```python
import re, json
from collections import import Counter
import matplotlib.pyplot as plt
import numpy as np
import pandas as pd
```

```python
def get_tokens(daide):
    tokens = re.findall(r'[A-Z]+', daide)
    return tokens
```

```python
import re, json
from collections import import Counter
```

```python
In [ ]:  eng_arr = []
         ref_arr = []
         trans_arr = []
         f_arr = []
         tok_len_arr = []

         def read_file():
             count = 0
             total_p = 0
             total_r = 0

             def compute_accuracy(reference, translation):
                 trimmed_translated_tokens = get_tokens(translation)
                 trimmed_reference_tokens = get_tokens(reference)

                 # precision = correct / output-length
                 # recall = correct / reference-length
                 # f = p * q * 2 / (p + q)
                 correct = list((Counter(trimmed_reference_tokens) & Counter(trimmed_transla
                 overlap = len(correct)
                 # return if denom is 0
                 if overlap == 0:
                     return 0, 0, 0
                 precision = overlap / len(trimmed_translated_tokens)
                 recall = overlap / len(trimmed_reference_tokens)
                 f = precision * recall * 2 / (precision + recall)
                 return round(f, 3), precision, recall

             with open('../data/eng_to_daide_clean.json', 'r', encoding='utf-8') as f:
                 data = json.load(f)

                 for entry in data:
                     count += 1
                     msg = entry['msg']
                     daide = entry['daide']
                     translation = entry['translation']
                     accuracy, p, r = compute_accuracy(daide, translation)
                     total_p += p
                     total_r += r
                     eng_arr.append(msg)
                     ref_arr.append(daide)
                     trans_arr.append(translation)
                     f_arr.append(accuracy)
                     tok_len_arr.append(len(msg.split(' ')))

             f.close()

             print('Average precision:', round(total_p / count, 3))
             print('Average recall:', round(total_r / count, 3))
             return

In [ ]:  read_file()
         d = {'English': eng_arr, 'Sentence Length': tok_len_arr, 'Reference': ref_arr, 'Tra
         df = pd.DataFrame(data=d)
         df
```

```
Average precision: 0.485
Average recall: 0.674
```

Out[ ]:

	English	Sentence Length	Reference	Translation	F-Score
0	Hi Italy, hope you're doing well. I'll be figu...	35	PRP (DMZ (FRA ITA) (PIE LYO WES TYS))	PRP (AND (DMZ (ENG PIE) (ITA LYO WES TYS)) (AL...	0.667
1	Sure, a strong England is always a threat to m...	22	YES (PRP (ALY (GER FRA) VSS (ENG)))	PRP (AND (ALY (GER ENG) VSS (NTH SCA)) (XDO ((...	0.476
2	As am I! What direction are you inclined to go...	16	PRP (DMZ (AUS RUS) (GAL))	PRP (AND (ALY (ENG GER) VSS (FRA)) (DMZ (ENG G...	0.400
3	A/T move fast and break things? I'm fleets yo...	28	PRP (ALY (TUR AUS) VSS (RUS ITA))	PRP (AND (XDO ((ENG FLT A) MTO T)) (ALY (ENG A...	0.357
4	And we work to split Italy between the two of ...	19	PRP (SCD (AUS TRI ROM) (TUR NAP TUN))	PRP (AND (ALY (ENG GER) VSS (ITA)) (XDO ((GER ...	0.370
...	...	...	...	...	...
307	Retreat the Italian army from Greece to Albania.	8	PRP (XDO ((ITA AMY GRE) RTO ALB))	PRP (XDO ((ITA ARM GRE) MTO ALB))	0.714
308	Let the French fleet in the English Channel su...	14	PRP (XDO ((FRA FLT ECH) SUP (FRA AMY BEL)))	PRP (AND (XDO ((FRA FLT ENG) SUP (FRA ARM BEL)...	0.583
309	Hi germany! Are you up for Sil as a DMZ? It wo...	53	PRP (DMZ (RUS GER) (SIL))	PRP (AND (DMZ (GER SIL)) (ALY (GER ENG) VSS (N...	0.533
310	Hi Turkey! I fully agree that we should stay p...	31	YES (PRP (PCE (AUS TUR)))	PRP (AND (SCD (TUR GRE BUL)) (SCD (ENG ROM SER)))	0.267
311	Hi Italy, hope you're doing well. I'll be figu...	35	PRP (DMZ (FRA ITA) (PIE WES))	PRP (AND (DMZ (ENG PIE) (ITA LYO WES TYS)) (AL...	0.526

312 rows × 5 columns

In [ ]:
```python
df.sort_values(by=['F-Score'], ascending=False)
```

Out[ ]:

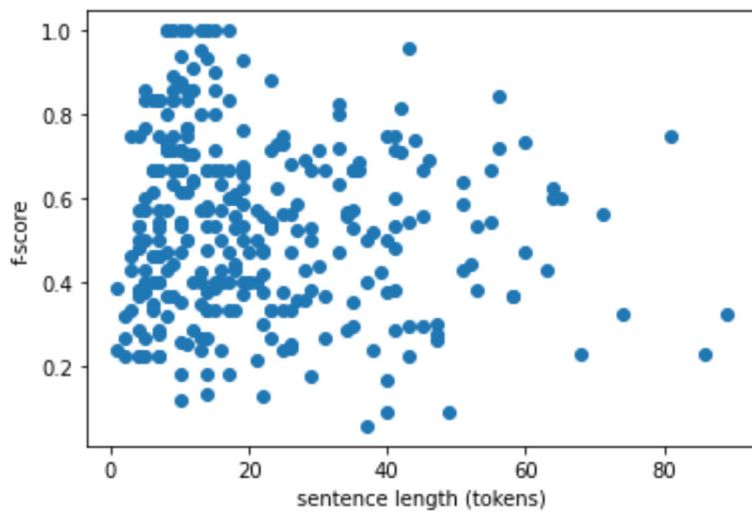|	English	Sentence Length	Reference	Translation	F-Score
61	You built a fleet in Edinburgh? Why? I'd think...	15	PRP (XDO ((ENG FLT EDI) BLD))	PRP (XDO ((ENG FLT EDI) BLD))	1.000
301	We propose an alliance between Germany, Austri...	13	PRP (ALY (GER AUS ITA) VSS (FRA RUS))	PRP (ALY (GER AUS ITA) VSS (FRA RUS))	1.000
265	I hope we can work together against France. I ...	14	PRP (ALY (ENG GER) VSS (FRA))	PRP (ALY (ENG GER) VSS (FRA))	1.000
126	Also, just out of curiosity, did you advise Ge...	14	PRP (XDO ((GER FLT KIE) BLD))	PRP (XDO ((GER FLT KIE) BLD))	1.000
293	it seems germany and France are teaming up aga...	10	PRP (ALY (GER FRA) VSS (ENG))	PRP (ALY (GER FRA) VSS (ENG))	1.000
...	...	...	...	...	...
174	Do we have anything more we need to talk about...	22	YES (PRP (ALY (ITA AUS) VSS (TUR)))	PRP (AND (QRY) (XDO ((ENG FLT ION) MTO LEP)))	0.125
185	Mhmm thought we had a non aggression pact ther...	10	YES (PRP (DMZ (ITA AUS) (TYR)))	REJ (PRP (AND (SCD (ENG BEL)) (ALY (ENG GER) V...	0.118
173	If you're all in, I'll just send you a link. ...	40	PRP (ALY (AUS ITA) VSS (TUR))	PRP (AND (XDO ((AUS ARM BLU) MTO WES)) (XDO ((...	0.091
232	I haven't been told to do a Lepanto yet, who s...	49	YES (PRP (PCE (AUS ITA)))	PRP (AND (DMZ (ENG GER)) (ALY (ENG GER) VSS (F...	0.087
216	Another thought - maybe, we agree that if we w...	37	PRP (PCE (GER ENG))	PRP (AND (ALY (ENG GER) VSS (AUS)) (DMZ (ENG G...	0.056

312 rows × 5 columns

In [ ]:
```python
rslt_df = df[df['F-Score'] > 0.99]
rslt_df.shape
```
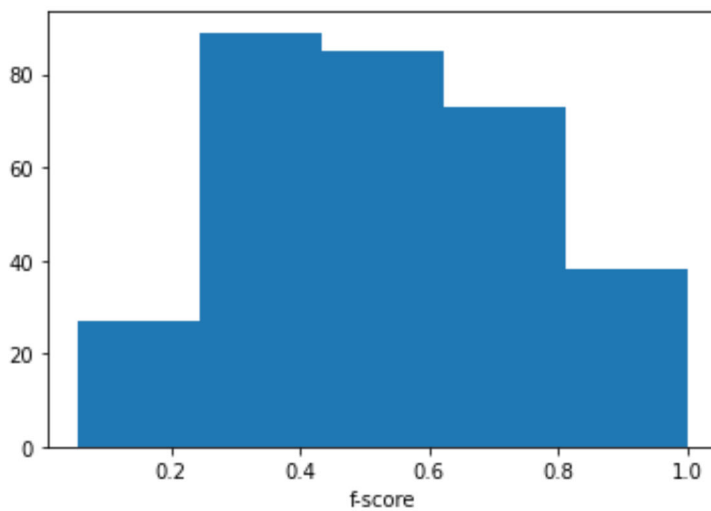
Out[ ]: `(11, 5)`

In [ ]:
```python
x = np.array(df['Sentence Length'])
y = np.array(df['F-Score'])

plt.scatter(x, y)
plt.xlabel("sentence length (tokens)")
plt.ylabel("f-score")
plt.show()
```

```
In [ ]:  plt.hist(df['F-Score'], bins=5)
         plt.xlabel("f-score")
         plt.show()
```



```
In [ ]:  df.sort_values(['F-Score', 'Sentence Length'], ascending=[True, True])
```

Out[ ]:

	English	Sentence Length	Reference	Translation	F-Score
216	Another thought - maybe, we agree that if we w...	37	PRP (PCE (GER ENG))	PRP (AND (ALY (ENG GER) VSS (AUS)) (DMZ (ENG G...	0.056
232	I haven't been told to do a Lepanto yet, who s...	49	YES (PRP (PCE (AUS ITA)))	PRP (AND (DMZ (ENG GER)) (ALY (ENG GER) VSS (F...	0.087
173	If you're all in, I'll just send you a link. ...	40	PRP (ALY (AUS ITA) VSS (TUR))	PRP (AND (XDO ((AUS ARM BLU) MTO WES)) (XDO ((...	0.091
185	Mhmm thought we had a non aggression pact ther...	10	YES (PRP (DMZ (ITA AUS) (TYR)))	REJ (PRP (AND (SCD (ENG BEL)) (ALY (ENG GER) V...	0.118
174	Do we have anything more we need to talk about...	22	YES (PRP (ALY (ITA AUS) VSS (TUR)))	PRP (AND (QRY) (XDO ((ENG FLT ION) MTO LEP)))	0.125
...	...	...	...	...	...
126	Also, just out of curiosity, did you advise Ge...	14	PRP (XDO ((GER FLT KIE) BLD))	PRP (XDO ((GER FLT KIE) BLD))	1.000
152	So you built F LON and France built F BRE, eh?...	14	PRP (AND (XDO ((ENG FLT LON) BLD)) (XDO ((FRA ...	PRP (AND (XDO ((ENG FLT LON) BLD)) (XDO ((FRA ...	1.000
265	I hope we can work together against France. I ...	14	PRP (ALY (ENG GER) VSS (FRA))	PRP (ALY (ENG GER) VSS (FRA))	1.000
61	You built a fleet in Edinburgh? Why? I'd think...	15	PRP (XDO ((ENG FLT EDI) BLD))	PRP (XDO ((ENG FLT EDI) BLD))	1.000
209	He's saying that I need to work with France to...	17	PRP (ALY (ENG FRA) VSS (GER))	PRP (ALY (ENG FRA) VSS (GER))	1.000

312 rows × 5 columns

In [ ]:
```python
rslt_df = df[df['F-Score'] < 0.01]
rslt_df.shape
```

Out[ ]: `(0, 5)`

In [ ]:
```python
np.average(df['F-Score'])
```

Out[ ]: `0.5353076923076924`

In [ ]:

```python
from daidepp import create_daide_grammar, daide_visitor

def validate(daide):
    try:
        grammar = create_daide_grammar(level=130, string_type='all')
        parse_tree = grammar.parse(daide)
        daide_visitor.visit(parse_tree)
        return True
    except:
        return False

valid = 0
total = 0

with open('../data/eng_to_daide_clean.json', 'r', encoding='utf-8') as f:
    data = json.load(f)

    for entry in data:
        msg = entry['msg']
        daide = entry['daide']
        translation = entry['translation']

        if validate(translation):
            valid += 1
        total += 1

    f.close()

print(f'Valid: {valid}/{total} ({valid/total*100:.2f}%)')
```

```
Valid: 98/312 (31.41%)
```