Created by Daniel Silalahi (Student Number:21073058)

Download the Data

```
%%capture
!pip install spacy
!pip install scattertext
!pip install tika
!pip install spacytextblob

import spacy
import json
import pylab
from IPython.core.display import display, HTML
import nltk
from tika import parser
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from spacytextblob.spacytextblob import SpacyTextBlob

%matplotlib inline
nlp = spacy.load("en_core_web_sm")
nlp.add_pipe('spacytextblob')
```

Import data from GITHUB

```
'''
Data is gathered from:
Biden:
https://www.whitehouse.gov/briefing-room/speeches-remarks/2022/07/08/remarks-by-president-biden-on-protecting-access-to-reproductive-health-care-services/
https://www.whitehouse.gov/briefing-room/statements-releases/2022/08/02/statement-by-president-joe-biden-on-defeat-of-kansas-ballot-measure-threatening-womens-
https://www.rev.com/blog/transcripts/president-biden-delivers-remarks-on-the-supreme-court-decision-6-24-22-transcript

Trump:
https://trumpwhitehouse.archives.gov/briefings-statements/remarks-president-trump-47th-annual-march-life/
https://trumpwhitehouse.archives.gov/briefings-statements/remarks-president-trump-march-life-participants-pro-life-leaders/
https://trumpwhitehouse.archives.gov/presidential-actions/presidential-proclamation-national-sanctity-human-life-day-2019/

Obama:
https://obamawhitehouse.archives.gov/the-press-office/2015/01/22/statement-president-42nd-anniversary-roe-v-wade
https://obamawhitehouse.archives.gov/the-press-office/2012/01/22/statement-president-roe-v-wade-anniversary
https://obamawhitehouse.archives.gov/the-press-office/statement-president-obama-36th-anniversary-roe-v-wade
https://obamawhitehouse.archives.gov/the-press-office/remarks-president-notre-dame-commencement

```

```
Bush:
https://www.americanrhetoric.com/speeches/gwbushmarchforlife.htm
https://georgewbush-whitehouse.archives.gov/news/releases/2008/01/20080122.html
https://georgewbush-whitehouse.archives.gov/news/releases/2004/01/20040122-3.html

Clinton:
https://clintonwhitehouse6.archives.gov/
https://www.presidency.ucsb.edu/documents/remarks-signing-memorandums-medical-research-and-reproductive-health-and-exchange-with

HW Bush:
https://www.govinfo.gov/content/pkg/PPP-1991-book1/html/PPP-1991-book1-doc-pg55-2.htm
https://www.presidency.ucsb.edu/documents/remarks-participants-the-march-for-life-rally-1

Reagan:
https://www.reaganlibrary.gov/archives/speech/remarks-participants-march-life-rally-0

https://www.reaganlibrary.gov/archives/speech/remarks-white-house-briefing-right-life-activists

Jimmy Carter:
https://www.presidency.ucsb.edu/documents/presidential-campaign-debate-0


Gerald Ford:
https://www.presidency.ucsb.edu/documents/presidential-campaign-debate-0
'''
import pandas as pd

url = "https://raw.githubusercontent.com/Allen-Bian/QM2-Final-project/main/Presidents%20Speeches%20-%20Sheet1.csv"

df = pd.read_csv(url)
```

Print the data to check

```
print(df)
```

```
         Presidents                                           Speeches
0        Joe Biden  Good morning, everyone.  Before I speak to the...
1     Donald Trump  Well, thank you very much and thank you, Jeann...
2     Barack Obama  Well, first of all, congratulations, Class of ...
3      George Bush  Well, thank you very much, Nellie. I appreciat...
4     Bill Clinton  Please sit down, ladies and gentlemen. Today I...
5  George H.W Bush  Once again, it is my distinct honor to address...
6    Ronald Reagan  Senators, Congressmen, ladies and gentlemen, w...
7     Jimmy Carter  I would not work hard to support any of those....
8      Gerald Ford  I support the Republican platform which calls ...
```

Find how many times abortion is mentioned by each president

```
import re
df['abortion']=df['Speeches'].apply(lambda x: len(re.findall(r'abortion', x, re.IGNORECASE)))

print(df[['Presidents','abortion']])
```

```
         Presidents  abortion
0        Joe Biden         8
1     Donald Trump        15
2     Barack Obama        10
3      George Bush        10
4     Bill Clinton         6
5  George H.W Bush         6
6    Ronald Reagan        40
7     Jimmy Carter         6
8      Gerald Ford         1
```

Create a dataframe for each president, with rows being their sentences containing abortion

```
# create dataframes for each president
df_joe_biden = pd.DataFrame(columns = ['Joe Biden'])
df_donald_trump = pd.DataFrame(columns = ['Donald Trump'])
df_barack_obama = pd.DataFrame(columns = ['Barack Obama'])
df_george_bush = pd.DataFrame(columns = ['George Bush'])
df_bill_clinton = pd.DataFrame(columns = ['Bill Clinton'])
df_george_hw_bush = pd.DataFrame(columns = ['George H.W Bush'])
df_ronald_reagan = pd.DataFrame(columns = ['Ronald Reagan'])
df_jimmy_carter = pd.DataFrame(columns = ['Jimmy Carter'])
df_gerald_ford = pd.DataFrame(columns = ['Gerald Ford'])

dfs = [df_joe_biden, df_donald_trump, df_barack_obama,
       df_george_bush, df_bill_clinton, df_george_hw_bush,
       df_ronald_reagan, df_jimmy_carter, df_gerald_ford]

for i in range(len(dfs)):
    speeches = df.iloc[i,1]
    abortion_sentences = re.findall(r"([^.]*abortion[^.]*)", speeches)
    # assigns abortion_sentences to column of current dataframe in dfs
    # The list(dfs[i])[0] part of the code accesses the first element of
    # the list (which is the name of the column)
    dfs[i][list(dfs[i])[0]] = abortion_sentences

# print all of the dataframes
for df_ in dfs:
  print(df_.head() , '\n')
```

```
                                     Joe Biden
0   The majority rattles off laws from the 19th c...
1    Even 150 years ago, the common law and many ...
2    And the Dobbs majority ignores that many law...
```

```
3   This vote makes clear what we know: the major...
4   And, the American people must continue to use...

                                        Donald Trump
0    When it comes to abortion, Democrats is a — ...
1  ” THE PRESIDENT:  Nearly every top Democrat in...
2   Senate Democrats even blocked legislation tha...
3    That’s why I’ve called on Congress — two of ...
4   Wade has resulted in some of the most permiss...

                                        Barack Obama
0  ) The question, then -- the question then is h...
1    He wrote, "I do not ask at this point that y...
2   That’s when we begin to say, "Maybe we won’t ...
3  " So let us work together to reduce the number...
4  )  Let’s honor the conscience of those who dis...

                                         George Bush
0  ) Working with the Congress, we have refused t...
1  ) And last November, it was my honor to sign i...
2  ) Today we're heartened -- we're heartened by ...
3   But the most recent data reports that more th...
4   Here in Washington we passed good laws that p...

                                        Bill Clinton
0   Today I am acting to separate our national he...
1   We must let medicine and science proceed unen...
2   As a nation, our goal should be to protect in...
3   Our vision should be of an America where abor...
4   Today I am also directing Secretary of Defens...

                                    George H.W Bush
0   Attempts by Congress to expand funding-- Fede...
1   And before you begin your march today, on thi...
2   We are concerned about abortion because it de...
3   And I think when it comes to abortion there's...
4   I know, too, that you and hundreds of thousan...

                                       Ronald Reagan
0   But I ask: What single issue could be of grea...
1   In our own time, medical science has added to...
2   We know, in particular, that when an abortion...
3  First, our position on international populatio...
4   Well, the United Nations Fund for Population ...

                                       Jimmy Carter
0                     I am strongly against abortion
1                          I think abortion is wrong
2   I don't think the Government ought to do anyt...
3   But short of a constitutional amendment, and ...
4   I personally don't believe that the Federal G...

                                       Gerald Ford
```

Conduct Sentiment Analysis on Each President Dataframe

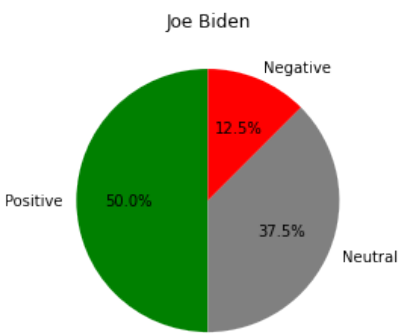
```
def analysis(score):
  if score>0:
        return 'Positive'
  elif score ==0:
        return 'Neutral'
  else:
        return 'Negative'

for i in range(len(dfs)):
  dfs[i]['Polarity'] = dfs[i][list(dfs[i])[0]].apply(lambda x: nlp(x)._.blob.polarity)
  dfs[i]['Subjectivity'] = dfs[i][list(dfs[i])[0]].apply(lambda x: nlp(x)._.blob.subjectivity)
  dfs[i]['Analysis'] = dfs[i]['Polarity'].apply(analysis)

# show a sample of the data
print(dfs[0].head())

df_list_subjective = []
for i in range(len(dfs)):
  df_list_subjective.append(dfs[i][dfs[i]['Subjectivity'] >= 0.5])
  print(df_list_subjective[i].head())

```

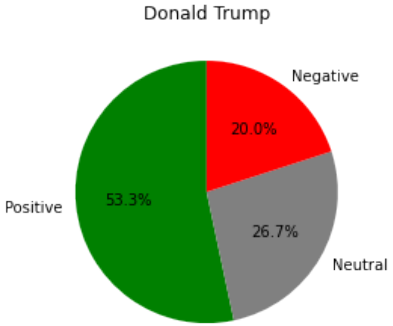
```
                                     Joe Biden  Polarity  Subjectivity  \
0   The majority rattles off laws from the 19th c...  0.000000      0.000000
1    Even 150 years ago, the common law and many ...  0.075000      0.455000
2    And the Dobbs majority ignores that many law...  0.500000      0.500000
3   This vote makes clear what we know: the major...  0.328571      0.639683
4   And, the American people must continue to use...  0.142857      0.267857

   Analysis
0   Neutral
1  Positive
2  Positive
3  Positive
4  Positive
                                     Joe Biden  Polarity  Subjectivity  \
2    And the Dobbs majority ignores that many law...  0.500000      0.500000
3   This vote makes clear what we know: the major...  0.328571      0.639683
5   State laws banning abortion are automatically... -0.183333      0.733333

   Analysis
2  Positive
3  Positive
5  Negative
                                  Donald Trump  Polarity  Subjectivity  \
0    When it comes to abortion, Democrats is a – ...    0.1875         0.750
3    That’s why I’ve called on Congress – two of ...    0.6500         0.625
4   Wade has resulted in some of the most permiss...    0.5000         0.500
5    For example, in the United States, it’s one ...    0.0000         1.000
```

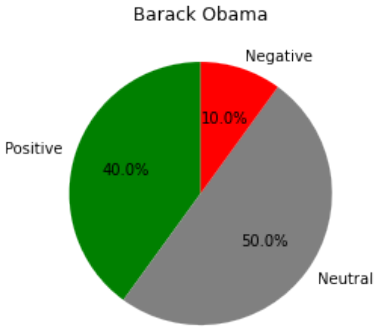
```
6    In fact, only 12 percent of Americans suppor...    0.0000         1.000

   Analysis
0  Positive
3  Positive
4  Positive
5   Neutral
6   Neutral
                                      Barack Obama  Polarity  Subjectivity  \
0  ) The question, then -- the question then is h...  0.117857      0.597487
1    He wrote, "I do not ask at this point that y...  0.000000      1.000000
4  )  Let’s honor the conscience of those who dis...  0.250000      0.668056
8    While this is a sensitive and often divisive...  0.311111      0.633333
9   While this is a sensitive and often divisive ...  0.100000      0.900000

   Analysis
0  Positive
1   Neutral
4  Positive
8  Positive
9  Positive
                                       George Bush  Polarity  Subjectivity  \
5   We came together to ban the cruel practice of...     -0.55          0.65
7   I want to thank you all for getting that ban ...      0.80          1.00

   Analysis
5  Negative
7  Positive
                                      Bill Clinton  Polarity  Subjectivity  \
3   Our vision should be of an America where abor...  0.333333      0.533333
```

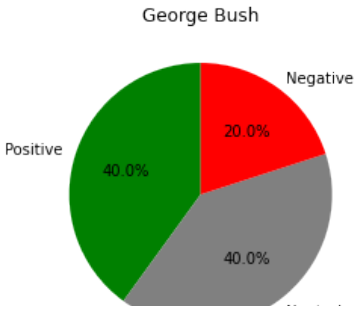
Create a Pie Chart of Polarity for Each President

```
for i in range(len(dfs)):
  pie_chart_values = dfs[i]['Analysis'].value_counts()
  # put first value of slice as positive, second as negative etc. the '.get' function gets value of the key, but if its not there, returns 0
  # this is done to prevent any key errors if there are any missing values for any Positive, Neutral, or Negative
  # https://www.w3schools.com/python/ref_dictionary_get.asp
  slices = [pie_chart_values.get('Positive', 0), pie_chart_values.get('Neutral', 0), pie_chart_values.get('Negative', 0)]
  labels = ['Positive', 'Neutral', 'Negative']
  colors = ['green', 'grey', 'red']
  plt.pie(slices, labels=labels, colors=colors, startangle=90, autopct='%1.1f%%')
  #pie_chart_values.plot(kind = 'pie', label='', autopct='%1.1f%%', startangle=90, colors=['green', 'red', 'grey'])
  plt.title(list(dfs[i])[0])
  plt.show()


```

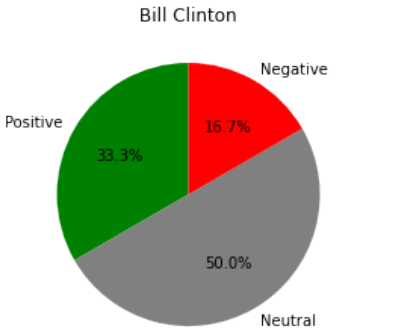

Joe Biden
Negative
12.5%
Positive
50.0%
37.5%
Neutral

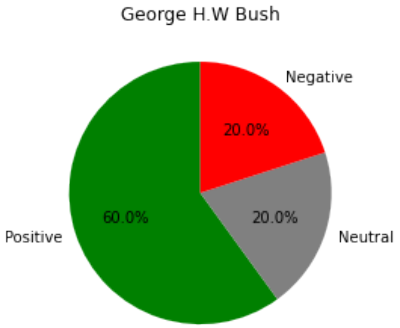

Donald Trump
Negative
20.0%
Positive
53.3%
26.7%
Neutral

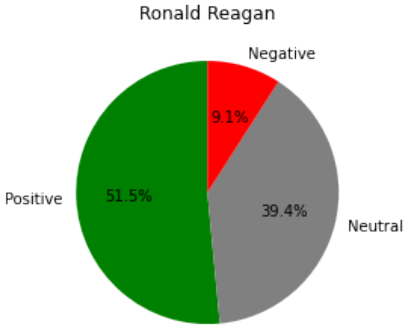

Barack Obama
Negative
10.0%
Positive
40.0%
50.0%
Neutral

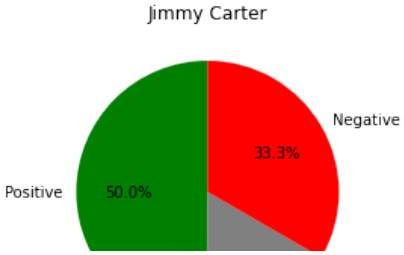

George Bush
Negative
20.0%
Positive
40.0%
40.0%


Neutral


Bill Clinton
Negative
Positive
16.7%
33.3%
50.0%
Neutral

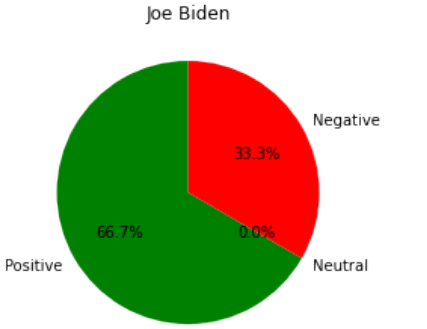

George H.W Bush
Negative
20.0%
60.0%
20.0%
Positive
Neutral

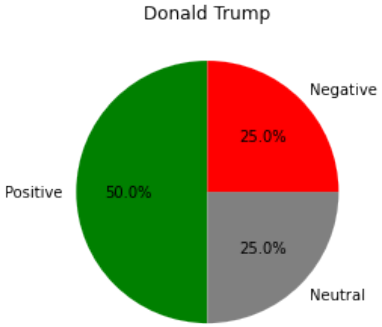

Ronald Reagan
Negative
9.1%
Positive
51.5%
39.4%
Neutral

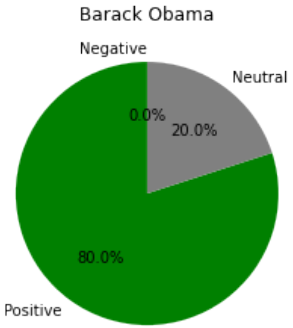

Jimmy Carter
Negative
33.3%
Positive
50.0%

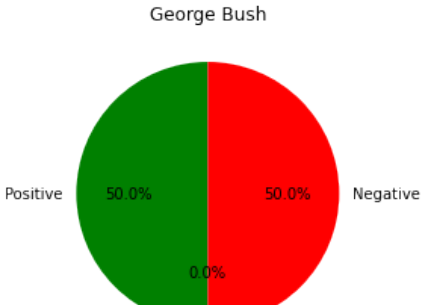
Pie chart of presidents sentences with subjectivity >= 0.5


```
for i in range(len(df_list_subjective)):
  pie_chart_values = df_list_subjective[i]['Analysis'].value_counts()
  slices = [pie_chart_values.get('Positive', 0), pie_chart_values.get('Neutral', 0), pie_chart_values.get('Negative', 0)]
  labels = ['Positive', 'Neutral', 'Negative']
  colors = ['green', 'grey', 'red']
  plt.pie(slices, labels=labels, colors=colors, startangle=90, autopct='%1.1f%%')
  #pie_chart_values.plot(kind = 'pie', label='', autopct='%1.1f%%', startangle=90, colors=['green', 'red', 'grey'])
  plt.title(list(df_list_subjective[i])[0])
  plt.show()

```


Joe Biden
Negative
33.3%
66.7%
0.0%
Positive
Neutral


Donald Trump
Negative
25.0%
Positive
50.0%
25.0%
Neutral


Barack Obama
Negative
Neutral
0.0%
20.0%
80.0%
Positive


George Bush
Positive
50.0%
50.0%
Negative
0.0%

Bill Clinton

Plot Polarity and Subjectivity of each President, using different colour to differentiate them

```
# list of colours that are easily distuingishable
colors = ['red', 'orange', 'yellow', 'green', 'blue', 'indigo', 'violet', 'black', 'gray']

plt.figure(figsize=(10,8))

# iterate over all dataframes
for i in range(len(dfs)):
  plt.scatter(dfs[i]['Polarity'], dfs[i]['Subjectivity'], color = colors[i], s=150, label = list(dfs[i])[0])


# create legend for each president and their respective colour
plt.legend(title="Legend")

# create plot title
plt.title("Scatter Plot of Polarity and Subjectivity of Each President's Sentences Regarding 'Abortion'")

# label plots
plt.xlabel('Polarity')
plt.ylabel('Subjectivity')

# show plot
plt.show()
```