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 and not translation.isspace() and len(translatic
        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	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
4	I haven't heard back from anyone else yet, so ...	Hello Germany, are you doing well? I am going ...	PRP (ALY (GER AUS))	4	0.245
...	...	...	...	...	...
447	Let the French fleet in the English Channel su...	The French support unit (supporter militaire) ...	FRA SUP (FRA AMY BEL)	5	0.333
448	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
449	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
450	That sounds good. If we stick together we can ...	Yes, Italy is my ally.	YES (ALY (TUR AUS))	4	0.062
451	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

452 rows × 5 columns

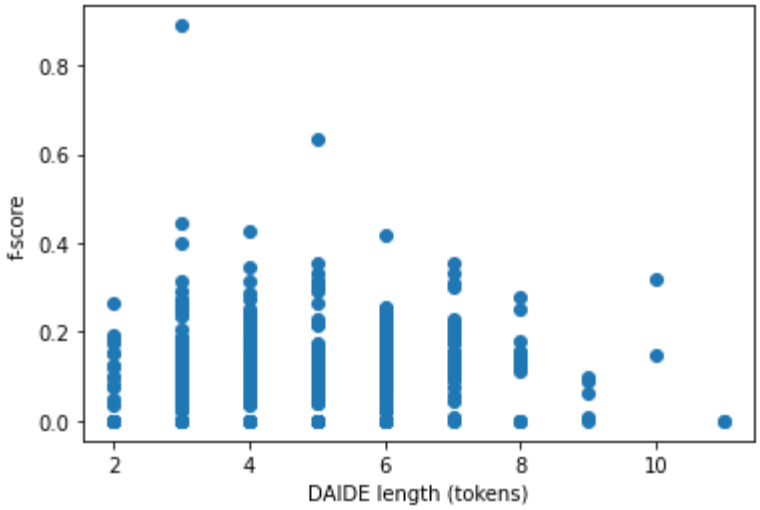
In [ ]:
```
df.sort_values(by=['F-Score'], ascending=False).head()
```

Out[ ]:

	English	Translation	DAIDE	DAIDE_length	F-Score
444	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
269	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
382	What's with the fleet build in Marseilles?	"I can build a fleet in Mar."	(FRA FLT MAR) BLD	4	0.429
446	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: 25.44%
```

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

Out[ ]:
```
0.1095995575221239
```