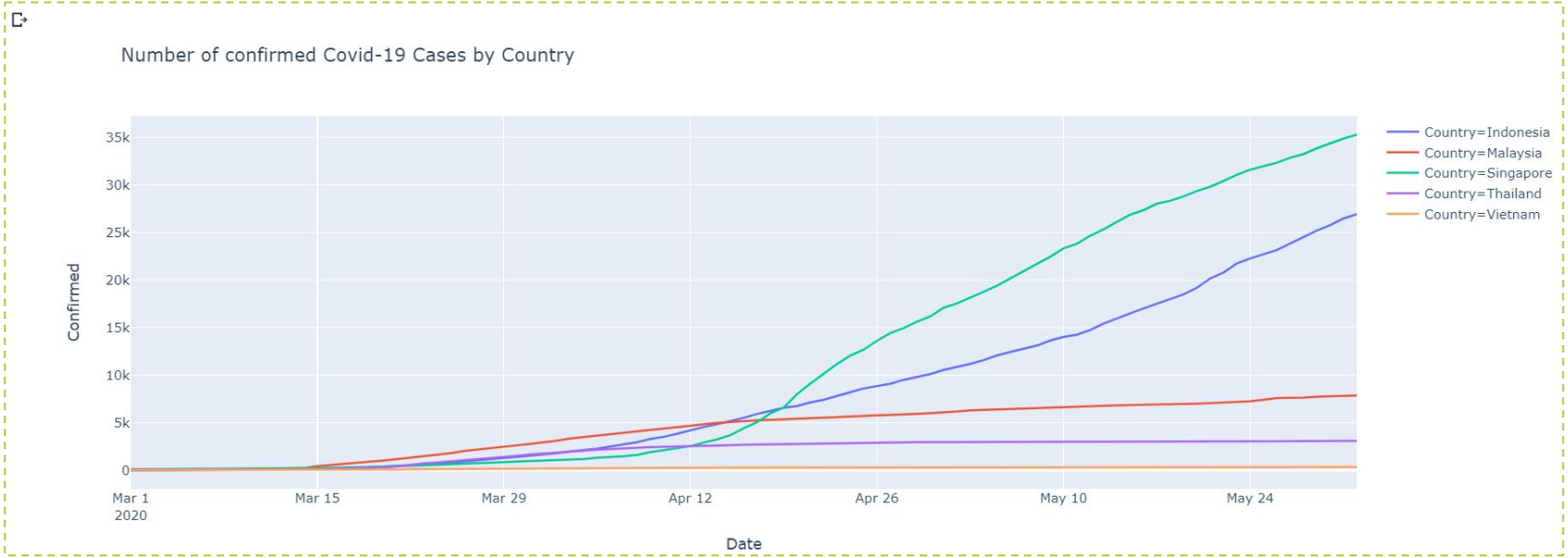
Multiple Countries in one Graph: Graph Code

- Sample Code for line graph

```
1  import plotly.express as px
2
3  graph = px.line(country_date_range_df, title = "Number of confirmed Covid-19 Cases by Country",
4  x = "Date", y = "Confirmed", color='Country')
5
6  graph.show()
```

{<oding:lab}

Multiple Countries in one Graph: Output



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Some Interesting APIs

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Wikipedia API in Python

- Wikipedia is an external library that we can install
  - Implementation of Wikipedia API in Python to fetch information from a Wikipedia article
- To install Wikipedia in Python (Google Colab)

```
1   !pip install wikipedia
```

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Querying Wikipedia

- Now, let's fetch data from Wikipedia library in Python!
- We begin by importing the wikipedia library
- We then do a Wikipedia search for query
  - wikipedia.search('query', results=)

```
1  import wikipedia
2
3  resultList = wikipedia.search("Harry Potter", results = 15)
4
5  for item in resultList:
6      print(item)
```

{<oding:lab}

Getting a Wikipedia Page

- wikipedia.page()
  - Get a WikipediaPage object for the page with given title
  - Do you remember how to store the data into a dataframe?
    - How can we store all the information in a dataframe

```
1  import wikipedia
2
3  wikiPage = 'Harry Potter'
4  print(wikipedia.WikipediaPage(wikiPage).categories)
```

{<oding:lab}

Intelligent Guess

- wikipedia.suggest()
  - makes an intelligent guess based on what you are searching and returns result

```
1   import wikipedia
2   print(wikipedia.suggest('facebook'))
```

Summary of Page

- wikipedia.summary()
  - Returns summary of the page

```
1  import wikipedia
2  print(wikipedia.summary('google'))
```

- What should you include if:
  - you only want 2 sentences from the summary?
  - 200 characters of the summary?

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Search and Summary (Demo/Practice - 7)

- Making use of the functions we have learnt, write a program which returns you the summary of the page based on your input
  - Get your program to make an intelligent guess!

Checkpoint 7

- Every students must be able to:
  - Understand and utilise wikipedia built in functions
    - Wikipedia.search
    - Wikipedia.page
    - Wikipedia.suggest
    - Wikipedia.summary
- For students who are waiting, try the following:
  - Search up what else can wikipedia API do

{<oding:lab}

Random Pages

- wikipedia.random()
  - Get a list of random wikipedia pages
- Sample program containing a randomKnowledge() function that returns 10 sentences about a random topic on wikipedia

```
1   import wikipedia
2
3   # Function that returns 10 sentences about a random topic on wikipedia
4   def randomKnowledge():
5       page = wikipedia.random(pages = 1)
6       print(wikipedia.summary(page, sentences = 10))
7
8   print(randomKnowledge())
```

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Wikipedia Languages

- wikipedia.set_lang()
  - Set or change the language of an article
  - In this example, the website is translated to French
  - Search up the different language code

```
1  import wikipedia
2
3  wikipedia.set_lang('fr')
4  print(wikipedia.summary('google',sentences=1))
```

{<oding:lab}

Wikipedia URL

- Getting URL for the page

```
1   import wikipedia
2
3   complete_url = wikipedia.page('facebook')
4   print(complete_url.url)
```

Extraction of section

- Instead of printing the entire page, sometimes we are only interested in certain sections
  - In this case, we are interested in the plot of the movie

```
import wikipedia
print(wikipedia.WikipediaPage(title = 'Harry Potter and the Philosopher\'s Stone (film)').summary)

# get the section of a page. In this case the Plot description of Metropolis
section = wikipedia.WikipediaPage('Harry Potter and the Philosopher\'s Stone (film)').section('Plot')

# that will return fairly clean text, but the next line of code
# will help clean that up.
section = section.replace('\n','').replace("\'","")
```

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Return of section (Demo/Practice - 8)

- Write a program that allows the user to input a search term and return a section of the search term accordingly
- Thinking Process
  - First ask the user for an input
  - Conduct a search over wikipedia which returns a page related to the input
  - Return a section of the page

Checkpoint 8

- Every student must be able to :
  - Understand and utilise the functions of Wikipedia Library in Python
  - How to extract a certain section/part of the page

- For those who are waiting, try the following:
  - Read up the other available functions in Wikipedia Library
  - Did you find anything interesting?

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NewsAPI in Python

- A popular API used to search and fetch news articles from any website
- This API anyone can fetch top 10 heading line of news from any website
- Before we can make import this API, we have to request for access
  - https://newsapi.org/register

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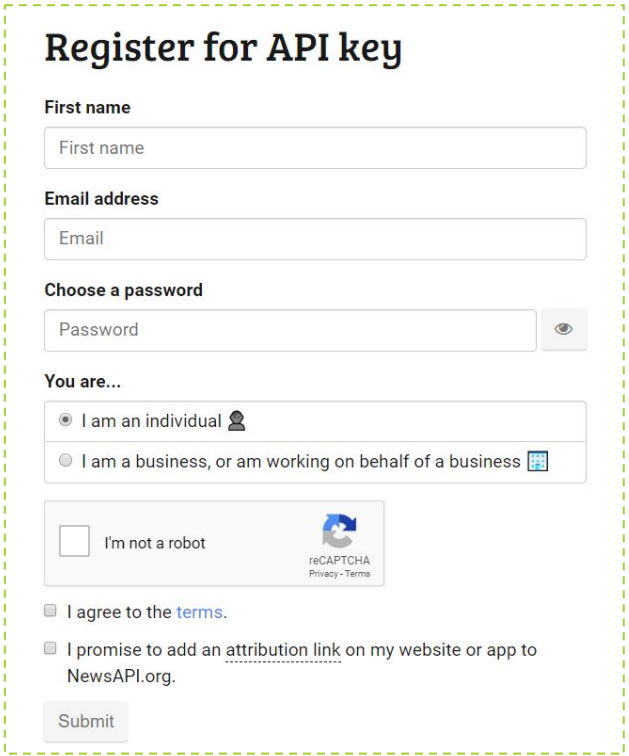
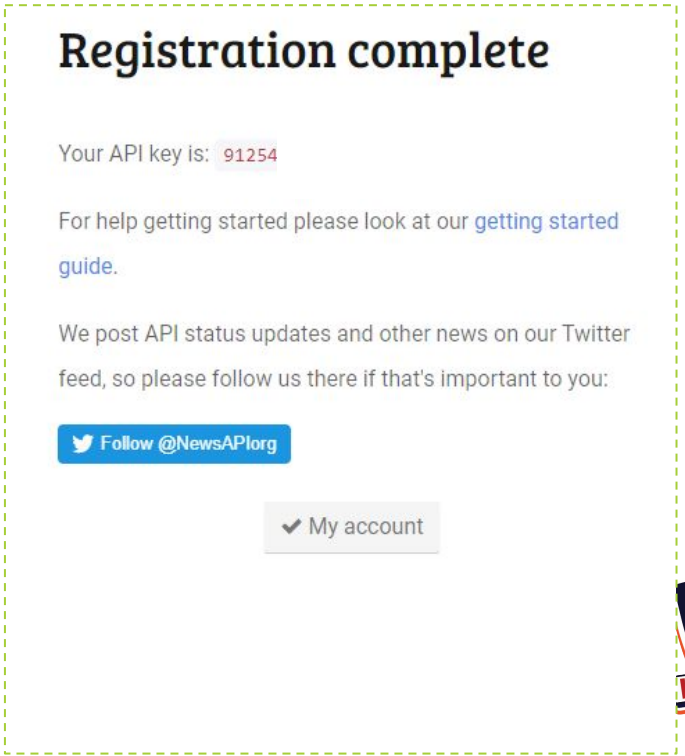
Requesting for API key





Finding Your API Key

- After registering at NewsAPI.org, you can find your API key at: https://newsapi.org/docs/authentication

Find Your API Key (Demo/Practice - 9)

- Register for newsapi and get your api key
  - https://newsapi.org/register

Checkpoint 9

- Every student must be able to:
  - Successfully register for newsapi and get API key

- For students who are waiting, try the following:
  - Explore the API documentation for newsapi

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Installing NewsAPI on Google Colab

- Install the newsapi package using command prompt
  - “pip install newsapi”

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NewsAPI Endpoints

- NewsAPI offers three endpoints
  - Get_everything
    - for all the news articles from over 30,000 sources
  - Get_top-headlines
    - for the most important headlines per country and category
  - Get_sources
    - for information on the various sources

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NewsAPI First Walkthrough (1/2)

- The first thing we need to do is to import the newsapi library

```
1  # Import library
2  from newsapi import NewsApiClient
```

  - Then we set our API keys

```
4  # set api key
5  api = NewsApiClient(api_key='a6a26f3d119444f6910c2b208954d168')
```

  - Get all the headlines of the top articles from “bbc-news”

```
7  # Getting top articles from sources
8  top_articles = api.get_top_headlines(sources='bbc-news')
```

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NewsAPI First Walkthrough (2/2)

- Now that we have all the top articles, we can go through each of them and print the respective details

```
10  # Printing every single title in the list of articles
11  for i in top_articles['articles']:
12      print(i['title'])
13      print(i['description'])
14      print(i['url'])
15      print(i['publishedAt'])
16      print("\n\n\n")
```

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NewsAPI First Walkthrough (Demo/Practice - 10)

- Try out the code to print the top headlines from “bbc-news”
  - Look through the API and see what other sources you can print headlines from
  - Documentation for sources: https://newsapi.org/docs/endpoints/sources

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Checkpoint 10

- Every student must be able to:
  - Successfully get API keys
  - Print top headlines from “bbc-news” source

- For students who are waiting, try the following:
  - Find out the height of all your classmates and calculate the mean, median and mode!

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newsapi.get_everything()

- Search through articles from over 30,000 large and small news sources and blogs
  - This includes breaking news as well as lesser known articles

- Useful for discovering and analyzing articles
  - Can also be used to retrieve articles for display

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Bitcoin Headlines Example: Retrieving Articles

- We want to search various news sources for articles on bitcoin
  - Note that the “from_param” has a limit of 1 month for free accounts

Bitcoin Headlines Example: Retrieving Articles Sample Code

```
from newsapi import NewsApiClient

api = NewsApiClient(api_key='a6a26f3d119444f6910c2b208954d168')

# One week
all_articles = api.get_everything(q='bitcoin',
                                  sources='bbc-news,the-verge,cnn,reuters',
                                  from_param='2019-05-13',
                                  to='2019-06-13',
                                  language='en',
                                  sort_by='relevancy',
                                  page=2)

```

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Bitcoin Headlines Example: Printing Article Titles

- We then print all the article titles

```
14  for i in all_articles['articles']:
15      print(i['title'])
```

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newsapi.get_everything() (Demo/Practice - 11)

- Try out the code to print the article titles from a query of your choice
  - Try changing the sources or adding more sources
  - Vary the date range to see if it affects your results
    - This is done by changing “from_param” and “to”

Checkpoint 11

- Every student must be able to:
  - Print article titles related to a search term by using .get_everything()

- For students who are waiting, try the following:
  - Edit your program to allow the user to select the search term
  - Try to print other parts of the article apart from the ‘title’

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Summary

- Extracting data using API
- Filtering extracted data
- Real world examples
  - Data.gov.sg
  - Kaggle.com
- newsapi
- wikipedia

Your Feedback Matters!

LIKE and follow us for more resources and tips!

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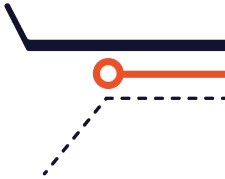
Appendix



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Movie description

- Singaporeans watch movies regularly, but sometimes we might not know what the movie is about and who the casts are.
- Develop a program which prompts the user for a movie title
  - Returns the summary of the movie
  - Returns the casts of the movie
    - Add in more functions where your program decides if the movie is worth watch based on the overall rating

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Movie description?: Hints

- Before you start developing your program, here are some questions you can ask yourself
  - How do I perform a search?
  - Which wikipedia method should I use?
    - What kind of output will I get?