

```
# pip install nltk
```

```
import nltk
```

```
corpus = """Lalu Prasad[1] (born 11 June 1948[a]) is an Indian politician and president of the Rashtriya Janata Dal (RJD).[2][3][4] He is a former chief minister of Bihar (1990-1997), a former railway minister of India (2004-2009), and a former member of Parliament (MP) of the Lok Sabha[5] & Rajya Sabha.
```

```
He entered politics at Patna University as a student leader and in 1977, was elected as one of the youngest member of the Lok Sabha for the Bharatiya Lok Dal of Janata Alliance.[6][7] He became the chief minister of Bihar in 1990. His party came to power in 2015 Bihar Legislative Assembly election in partnership with Nitish Kumar of JD(U). This coalition ended when Nitish resigned and RJD was ousted, becoming the opposition party.
```

```
In 2020 Bihar Legislative Assembly election, RJD remained the single largest party in Bihar, and along with JD(U) in power after JD(U) rejoined MGB in 2022, headed the government until JD(U) returned to NDA.
```

```
Lalu was convicted in the controversial Fodder Scam, and was serving a term until 17 April 2021, when he was granted bail from the High Court.[8]
```

```
"""
```

```
# nltk.download('all')
```

```
from nltk.tokenize import sent_tokenize, word_tokenize
```

```
#Question 1(a)
```

```
sentences = sent_tokenize(corpus)
```

```
print("Output 1(a): \n")
```

```
sentences
```

```
Output 1(a):
```

```
['Lalu Prasad[1] (born 11 June 1948[a]) is an Indian politician and president of the Rashtriya Janata Dal (RJD).', '[2][3][4] He is a former chief minister of Bihar (1990-1997), a former railway minister of India (2004-2009), and a former member of Parliament (MP) of the Lok Sabha[5] & Rajya Sabha.',
```

```
'He entered politics at Patna University as a student leader and in 1977, was elected as one of the youngest member of the Lok Sabha for the Bharatiya Lok Dal of Janata Alliance.',
```

```
'[6][7] He became the chief minister of Bihar in 1990.',
```

```
'His party came to power in 2015 Bihar Legislative Assembly election
```

```
in partnership with Nitish Kumar of JD(U).',  
'This coalition ended when Nitish resigned and RJD was ousted,  
becoming the opposition party.',  
'In 2020 Bihar Legislative Assembly election, RJD remained the single  
largest party in Bihar, and along with JD(U) in power after JD(U)  
rejoined MGB in 2022, headed the government until JD(U) returned to  
NDA.',  
'Lalu was convicted in the controversial Fodder Scam, and was serving  
a term until 17 April 2021, when he was granted bail from the High  
Court.',  
'[8]'
```

#Question 1(b)

```
words = word_tokenize(corpus)
```

```
print("Output 1(b): \n")  
words
```

Output 1(b):

```
['Lalu',  
'Prasad',  
'[',  
'1',  
']',  
'(',  
'born',  
'11',  
'June',  
'1948',  
'[',  
'a',  
']',  
)',  
'is',  
'an',  
'Indian',  
'politician',  
'and',  
'president',  
'of',  
'the',  
'Rashtriya',  
'Janata',  
'Dal',  
'(',  
'RJD',  
)',  
'.',
```

'[',
'2',
''],
'[',
'3',
''],
'[',
'4',
''],
'He',
'is',
'a',
'former',
'chief',
'minister',
'of',
'Bihar',
'(',
'1990-1997',
''),
'',
'a',
'former',
'railway',
'minister',
'of',
'India',
'(',
'2004-2009',
''),
'',
'and',
'a',
'former',
'member',
'of',
'Parliament',
'(',
'MP',
''),
'of',
'the',
'Lok',
'Sabha',
'[',
'5',
''],
'&',
'Rajya',

'Sabha',
'',
'He',
'entered',
'politics',
'at',
'Patna',
'University',
'as',
'a',
'student',
'leader',
'and',
'in',
'1977',
'',
'was',
'elected',
'as',
'one',
'of',
'the',
'youngest',
'member',
'of',
'the',
'Lok',
'Sabha',
'for',
'the',
'Bharatiya',
'Lok',
'Dal',
'of',
'Janata',
'Alliance',
'',
'[',
'6',
']',
'[',
'7',
']',
'He',
'became',
'the',
'chief',
'minister',
'of',

'Bihar',
'in',
'1990',
,,
'His',
'party',
'came',
'to',
'power',
'in',
'2015',
'Bihar',
'Legislative',
'Assembly',
'election',
'in',
'partnership',
'with',
'Nitish',
'Kumar',
'of',
'JD',
'(',
'U',
)',
,,
'This',
'coalition',
'ended',
'when',
'Nitish',
'resigned',
'and',
'RJD',
'was',
'ousted',
,,
'becoming',
'the',
'opposition',
'party',
,,
'In',
'2020',
'Bihar',
'Legislative',
'Assembly',
'election',
,,

'RJD',
'remained',
'the',
'single',
'largest',
'party',
'in',
'Bihar',
,',
,',
'and',
'along',
'with',
'JD',
'(',
'U',
)',
'in',
'power',
'after',
'JD',
'(',
'U',
)',
'rejoined',
'MGB',
'in',
'2022',
,',
,',
'headed',
'the',
'government',
'until',
'JD',
'(',
'U',
)',
'returned',
'to',
'NDA',
,',
,',
'Lalu',
'was',
'convicted',
'in',
'the',
'controversial',
'Fodder',
'Scam',
,',
,',

```
'and',  
'was',  
'serving',  
'a',  
'term',  
'until',  
'17',  
'April',  
'2021',  
,,  
'when',  
'he',  
'was',  
'granted',  
'bail',  
'from',  
'the',  
'High',  
'Court',  
,,  
'[',  
'8',  
'']]
```

```
from nltk.corpus import stopwords  
stopwords.words('english')
```

```
['a',  
'about',  
'above',  
'after',  
'again',  
'against',  
'ain',  
'all',  
'am',  
'an',  
'and',  
'any',  
'are',  
'aren',  
'aren't',  
'as',  
'at',  
'be',  
'because',  
'been',  
'before',  
'being',
```

'below',
'between',
'both',
'but',
'by',
'can',
'couldn',
"couldn't",
'd',
'did',
'didn',
"didn't",
'do',
'does',
'doesn',
"doesn't",
'doing',
'don',
"don't",
'down',
'during',
'each',
'few',
'for',
'from',
'further',
'had',
'hadn',
"hadn't",
'has',
'hasn',
"hasn't",
'have',
'haven',
"haven't",
'having',
'he',
"he'd",
"he'll",
'her',
'here',
'hers',
'herself',
"he's",
'him',
'himself',
'his',
'how',
'i',

'i'd',
'if',
"i'll",
"i'm",
'in',
'into',
'is',
'isn',
"isn't",
'it',
"it'd",
"it'll",
"it's",
'its',
'itself',
"i've",
'just',
'll',
'm',
'ma',
'me',
'mightn',
"mightn't",
'more',
'most',
'mustn',
"mustn't",
'my',
'myself',
'needn',
"needn't",
'no',
'nor',
'not',
'now',
'o',
'of',
'off',
'on',
'once',
'only',
'or',
'other',
'our',
'ours',
'ourselves',
'out',
'over',
'own',

're',
's',
'same',
'shan',
"shan't",
'she',
"she'd",
"she'll",
"she's",
'should',
'shouldn',
"shouldn't",
"should've",
'so',
'some',
'such',
't',
'than',
'that',
"that'll",
'the',
'their',
'theirs',
'them',
'themselves',
'then',
'there',
'these',
'they',
"they'd",
"they'll",
"they're",
"they've",
'this',
'those',
'through',
'to',
'too',
'under',
'until',
'up',
've',
'very',
'was',
'wasn',
"wasn't",
'we',
"we'd",
"we'll",

```
"we're",
'were',
'weren',
"weren't",
"we've",
'what',
'when',
'where',
'which',
'while',
'who',
'whom',
'why',
'will',
'with',
'won',
"won't",
'wouldn',
"wouldn't",
'y',
'you',
"you'd",
"you'll",
'your',
"you're",
'yours',
'yourself',
'yourselves',
"you've"]
```

#Question 2

```
cleaned_corpus = []
for word in words:
    if word not in stopwords.words('english'):
        cleaned_corpus.append(word)
```

```
print("Output 2: \n")
cleaned_corpus
```

Output 2:

```
['Lalu',
'Prasad',
'[',
'1',
']',
'(',
'born',
'11',
```

'June',
'1948',
['',
'],'',
)',
'Indian',
'politician',
'president',
'Rashtriya',
'Janata',
'Dal',
(',
'RJD',
)',
,',
,',
['',
'2',
'],'',
['',
'3',
'],'',
['',
'4',
'],'',
'He',
'former',
'chief',
'minister',
'Bihar',
(',
'1990-1997',
)',
,',
,',
'former',
'railway',
'minister',
'India',
(',
'2004-2009',
)',
,',
,',
'former',
'member',
'Parliament',
(',
'MP',
)',
'Lok',
'Sabha',

['
'5',
'],'
'&',
'Rajya',
'Sabha',
.'
'He',
'entered',
'politics',
'Patna',
'University',
'student',
'leader',
'1977',
.'
'elected',
'one',
'youngest',
'member',
'Lok',
'Sabha',
'Bharatiya',
'Lok',
'Dal',
'Janata',
'Alliance',
.'
['
'6',
'],'
['
'7',
'],'
'He',
'became',
'chief',
'minister',
'Bihar',
'1990',
.'
'His',
'party',
'came',
'power',
'2015',
'Bihar',
'Legislative',
'Assembly',

'election',
'partnership',
'Nitish',
'Kumar',
'JD',
'(',
'U',
)',
,,
'This',
'coalition',
'ended',
'Nitish',
'resigned',
'RJD',
'ousted',
,,
,,
'becoming',
'opposition',
'party',
,,
'In',
'2020',
'Bihar',
'Legislative',
'Assembly',
'election',
,,
'RJD',
'remained',
'single',
'largest',
'party',
'Bihar',
,,
'along',
'JD',
'(',
'U',
)',
'power',
'JD',
'(',
'U',
)',
'rejoined',
'MGB',
'2022',
,,
,,

```

'headed',
'government',
'JD',
'(',
'U',
')',
'returned',
'NDA',
',',
',',
'Lalu',
'convicted',
'controversial',
'Fodder',
'Scam',
',',
',',
'serving',
'term',
'17',
'April',
'2021',
',',
',',
'granted',
'bail',
'High',
'Court',
',',
',',
'[',
'8',
']']

```

#Question 3

```
tagged = nltk.pos_tag(words)
```

```
print("Output 3:\n")
```

```
tagged
```

Output 3:

```

[('Lalu', 'NNP'),
 ('Prasad', 'NNP'),
 ('[', 'VBD'),
 ('1', 'CD'),
 (']', 'NNP'),
 ('(', '('),
 ('born', 'VBN'),
 ('11', 'CD'),
 ('June', 'NNP'),
 ('1948', 'CD'),
 ('[', 'VBD'),

```

```
('a', 'DT'),
(']', 'NN'),
(')', ')'),
('is', 'VBZ'),
('an', 'DT'),
('Indian', 'JJ'),
('politician', 'NN'),
('and', 'CC'),
('president', 'NN'),
('of', 'IN'),
('the', 'DT'),
('Rashtriya', 'NNP'),
('Janata', 'NNP'),
('Dal', 'NNP'),
('(', '('),
('RJD', 'NNP'),
(')', ')'),
('.', '.'),
('[', '$'),
('2', 'CD'),
(']', 'NNP'),
('[', 'VBD'),
('3', 'CD'),
(']', 'NNP'),
('[', 'VBD'),
('4', 'CD'),
(']', 'NN'),
('He', 'PRP'),
('is', 'VBZ'),
('a', 'DT'),
('former', 'JJ'),
('chief', 'JJ'),
('minister', 'NN'),
('of', 'IN'),
('Bihar', 'NNP'),
('(', '('),
('1990-1997', 'JJ'),
(')', ')'),
(',', ','),
('a', 'DT'),
('former', 'JJ'),
('railway', 'NN'),
('minister', 'NN'),
('of', 'IN'),
('India', 'NNP'),
('(', '('),
('2004-2009', 'CD'),
(')', ')'),
(',', ','),
```


('and', 'CC'),
('a', 'DT'),
('former', 'JJ'),
('member', 'NN'),
('of', 'IN'),
('Parliament', 'NNP'),
('(', '('),
('MP', 'NNP'),
(')', ')'),
('of', 'IN'),
('the', 'DT'),
('Lok', 'NNP'),
('Sabha', 'NNP'),
('[', 'VBD'),
('5', 'CD'),
(']', 'NNP'),
('&', 'CC'),
('Rajya', 'NNP'),
('Sabha', 'NNP'),
('.', '.'),
('He', 'PRP'),
('entered', 'VBD'),
('politics', 'NNS'),
('at', 'IN'),
('Patna', 'NNP'),
('University', 'NNP'),
('as', 'IN'),
('a', 'DT'),
('student', 'NN'),
('leader', 'NN'),
('and', 'CC'),
('in', 'IN'),
('1977', 'CD'),
(',', ','),
('was', 'VBD'),
('elected', 'VBN'),
('as', 'IN'),
('one', 'CD'),
('of', 'IN'),
('the', 'DT'),
('youngest', 'JJ'),
('member', 'NN'),
('of', 'IN'),
('the', 'DT'),
('Lok', 'NNP'),
('Sabha', 'NNP'),
('for', 'IN'),
('the', 'DT'),
('Bharatiya', 'NNP'),

('Lok', 'NNP'),
('Dal', 'NNP'),
('of', 'IN'),
('Janata', 'NNP'),
('Alliance', 'NNP'),
('.', '.'),
('[', 'CC'),
('6', 'CD'),
(']', 'JJ'),
('[', '\$'),
('7', 'CD'),
(']', 'CC'),
('He', 'PRP'),
('became', 'VBD'),
('the', 'DT'),
('chief', 'JJ'),
('minister', 'NN'),
('of', 'IN'),
('Bihar', 'NNP'),
('in', 'IN'),
('1990', 'CD'),
('.', '.'),
('His', 'PRP\$'),
('party', 'NN'),
('came', 'VBD'),
('to', 'TO'),
('power', 'NN'),
('in', 'IN'),
('2015', 'CD'),
('Bihar', 'NNP'),
('Legislative', 'NNP'),
('Assembly', 'NNP'),
('election', 'NN'),
('in', 'IN'),
('partnership', 'NN'),
('with', 'IN'),
('Nitish', 'JJ'),
('Kumar', 'NNP'),
('of', 'IN'),
('JD', 'NNP'),
('(', '('),
('U', 'NNP'),
(')', ')'),
('.', '.'),
('This', 'DT'),
('coalition', 'NN'),
('ended', 'VBD'),
('when', 'WRB'),
('Nitish', 'JJ'),

('resigned', 'VBD'),
('and', 'CC'),
('RJD', 'NNP'),
('was', 'VBD'),
('ousted', 'VBN'),
(',', ' '),
('becoming', 'VBG'),
('the', 'DT'),
('opposition', 'NN'),
('party', 'NN'),
('.', ' '),
('In', 'IN'),
('2020', 'CD'),
('Bihar', 'NNP'),
('Legislative', 'NNP'),
('Assembly', 'NNP'),
('election', 'NN'),
(',', ' '),
('RJD', 'NNP'),
('remained', 'VBD'),
('the', 'DT'),
('single', 'JJ'),
('largest', 'JJS'),
('party', 'NN'),
('in', 'IN'),
('Bihar', 'NNP'),
(',', ' '),
('and', 'CC'),
('along', 'IN'),
('with', 'IN'),
('JD', 'NNP'),
('(', '('),
('U', 'NNP'),
(')', ')'),
('in', 'IN'),
('power', 'NN'),
('after', 'IN'),
('JD', 'NNP'),
('(', '('),
('U', 'NNP'),
(')', ')'),
('rejoined', 'VBD'),
('MGB', 'NNP'),
('in', 'IN'),
('2022', 'CD'),
(',', ' '),
('headed', 'VBD'),
('the', 'DT'),
('government', 'NN'),

```

('until', 'IN'),
('JD', 'NNP'),
('(', '('),
('U', 'NNP'),
(')', ')'),
('returned', 'VBD'),
('to', 'TO'),
('NDA', 'NNP'),
('.', '.'),
('Lalu', 'NNP'),
('was', 'VBD'),
('convicted', 'VBN'),
('in', 'IN'),
('the', 'DT'),
('controversial', 'JJ'),
('Fodder', 'NNP'),
('Scam', 'NNP'),
(',', ','),
('and', 'CC'),
('was', 'VBD'),
('serving', 'VBG'),
('a', 'DT'),
('term', 'NN'),
('until', 'IN'),
('17', 'CD'),
('April', 'NNP'),
('2021', 'CD'),
(',', ','),
('when', 'WRB'),
('he', 'PRP'),
('was', 'VBD'),
('granted', 'VBN'),
('bail', 'NN'),
('from', 'IN'),
('the', 'DT'),
('High', 'JJ'),
('Court', 'NNP'),
('.', '.'),
('[', 'CC'),
('8', 'CD'),
(']', 'NN')]

```

```
# pip install numpy
```

```
import numpy
```

```
chunks = nltk.ne_chunk(tagged)
```

```
# pip install svglint
```

chunks

```
#Question 4
print("Output 4:\n")
for chunk in chunks:
    if hasattr(chunk, 'label'):
        print(chunk.label(), ' '.join(c[0] for c in chunk))
```

Output 4:

```
PERSON Lalu
PERSON Prasad
GPE Indian
ORGANIZATION Rashtriya Janata Dal
ORGANIZATION RJD
GPE Bihar
GPE India
ORGANIZATION Parliament
ORGANIZATION Lok Sabha
PERSON Rajya Sabha
ORGANIZATION Patna University
ORGANIZATION Lok Sabha
ORGANIZATION Bharatiya Lok Dal
PERSON Janata Alliance
GPE Bihar
PERSON Nitish Kumar
GPE JD
PERSON Nitish
ORGANIZATION RJD
ORGANIZATION RJD
GPE Bihar
ORGANIZATION JD
ORGANIZATION MGB
ORGANIZATION NDA
PERSON Lalu
PERSON Fodder Scam
ORGANIZATION High Court
```

```
# pip install --upgrade pip setuptools wheel
```

```
# pip install tokenizers
```

```
# pip install transformers
```

```
from transformers import pipeline
```

```
/home/administrator/.local/lib/python3.6/site-packages/tqdm/
auto.py:22: TqdmWarning: IProgress not found. Please update jupyter
```

and ipywidgets. See
https://ipywidgets.readthedocs.io/en/stable/user_install.html
from .autonotebook import tqdm as notebook_tqdm

```
# pip install torch
```

```
! python3 -m pip install 'tensorflow[and-cuda]'
```

Defaulting to user installation because normal site-packages is not writeable

Requirement already satisfied: tensorflow[and-cuda] in
/home/administrator/.local/lib/python3.6/site-packages (2.6.2)

WARNING: tensorflow 2.6.2 does not provide the extra 'and-cuda'

Requirement already satisfied: google-pasta~=0.2 in
/home/administrator/.local/lib/python3.6/site-packages (from
tensorflow[and-cuda]) (0.2.0)

Requirement already satisfied: protobuf>=3.9.2 in
/home/administrator/.local/lib/python3.6/site-packages (from
tensorflow[and-cuda]) (3.19.6)

Requirement already satisfied: six~=1.15.0 in
/home/administrator/.local/lib/python3.6/site-packages (from
tensorflow[and-cuda]) (1.15.0)

Requirement already satisfied: wheel~=0.35 in
/home/administrator/.local/lib/python3.6/site-packages (from
tensorflow[and-cuda]) (0.37.1)

Requirement already satisfied: opt-einsum~=3.3.0 in
/home/administrator/.local/lib/python3.6/site-packages (from
tensorflow[and-cuda]) (3.3.0)

Requirement already satisfied: grpcio<2.0,>=1.37.0 in
/home/administrator/.local/lib/python3.6/site-packages (from
tensorflow[and-cuda]) (1.48.2)

Requirement already satisfied: gast==0.4.0 in
/home/administrator/.local/lib/python3.6/site-packages (from
tensorflow[and-cuda]) (0.4.0)

Requirement already satisfied: flatbuffers~=1.12.0 in
/home/administrator/.local/lib/python3.6/site-packages (from
tensorflow[and-cuda]) (1.12)

Requirement already satisfied: numpy~=1.19.2 in
/home/administrator/.local/lib/python3.6/site-packages (from
tensorflow[and-cuda]) (1.19.5)

Requirement already satisfied: termcolor~=1.1.0 in
/home/administrator/.local/lib/python3.6/site-packages (from
tensorflow[and-cuda]) (1.1.0)

Requirement already satisfied: typing-extensions~=3.7.4 in
/home/administrator/.local/lib/python3.6/site-packages (from
tensorflow[and-cuda]) (3.7.4.3)

Requirement already satisfied: clang~=5.0 in
/home/administrator/.local/lib/python3.6/site-packages (from
tensorflow[and-cuda]) (5.0)

Requirement already satisfied: tensorboard<2.7,>=2.6.0 in

/home/administrator/.local/lib/python3.6/site-packages (from tensorflow[and-cuda]) (2.6.0)
Requirement already satisfied: keras-preprocessing~=1.1.2 in /home/administrator/.local/lib/python3.6/site-packages (from tensorflow[and-cuda]) (1.1.2)
Requirement already satisfied: tensorflow-estimator<2.7,>=2.6.0 in /home/administrator/.local/lib/python3.6/site-packages (from tensorflow[and-cuda]) (2.6.0)
Requirement already satisfied: keras<2.7,>=2.6.0 in /home/administrator/.local/lib/python3.6/site-packages (from tensorflow[and-cuda]) (2.6.0)
Requirement already satisfied: absl-py~=0.10 in /home/administrator/.local/lib/python3.6/site-packages (from tensorflow[and-cuda]) (0.15.0)
Requirement already satisfied: wrapt~=1.12.1 in /home/administrator/.local/lib/python3.6/site-packages (from tensorflow[and-cuda]) (1.12.1)
Requirement already satisfied: h5py~=3.1.0 in /home/administrator/.local/lib/python3.6/site-packages (from tensorflow[and-cuda]) (3.1.0)
Requirement already satisfied: astunparse~=1.6.3 in /home/administrator/.local/lib/python3.6/site-packages (from tensorflow[and-cuda]) (1.6.3)
Requirement already satisfied: cached-property in /home/administrator/.local/lib/python3.6/site-packages (from h5py~=3.1.0->tensorflow[and-cuda]) (1.5.2)
Requirement already satisfied: setuptools>=41.0.0 in /home/administrator/.local/lib/python3.6/site-packages (from tensorboard<2.7,>=2.6.0->tensorflow[and-cuda]) (59.6.0)
Requirement already satisfied: werkzeug>=0.11.15 in /home/administrator/.local/lib/python3.6/site-packages (from tensorboard<2.7,>=2.6.0->tensorflow[and-cuda]) (2.0.3)
Requirement already satisfied: google-auth-oauthlib<0.5,>=0.4.1 in /home/administrator/.local/lib/python3.6/site-packages (from tensorboard<2.7,>=2.6.0->tensorflow[and-cuda]) (0.4.6)
Requirement already satisfied: tensorboard-data-server<0.7.0,>=0.6.0 in /home/administrator/.local/lib/python3.6/site-packages (from tensorboard<2.7,>=2.6.0->tensorflow[and-cuda]) (0.6.1)
Requirement already satisfied: google-auth<2,>=1.6.3 in /home/administrator/.local/lib/python3.6/site-packages (from tensorboard<2.7,>=2.6.0->tensorflow[and-cuda]) (1.35.0)
Requirement already satisfied: tensorboard-plugin-wit>=1.6.0 in /home/administrator/.local/lib/python3.6/site-packages (from tensorboard<2.7,>=2.6.0->tensorflow[and-cuda]) (1.8.1)
Requirement already satisfied: markdown>=2.6.8 in /home/administrator/.local/lib/python3.6/site-packages (from tensorboard<2.7,>=2.6.0->tensorflow[and-cuda]) (3.3.7)
Requirement already satisfied: requests<3,>=2.21.0 in /home/administrator/.local/lib/python3.6/site-packages (from

tensorboard<2.7,>=2.6.0->tensorflow[and-cuda]) (2.27.1)
 Requirement already satisfied: cachetools<5.0,>=2.0.0 in
 /home/administrator/.local/lib/python3.6/site-packages (from google-
 auth<2,>=1.6.3->tensorboard<2.7,>=2.6.0->tensorflow[and-cuda]) (4.2.4)
 Requirement already satisfied: rsa<5,>=3.1.4 in
 /home/administrator/.local/lib/python3.6/site-packages (from google-
 auth<2,>=1.6.3->tensorboard<2.7,>=2.6.0->tensorflow[and-cuda]) (4.9)
 Requirement already satisfied: pyasn1-modules>=0.2.1 in
 /home/administrator/.local/lib/python3.6/site-packages (from google-
 auth<2,>=1.6.3->tensorboard<2.7,>=2.6.0->tensorflow[and-cuda]) (0.3.0)
 Requirement already satisfied: requests-oauthlib>=0.7.0 in
 /home/administrator/.local/lib/python3.6/site-packages (from google-
 auth-oauthlib<0.5,>=0.4.1->tensorboard<2.7,>=2.6.0->tensorflow[and-
 cuda]) (2.0.0)
 Requirement already satisfied: importlib-metadata>=4.4 in
 /home/administrator/.local/lib/python3.6/site-packages (from
 markdown>=2.6.8->tensorboard<2.7,>=2.6.0->tensorflow[and-cuda])
 (4.8.3)
 Requirement already satisfied: idna<4,>=2.5 in /usr/lib/python3/dist-
 packages (from requests<3,>=2.21.0->tensorboard<2.7,>=2.6.0-
 >tensorflow[and-cuda]) (2.6)
 Requirement already satisfied: charset-normalizer~=2.0.0 in
 /home/administrator/.local/lib/python3.6/site-packages (from
 requests<3,>=2.21.0->tensorboard<2.7,>=2.6.0->tensorflow[and-cuda])
 (2.0.12)
 Requirement already satisfied: certifi>=2017.4.17 in
 /usr/lib/python3/dist-packages (from requests<3,>=2.21.0-
 >tensorboard<2.7,>=2.6.0->tensorflow[and-cuda]) (2018.1.18)
 Requirement already satisfied: urllib3<1.27,>=1.21.1 in
 /usr/lib/python3/dist-packages (from requests<3,>=2.21.0-
 >tensorboard<2.7,>=2.6.0->tensorflow[and-cuda]) (1.22)
 Requirement already satisfied: dataclasses in
 /home/administrator/.local/lib/python3.6/site-packages (from
 werkzeug>=0.11.15->tensorboard<2.7,>=2.6.0->tensorflow[and-cuda])
 (0.8)
 Requirement already satisfied: zipp>=0.5 in
 /home/administrator/.local/lib/python3.6/site-packages (from
 importlib-metadata>=4.4->markdown>=2.6.8->tensorboard<2.7,>=2.6.0-
 >tensorflow[and-cuda]) (3.6.0)
 Requirement already satisfied: pyasn1<0.6.0,>=0.4.6 in
 /home/administrator/.local/lib/python3.6/site-packages (from pyasn1-
 modules>=0.2.1->google-auth<2,>=1.6.3->tensorboard<2.7,>=2.6.0-
 >tensorflow[and-cuda]) (0.5.1)
 Requirement already satisfied: oauthlib>=3.0.0 in
 /home/administrator/.local/lib/python3.6/site-packages (from requests-
 oauthlib>=0.7.0->google-auth-oauthlib<0.5,>=0.4.1-
 >tensorboard<2.7,>=2.6.0->tensorflow[and-cuda]) (3.2.2)

#Question 5


```

sentiment_pipeline = pipeline("sentiment-analysis")
data = [
    "I'm thinking about going to the store later", # Neutral
    "You've let me down", # Negative
    "Your smile brightens my day", # Positive
    "I'm feeling okay", # Neutral
    "You always know how to cheer me up", # Positive
    "I don't trust you anymore", # Negative
    "I'm so proud of you!", # Positive
    "This situation is so frustrating", # Negative
    "I'm working on a project right now", # Neutral
    "Can you pass me the salt?", # Neutral
    "I'm lucky to have you in my life", # Positive
    "I'm so angry about this", # Negative
    "I'll be there at 5 PM", # Neutral
    "I don't want to talk to you right now", # Negative
    "I appreciate everything you do", # Positive
    "I love spending time with you", # Positive
    "I'm not happy with how things turned out", # Negative
    "I'm grateful for your support", # Positive
    "I feel hurt by your actions", # Negative
    "This is the best day ever", # Positive
    "I can't stand you", # Negative
    "The weather is nice today", # Neutral
    "I'm lucky to have you in my life", # Positive
    "I haven't made up my mind yet", # Neutral
    "I'm so disappointed in you", # Negative
    "I'm working on a project right now", # Neutral
    "I'm proud of you", # Positive
    "You're an amazing person", # Positive
    "You always ignore me", # Negative
    "It's an average day today", # Neutral
]

```

No model was supplied, defaulted to distilbert-base-uncased-finetuned-sst-2-english (<https://huggingface.co/distilbert-base-uncased-finetuned-sst-2-english>)

Downloading: 100%|██████████| 256M/256M [00:59<00:00, 4.52MB/s]

All model checkpoint layers were used when initializing
TFDistilBertForSequenceClassification.

All the layers of TFDistilBertForSequenceClassification were
initialized from the model checkpoint at distilbert-base-uncased-
finetuned-sst-2-english.

If your task is similar to the task the model of the checkpoint was
trained on, you can already use TFDistilBertForSequenceClassification
for predictions without further training.

Downloading: 100%|██████████| 48.0/48.0 [00:00<00:00, 11.6kB/s]

Downloading: 100%|██████████| 226k/226k [00:00<00:00, 631kB/s]

```
print("Output 5:")  
sentiment_pipeline(data)
```

Output 5:

```
[{'label': 'POSITIVE', 'score': 0.8767902851104736},  
{ 'label': 'NEGATIVE', 'score': 0.9718035459518433},  
{ 'label': 'POSITIVE', 'score': 0.9998611211776733},  
{ 'label': 'POSITIVE', 'score': 0.9998173117637634},  
{ 'label': 'POSITIVE', 'score': 0.9998579025268555},  
{ 'label': 'NEGATIVE', 'score': 0.9984240531921387},  
{ 'label': 'POSITIVE', 'score': 0.9998575448989868},  
{ 'label': 'NEGATIVE', 'score': 0.9994235038757324},  
{ 'label': 'POSITIVE', 'score': 0.9896953105926514},  
{ 'label': 'NEGATIVE', 'score': 0.8937267065048218},  
{ 'label': 'POSITIVE', 'score': 0.9998633861541748},  
{ 'label': 'NEGATIVE', 'score': 0.9993712306022644},  
{ 'label': 'POSITIVE', 'score': 0.9954759478569031},  
{ 'label': 'NEGATIVE', 'score': 0.9900822043418884},  
{ 'label': 'POSITIVE', 'score': 0.9998400211334229},  
{ 'label': 'POSITIVE', 'score': 0.9998492002487183},  
{ 'label': 'NEGATIVE', 'score': 0.9997884631156921},  
{ 'label': 'POSITIVE', 'score': 0.9997978806495667},  
{ 'label': 'NEGATIVE', 'score': 0.9994277358055115},  
{ 'label': 'POSITIVE', 'score': 0.9998644590377808},  
{ 'label': 'NEGATIVE', 'score': 0.9992284774780273},  
{ 'label': 'POSITIVE', 'score': 0.9998350143432617},  
{ 'label': 'POSITIVE', 'score': 0.9998633861541748},  
{ 'label': 'NEGATIVE', 'score': 0.9977174997329712},  
{ 'label': 'NEGATIVE', 'score': 0.9995496869087219},  
{ 'label': 'POSITIVE', 'score': 0.9896953105926514},  
{ 'label': 'POSITIVE', 'score': 0.9998606443405151},  
{ 'label': 'POSITIVE', 'score': 0.9998834133148193},  
{ 'label': 'NEGATIVE', 'score': 0.9980337023735046},  
{ 'label': 'POSITIVE', 'score': 0.9967676401138306}]
```