In [ ]:
```
from collections import Counter
import matplotlib.pyplot as plt
import numpy as np
import pandas as pd
from typing import List

# remove punctuations and use lowercase
def tokenize(sentence: str) -> List[str]:
    def trim_all(token: str) -> str:
        if len(token) == 0:
            return token
        while len(token) > 0 and (token[0] == '"' or token[0] == '('):
            token = token[1:]
        while len(token) > 0 and (token[-1] == '"' or token[-1] == '.' or
            token[-1] == ',' or token[-1] == ')' or token[-1] == '!' or toke
            token = token[:-1]
        return token

    words = sentence.split(' ')
    tokens = []
    for word in words:
        if len(word) == 0 or word.isspace():
            continue
        lowercase = word.lower()
        trimmed = trim_all(lowercase)
        tokens.append(trimmed)
    return tokens

def compute_accuracy(reference: str, translation: str) -> float:
    # precision = correct / output-length
    # recall = correct / reference-length
    # f = p * q * 2 / (p + q)
    correct = list((Counter(reference) & Counter(translation)).elements())
    overlap = len(correct)
    # return if denom is 0
    if overlap == 0:
        return 0
    precision = overlap / len(translation)
    recall = overlap / len(reference)
    f = precision * recall * 2 / (precision + recall)
    return round(f, 3)
```

In [ ]:
```
with open('../data/generated_eng.txt', 'r', encoding='utf-8') as f:
    lines = f.read().split('\n\n')

daide_arr = []
ref_arr = []
trnsln_arr = []
f_arr = []
len_arr = []

count = 0

for entry in lines:
    eng, daide, translation = entry.split('\n')
    if len(translation) == 0:
        continue
    eng_tok = tokenize(eng[9:])
    daide = daide[7:]
    translation_tok = tokenize(translation[13:])

    if len(translation) > 0:
        count += 1
        trnsln_arr.append(translation[13:])
        ref_arr.append(eng[9:])
        daide_arr.append(daide)
        f_arr.append(compute_accuracy(eng_tok, translation_tok))
        len_arr.append(len(tokenize(daide)))
```

In [ ]:
```
d = {'English': ref_arr, 'Translation': trnsln_arr, 'DAIDE': daide_arr, 'DAI
df = pd.DataFrame(data=d)
df
```

Out[ ]:

	English	Translation	DAIDE	DAIDE_length	F-Score
0	We both hate how I vs T just slows us both dow...	"Hi Italy, hope you're doing well. I'll be fig...	PRP (ALY (TUR ITA))	4	0.161
1	Hi Italy, hope you're doing well. I'll be figu...	"I am asking if you need help. I could build a...	PRP (DMZ (FRA ITA) (PIE LYO WES TYS))	8	0.122
2	Do you need help? I could build a fleet in Mar...	"I can build a fleet in Mar."	PRP ((FRA FLT MAR) BLD)	5	0.632
3	I'm hoping to get to Mun this round. if you co...		PRP ((ITA SUP ((FRA AMY RUH) MTO MUN)) (FRA SU...	13	0.000
4	Alternatively, pressure R somehow to take away...	This means "This means 'This means that the pr...	PRP (PRP (NOT (RUS SUP MUN)))	6	0.074
...	...	...	...	...	...
592	Hi germany! Are you up for Sil as a DMZ? It wo...	The DMZ between Russia and Germany is open for...	PRP (DMZ (RUS GER) (SIL))	5	0.127
593	Hey Austria! How's it going? I am hoping we ca...	The person is asking Italy if they need help. ...	PRP (ALY (TUR))	3	0.133
594	Hi Turkey! I fully agree that we should stay p...		(YES (PCE (AUS TUR))) (PRP ((SCD (TUR (GRE BUL...	13	0.000
595	That sounds good. If we stick together we can ...	Yes, Italy is my ally.	YES (ALY (TUR AUS))	4	0.062
596	Hi Italy, hope you're doing well. I'll be figu...	"Do you need help? I could build a fleet in Ma...	PRP (DMZ (FRA ITA) (PIE WES))	6	0.089

597 rows × 5 columns

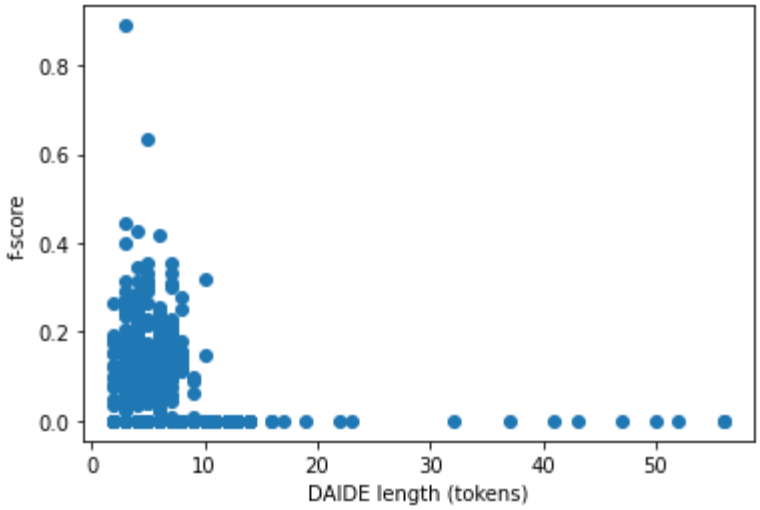
In [ ]:
```
df.sort_values(by=['F-Score'], ascending=False).head()
```

Out[ ]:

	English	Translation	DAIDE	DAIDE_length	F-Score
585	the Italian fleet in Venice	(Italian Fleet in Venice)	(ITA FLT VEN)	3	0.889
2	Do you need help? I could build a fleet in Mar...	"I can build a fleet in Mar."	PRP ((FRA FLT MAR) BLD)	5	0.632
353	I'm more than happy to ally long term with you	Yes, I would like to ally with you.	YES (ALY (AUS))	3	0.444
503	What's with the fleet build in Marseilles?	"I can build a fleet in Mar."	(FRA FLT MAR) BLD	4	0.429
589	We accept the peace proposal between England, ...	Yes, the power of England, France, and Germany...	YES (PRP (PCE (ENG FRA GER)))	6	0.417

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

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



In [ ]:
```
rslt_df = df[df['F-Score'] < 0.01]
rslt_df.shape
print(f"Percentage of translations with f-score = 0: {round(rslt_df.shape[0]
```

```
Percentage of translations with f-score = 0: 43.55%
```

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

Out[ ]:
```
0.08297989949748744
```