

409project

May 10, 2023

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[1]: from collections import defaultdict
import numpy as np
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[23]: def start_translation_chances(sentences):
    # Create a default dictionary for storing the translation probabilities
    translation_prob = defaultdict(lambda: defaultdict(lambda: 0.0))
    # Initialize translation probabilities uniformly
    for pair in sentences:
        e, f = pair
        prob = 1 / len(f)
        for e_word in e:
            for f_word in f:
                translation_prob[e_word][f_word] = prob
    return translation_prob
```

```
[24]: def learn_translation_chances(sentences, repeat=10):
    # Initialize translation probabilities
    t = start_translation_chances(sentences)

    for i in range(repeat):
        print(f"Iteration {i+1}")

        # Initialize counts
        count = defaultdict(lambda: defaultdict(float))
        total = defaultdict(float)

        # E-step: Collect counts
        for e, f in sentences:
            s_total = defaultdict(float)
            for e_word in e:
                s_total[e_word] = 0
                for f_word in f:
                    s_total[e_word] += t[e_word][f_word]
            for e_word in e:
                for f_word in f:
                    increment = t[e_word][f_word] / s_total[e_word]
                    count[e_word][f_word] += increment
```

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        total[f_word] += increment
    # M-step: Update probabilities
    for f_word in total:
        for e_word in count:
            t[e_word][f_word] = count[e_word][f_word] / total[f_word]

    # Print s_total and counts for each iteration
    print(f"s_total: {dict(s_total)}")
    print(f"counts: {dict(count)}")
    print(f"total(f): {dict(total)}")
    return t

```

```

[37]: sentences = [
    (['dışarı', 'çıkalım', 'mı'], ['shall', 'we', 'go', 'out']),
    (['yemek', 'yiyelim'], ['Lets', 'have', 'dinner']),
    (['nerelisin'], ['where', 'are', 'you', 'from']),
    (['sıkıldım'], ['I', 'am', 'bored']),
    (['hava', 'nasıl'], ['how', 'is', 'the', 'weather'])
]

translation_chances = learn_translation_chances(sentences)

```

Iteration 1

```

s_total: {'hava': 1.0, 'nasıl': 1.0}
counts: {'dışarı': defaultdict(<class 'float'>, {'shall': 0.25, 'we': 0.25, 'go': 0.25, 'out': 0.25, 'Lets': 0.0, 'have': 0.0, 'dinner': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how': 0.0, 'is': 0.0, 'the': 0.0, 'weather': 0.0}), 'çıkalım': defaultdict(<class 'float'>, {'shall': 0.25, 'we': 0.25, 'go': 0.25, 'out': 0.25, 'Lets': 0.0, 'have': 0.0, 'dinner': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how': 0.0, 'is': 0.0, 'the': 0.0, 'weather': 0.0}), 'mı': defaultdict(<class 'float'>, {'shall': 0.25, 'we': 0.25, 'go': 0.25, 'out': 0.25, 'Lets': 0.0, 'have': 0.0, 'dinner': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how': 0.0, 'is': 0.0, 'the': 0.0, 'weather': 0.0}), 'yemek': defaultdict(<class 'float'>, {'Lets': 0.3333333333333333, 'have': 0.3333333333333333, 'dinner': 0.3333333333333333, 'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how': 0.0, 'is': 0.0, 'the': 0.0, 'weather': 0.0}), 'yiyelim': defaultdict(<class 'float'>, {'Lets': 0.3333333333333333, 'have': 0.3333333333333333, 'dinner': 0.3333333333333333, 'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how': 0.0, 'is': 0.0, 'the': 0.0, 'weather': 0.0}), 'nerelisin': defaultdict(<class 'float'>, {'where': 0.25, 'are': 0.25, 'you': 0.25, 'from': 0.25, 'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'Lets': 0.0, 'have': 0.0, 'dinner': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how': 0.0, 'is': 0.0, 'the': 0.0, 'weather': 0.0}), 'sıkıldım': defaultdict(<class 'float'>,

```

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{'I': 0.3333333333333333, 'am': 0.3333333333333333, 'bored': 0.3333333333333333,
'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'Lets': 0.0, 'have': 0.0,
'dinner': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0, 'how': 0.0,
'is': 0.0, 'the': 0.0, 'weather': 0.0}), 'hava': defaultdict(<class 'float'>,
{'how': 0.25, 'is': 0.25, 'the': 0.25, 'weather': 0.25, 'shall': 0.0, 'we': 0.0,
'go': 0.0, 'out': 0.0, 'Lets': 0.0, 'have': 0.0, 'dinner': 0.0, 'where': 0.0,
'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0}),
'nasıl': defaultdict(<class 'float'>, {'how': 0.25, 'is': 0.25, 'the': 0.25,
'weather': 0.25, 'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'Lets': 0.0,
'have': 0.0, 'dinner': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0,
'I': 0.0, 'am': 0.0, 'bored': 0.0})}
total(f): {'shall': 0.75, 'we': 0.75, 'go': 0.75, 'out': 0.75, 'Lets':
0.6666666666666666, 'have': 0.6666666666666666, 'dinner': 0.6666666666666666,
'where': 0.25, 'are': 0.25, 'you': 0.25, 'from': 0.25, 'I': 0.3333333333333333,
'am': 0.3333333333333333, 'bored': 0.3333333333333333, 'how': 0.5, 'is': 0.5,
'the': 0.5, 'weather': 0.5}
Iteration 2
s_total: {'hava': 2.0, 'nasıl': 2.0}
counts: {'dişarı': defaultdict(<class 'float'>, {'shall': 0.25, 'we': 0.25,
'go': 0.25, 'out': 0.25, 'Lets': 0.0, 'have': 0.0, 'dinner': 0.0, 'where': 0.0,
'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how':
0.0, 'is': 0.0, 'the': 0.0, 'weather': 0.0}), 'çıkalım': defaultdict(<class
'float'>, {'shall': 0.25, 'we': 0.25, 'go': 0.25, 'out': 0.25, 'Lets': 0.0,
'have': 0.0, 'dinner': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0,
'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how': 0.0, 'is': 0.0, 'the': 0.0, 'weather':
0.0}), 'mı': defaultdict(<class 'float'>, {'shall': 0.25, 'we': 0.25, 'go':
0.25, 'out': 0.25, 'Lets': 0.0, 'have': 0.0, 'dinner': 0.0, 'where': 0.0, 'are':
0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how': 0.0,
'is': 0.0, 'the': 0.0, 'weather': 0.0}), 'yemek': defaultdict(<class 'float'>,
{'Lets': 0.3333333333333333, 'have': 0.3333333333333333, 'dinner':
0.3333333333333333, 'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'where':
0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0,
'how': 0.0, 'is': 0.0, 'the': 0.0, 'weather': 0.0}), 'yiyelim':
defaultdict(<class 'float'>, {'Lets': 0.3333333333333333, 'have':
0.3333333333333333, 'dinner': 0.3333333333333333, 'shall': 0.0, 'we': 0.0, 'go':
0.0, 'out': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0,
'am': 0.0, 'bored': 0.0, 'how': 0.0, 'is': 0.0, 'the': 0.0, 'weather': 0.0}),
'nerelisin': defaultdict(<class 'float'>, {'where': 0.25, 'are': 0.25, 'you':
0.25, 'from': 0.25, 'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'Lets': 0.0,
'have': 0.0, 'dinner': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how': 0.0, 'is':
0.0, 'the': 0.0, 'weather': 0.0}), 'sıkıldım': defaultdict(<class 'float'>,
{'I': 0.3333333333333333, 'am': 0.3333333333333333, 'bored': 0.3333333333333333,
'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'Lets': 0.0, 'have': 0.0,
'dinner': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0, 'how': 0.0,
'is': 0.0, 'the': 0.0, 'weather': 0.0}), 'hava': defaultdict(<class 'float'>,
{'how': 0.25, 'is': 0.25, 'the': 0.25, 'weather': 0.25, 'shall': 0.0, 'we': 0.0,
'go': 0.0, 'out': 0.0, 'Lets': 0.0, 'have': 0.0, 'dinner': 0.0, 'where': 0.0,
'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0}),

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'nasıl': defaultdict(<class 'float'>, {'how': 0.25, 'is': 0.25, 'the': 0.25,
'weather': 0.25, 'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'Lets': 0.0,
'have': 0.0, 'dinner': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0,
'I': 0.0, 'am': 0.0, 'bored': 0.0})}
total(f): {'shall': 0.75, 'we': 0.75, 'go': 0.75, 'out': 0.75, 'Lets':
0.6666666666666666, 'have': 0.6666666666666666, 'dinner': 0.6666666666666666,
'where': 0.25, 'are': 0.25, 'you': 0.25, 'from': 0.25, 'I': 0.3333333333333333,
'am': 0.3333333333333333, 'bored': 0.3333333333333333, 'how': 0.5, 'is': 0.5,
'the': 0.5, 'weather': 0.5}
Iteration 3
s_total: {'hava': 2.0, 'nasıl': 2.0}
counts: {'dışarı': defaultdict(<class 'float'>, {'shall': 0.25, 'we': 0.25,
'go': 0.25, 'out': 0.25, 'Lets': 0.0, 'have': 0.0, 'dinner': 0.0, 'where': 0.0,
'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how':
0.0, 'is': 0.0, 'the': 0.0, 'weather': 0.0}), 'çıkalım': defaultdict(<class
'float'>, {'shall': 0.25, 'we': 0.25, 'go': 0.25, 'out': 0.25, 'Lets': 0.0,
'have': 0.0, 'dinner': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0,
'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how': 0.0, 'is': 0.0, 'the': 0.0, 'weather':
0.0}), 'mı': defaultdict(<class 'float'>, {'shall': 0.25, 'we': 0.25, 'go':
0.25, 'out': 0.25, 'Lets': 0.0, 'have': 0.0, 'dinner': 0.0, 'where': 0.0, 'are':
0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how': 0.0,
'is': 0.0, 'the': 0.0, 'weather': 0.0}), 'yemek': defaultdict(<class 'float'>,
{'Lets': 0.3333333333333333, 'have': 0.3333333333333333, 'dinner':
0.3333333333333333, 'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'where':
0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0,
'how': 0.0, 'is': 0.0, 'the': 0.0, 'weather': 0.0}), 'iyelim':
defaultdict(<class 'float'>, {'Lets': 0.3333333333333333, 'have':
0.3333333333333333, 'dinner': 0.3333333333333333, 'shall': 0.0, 'we': 0.0, 'go':
0.0, 'out': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0,
'am': 0.0, 'bored': 0.0, 'how': 0.0, 'is': 0.0, 'the': 0.0, 'weather': 0.0}),
'nerelisin': defaultdict(<class 'float'>, {'where': 0.25, 'are': 0.25, 'you':
0.25, 'from': 0.25, 'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'Lets': 0.0,
'have': 0.0, 'dinner': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how': 0.0, 'is':
0.0, 'the': 0.0, 'weather': 0.0}), 'sıkıldım': defaultdict(<class 'float'>,
{'I': 0.3333333333333333, 'am': 0.3333333333333333, 'bored': 0.3333333333333333,
'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'Lets': 0.0, 'have': 0.0,
'dinner': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0, 'how': 0.0,
'is': 0.0, 'the': 0.0, 'weather': 0.0}), 'hava': defaultdict(<class 'float'>,
{'how': 0.25, 'is': 0.25, 'the': 0.25, 'weather': 0.25, 'shall': 0.0, 'we': 0.0,
'go': 0.0, 'out': 0.0, 'Lets': 0.0, 'have': 0.0, 'dinner': 0.0, 'where': 0.0,
'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0}),
'nasıl': defaultdict(<class 'float'>, {'how': 0.25, 'is': 0.25, 'the': 0.25,
'weather': 0.25, 'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'Lets': 0.0,
'have': 0.0, 'dinner': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0,
'I': 0.0, 'am': 0.0, 'bored': 0.0})}
total(f): {'shall': 0.75, 'we': 0.75, 'go': 0.75, 'out': 0.75, 'Lets':
0.6666666666666666, 'have': 0.6666666666666666, 'dinner': 0.6666666666666666,
'where': 0.25, 'are': 0.25, 'you': 0.25, 'from': 0.25, 'I': 0.3333333333333333,

```

```
'am': 0.3333333333333333, 'bored': 0.3333333333333333, 'how': 0.5, 'is': 0.5,
'the': 0.5, 'weather': 0.5}
```

Iteration 4

```
s_total: {'hava': 2.0, 'nasıl': 2.0}
```

```
counts: {'dışarı': defaultdict(<class 'float'>, {'shall': 0.25, 'we': 0.25,
'go': 0.25, 'out': 0.25, 'Lets': 0.0, 'have': 0.0, 'dinner': 0.0, 'where': 0.0,
'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how':
0.0, 'is': 0.0, 'the': 0.0, 'weather': 0.0}), 'çıkalım': defaultdict(<class
'float'>, {'shall': 0.25, 'we': 0.25, 'go': 0.25, 'out': 0.25, 'Lets': 0.0,
'have': 0.0, 'dinner': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0,
'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how': 0.0, 'is': 0.0, 'the': 0.0, 'weather':
0.0}), 'mı': defaultdict(<class 'float'>, {'shall': 0.25, 'we': 0.25, 'go':
0.25, 'out': 0.25, 'Lets': 0.0, 'have': 0.0, 'dinner': 0.0, 'where': 0.0, 'are':
0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how': 0.0,
'is': 0.0, 'the': 0.0, 'weather': 0.0}), 'yemek': defaultdict(<class 'float'>,
{'Lets': 0.3333333333333333, 'have': 0.3333333333333333, 'dinner':
0.3333333333333333, 'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'where':
0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0,
'how': 0.0, 'is': 0.0, 'the': 0.0, 'weather': 0.0}), 'yiyelim':
defaultdict(<class 'float'>, {'Lets': 0.3333333333333333, 'have':
0.3333333333333333, 'dinner': 0.3333333333333333, 'shall': 0.0, 'we': 0.0, 'go':
0.0, 'out': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0,
'am': 0.0, 'bored': 0.0, 'how': 0.0, 'is': 0.0, 'the': 0.0, 'weather': 0.0}),
'nerelisin': defaultdict(<class 'float'>, {'where': 0.25, 'are': 0.25, 'you':
0.25, 'from': 0.25, 'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'Lets': 0.0,
'have': 0.0, 'dinner': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how': 0.0, 'is':
0.0, 'the': 0.0, 'weather': 0.0}), 'sıkıldım': defaultdict(<class 'float'>,
{'I': 0.3333333333333333, 'am': 0.3333333333333333, 'bored': 0.3333333333333333,
'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'Lets': 0.0, 'have': 0.0,
'dinner': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0, 'how': 0.0,
'is': 0.0, 'the': 0.0, 'weather': 0.0}), 'hava': defaultdict(<class 'float'>,
{'how': 0.25, 'is': 0.25, 'the': 0.25, 'weather': 0.25, 'shall': 0.0, 'we': 0.0,
'go': 0.0, 'out': 0.0, 'Lets': 0.0, 'have': 0.0, 'dinner': 0.0, 'where': 0.0,
'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0}),
'nasıl': defaultdict(<class 'float'>, {'how': 0.25, 'is': 0.25, 'the': 0.25,
'weather': 0.25, 'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'Lets': 0.0,
'have': 0.0, 'dinner': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0,
'I': 0.0, 'am': 0.0, 'bored': 0.0})}
```

```
total(f): {'shall': 0.75, 'we': 0.75, 'go': 0.75, 'out': 0.75, 'Lets':
0.6666666666666666, 'have': 0.6666666666666666, 'dinner': 0.6666666666666666,
'where': 0.25, 'are': 0.25, 'you': 0.25, 'from': 0.25, 'I': 0.3333333333333333,
'am': 0.3333333333333333, 'bored': 0.3333333333333333, 'how': 0.5, 'is': 0.5,
'the': 0.5, 'weather': 0.5}
```

Iteration 5

```
s_total: {'hava': 2.0, 'nasıl': 2.0}
```

```
counts: {'dışarı': defaultdict(<class 'float'>, {'shall': 0.25, 'we': 0.25,
'go': 0.25, 'out': 0.25, 'Lets': 0.0, 'have': 0.0, 'dinner': 0.0, 'where': 0.0,
'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how':
```

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0.0, 'is': 0.0, 'the': 0.0, 'weather': 0.0})), 'çıkalım': defaultdict(<class
'float'>, {'shall': 0.25, 'we': 0.25, 'go': 0.25, 'out': 0.25, 'Lets': 0.0,
'have': 0.0, 'dinner': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0,
'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how': 0.0, 'is': 0.0, 'the': 0.0, 'weather':
0.0})), 'mı': defaultdict(<class 'float'>, {'shall': 0.25, 'we': 0.25, 'go':
0.25, 'out': 0.25, 'Lets': 0.0, 'have': 0.0, 'dinner': 0.0, 'where': 0.0, 'are':
0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how': 0.0,
'is': 0.0, 'the': 0.0, 'weather': 0.0})), 'yemek': defaultdict(<class 'float'>,
{'Lets': 0.3333333333333333, 'have': 0.3333333333333333, 'dinner':
0.3333333333333333, 'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'where':
0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0,
'how': 0.0, 'is': 0.0, 'the': 0.0, 'weather': 0.0})), 'yiyelim':
defaultdict(<class 'float'>, {'Lets': 0.3333333333333333, 'have':
0.3333333333333333, 'dinner': 0.3333333333333333, 'shall': 0.0, 'we': 0.0, 'go':
0.0, 'out': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0,
'am': 0.0, 'bored': 0.0, 'how': 0.0, 'is': 0.0, 'the': 0.0, 'weather': 0.0})),
'nerelisin': defaultdict(<class 'float'>, {'where': 0.25, 'are': 0.25, 'you':
0.25, 'from': 0.25, 'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'Lets': 0.0,
'have': 0.0, 'dinner': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how': 0.0, 'is':
0.0, 'the': 0.0, 'weather': 0.0})), 'sıkıldım': defaultdict(<class 'float'>,
{'I': 0.3333333333333333, 'am': 0.3333333333333333, 'bored': 0.3333333333333333,
'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'Lets': 0.0, 'have': 0.0,
'dinner': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0, 'how': 0.0,
'is': 0.0, 'the': 0.0, 'weather': 0.0})), 'hava': defaultdict(<class 'float'>,
{'how': 0.25, 'is': 0.25, 'the': 0.25, 'weather': 0.25, 'shall': 0.0, 'we': 0.0,
'go': 0.0, 'out': 0.0, 'Lets': 0.0, 'have': 0.0, 'dinner': 0.0, 'where': 0.0,
'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0})),
'nasıl': defaultdict(<class 'float'>, {'how': 0.25, 'is': 0.25, 'the': 0.25,
'weather': 0.25, 'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'Lets': 0.0,
'have': 0.0, 'dinner': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0,
'I': 0.0, 'am': 0.0, 'bored': 0.0})))
total(f): {'shall': 0.75, 'we': 0.75, 'go': 0.75, 'out': 0.75, 'Lets':
0.6666666666666666, 'have': 0.6666666666666666, 'dinner': 0.6666666666666666,
'where': 0.25, 'are': 0.25, 'you': 0.25, 'from': 0.25, 'I': 0.3333333333333333,
'am': 0.3333333333333333, 'bored': 0.3333333333333333, 'how': 0.5, 'is': 0.5,
'the': 0.5, 'weather': 0.5}

```

Iteration 6

```
s_total: {'hava': 2.0, 'nasıl': 2.0}
```

```

counts: {'dışarı': defaultdict(<class 'float'>, {'shall': 0.25, 'we': 0.25,
'go': 0.25, 'out': 0.25, 'Lets': 0.0, 'have': 0.0, 'dinner': 0.0, 'where': 0.0,
'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how':
0.0, 'is': 0.0, 'the': 0.0, 'weather': 0.0})), 'çıkalım': defaultdict(<class
'float'>, {'shall': 0.25, 'we': 0.25, 'go': 0.25, 'out': 0.25, 'Lets': 0.0,
'have': 0.0, 'dinner': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0,
'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how': 0.0, 'is': 0.0, 'the': 0.0, 'weather':
0.0})), 'mı': defaultdict(<class 'float'>, {'shall': 0.25, 'we': 0.25, 'go':
0.25, 'out': 0.25, 'Lets': 0.0, 'have': 0.0, 'dinner': 0.0, 'where': 0.0, 'are':
0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how': 0.0,

```

```

'is': 0.0, 'the': 0.0, 'weather': 0.0})), 'yemek': defaultdict(<class 'float'>,
{'Lets': 0.3333333333333333, 'have': 0.3333333333333333, 'dinner':
0.3333333333333333, 'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'where':
0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0,
'how': 0.0, 'is': 0.0, 'the': 0.0, 'weather': 0.0})), 'yiyelim':
defaultdict(<class 'float'>, {'Lets': 0.3333333333333333, 'have':
0.3333333333333333, 'dinner': 0.3333333333333333, 'shall': 0.0, 'we': 0.0, 'go':
0.0, 'out': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0,
'am': 0.0, 'bored': 0.0, 'how': 0.0, 'is': 0.0, 'the': 0.0, 'weather': 0.0})),
'nerelisin': defaultdict(<class 'float'>, {'where': 0.25, 'are': 0.25, 'you':
0.25, 'from': 0.25, 'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'Lets': 0.0,
'have': 0.0, 'dinner': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how': 0.0, 'is':
0.0, 'the': 0.0, 'weather': 0.0})), 'sıkıldım': defaultdict(<class 'float'>,
{'I': 0.3333333333333333, 'am': 0.3333333333333333, 'bored': 0.3333333333333333,
'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'Lets': 0.0, 'have': 0.0,
'dinner': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0, 'how': 0.0,
'is': 0.0, 'the': 0.0, 'weather': 0.0})), 'hava': defaultdict(<class 'float'>,
{'how': 0.25, 'is': 0.25, 'the': 0.25, 'weather': 0.25, 'shall': 0.0, 'we': 0.0,
'go': 0.0, 'out': 0.0, 'Lets': 0.0, 'have': 0.0, 'dinner': 0.0, 'where': 0.0,
'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0})),
'nasıl': defaultdict(<class 'float'>, {'how': 0.25, 'is': 0.25, 'the': 0.25,
'weather': 0.25, 'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'Lets': 0.0,
'have': 0.0, 'dinner': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0,
'I': 0.0, 'am': 0.0, 'bored': 0.0})))
total(f): {'shall': 0.75, 'we': 0.75, 'go': 0.75, 'out': 0.75, 'Lets':
0.6666666666666666, 'have': 0.6666666666666666, 'dinner': 0.6666666666666666,
'where': 0.25, 'are': 0.25, 'you': 0.25, 'from': 0.25, 'I': 0.3333333333333333,
'am': 0.3333333333333333, 'bored': 0.3333333333333333, 'how': 0.5, 'is': 0.5,
'the': 0.5, 'weather': 0.5}
Iteration 7
s_total: {'hava': 2.0, 'nasıl': 2.0}
counts: {'dışarı': defaultdict(<class 'float'>, {'shall': 0.25, 'we': 0.25,
'go': 0.25, 'out': 0.25, 'Lets': 0.0, 'have': 0.0, 'dinner': 0.0, 'where': 0.0,
'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how':
0.0, 'is': 0.0, 'the': 0.0, 'weather': 0.0})), 'çıkalım': defaultdict(<class
'float'>, {'shall': 0.25, 'we': 0.25, 'go': 0.25, 'out': 0.25, 'Lets': 0.0,
'have': 0.0, 'dinner': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0,
'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how': 0.0, 'is': 0.0, 'the': 0.0, 'weather':
0.0})), 'mı': defaultdict(<class 'float'>, {'shall': 0.25, 'we': 0.25, 'go':
0.25, 'out': 0.25, 'Lets': 0.0, 'have': 0.0, 'dinner': 0.0, 'where': 0.0, 'are':
0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how': 0.0,
'is': 0.0, 'the': 0.0, 'weather': 0.0})), 'yemek': defaultdict(<class 'float'>,
{'Lets': 0.3333333333333333, 'have': 0.3333333333333333, 'dinner':
0.3333333333333333, 'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'where':
0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0,
'how': 0.0, 'is': 0.0, 'the': 0.0, 'weather': 0.0})), 'yiyelim':
defaultdict(<class 'float'>, {'Lets': 0.3333333333333333, 'have':
0.3333333333333333, 'dinner': 0.3333333333333333, 'shall': 0.0, 'we': 0.0, 'go':

```

```

0.0, 'out': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0,
'am': 0.0, 'bored': 0.0, 'how': 0.0, 'is': 0.0, 'the': 0.0, 'weather': 0.0}),
'nerelisin': defaultdict(<class 'float'>, {'where': 0.25, 'are': 0.25, 'you':
0.25, 'from': 0.25, 'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'Lets': 0.0,
'have': 0.0, 'dinner': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how': 0.0, 'is':
0.0, 'the': 0.0, 'weather': 0.0}), 'sıkıldım': defaultdict(<class 'float'>,
{'I': 0.3333333333333333, 'am': 0.3333333333333333, 'bored': 0.3333333333333333,
'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'Lets': 0.0, 'have': 0.0,
'dinner': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0, 'how': 0.0,
'is': 0.0, 'the': 0.0, 'weather': 0.0}), 'hava': defaultdict(<class 'float'>,
{'how': 0.25, 'is': 0.25, 'the': 0.25, 'weather': 0.25, 'shall': 0.0, 'we': 0.0,
'go': 0.0, 'out': 0.0, 'Lets': 0.0, 'have': 0.0, 'dinner': 0.0, 'where': 0.0,
'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0}),
'nasıl': defaultdict(<class 'float'>, {'how': 0.25, 'is': 0.25, 'the': 0.25,
'weather': 0.25, 'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'Lets': 0.0,
'have': 0.0, 'dinner': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0,
'I': 0.0, 'am': 0.0, 'bored': 0.0})})
total(f): {'shall': 0.75, 'we': 0.75, 'go': 0.75, 'out': 0.75, 'Lets':
0.6666666666666666, 'have': 0.6666666666666666, 'dinner': 0.6666666666666666,
'where': 0.25, 'are': 0.25, 'you': 0.25, 'from': 0.25, 'I': 0.3333333333333333,
'am': 0.3333333333333333, 'bored': 0.3333333333333333, 'how': 0.5, 'is': 0.5,
'the': 0.5, 'weather': 0.5}
Iteration 8
s_total: {'hava': 2.0, 'nasıl': 2.0}
counts: {'dışarı': defaultdict(<class 'float'>, {'shall': 0.25, 'we': 0.25,
'go': 0.25, 'out': 0.25, 'Lets': 0.0, 'have': 0.0, 'dinner': 0.0, 'where': 0.0,
'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how':
0.0, 'is': 0.0, 'the': 0.0, 'weather': 0.0}), 'çıkalım': defaultdict(<class
'float'>, {'shall': 0.25, 'we': 0.25, 'go': 0.25, 'out': 0.25, 'Lets': 0.0,
'have': 0.0, 'dinner': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0,
'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how': 0.0, 'is': 0.0, 'the': 0.0, 'weather':
0.0}), 'mı': defaultdict(<class 'float'>, {'shall': 0.25, 'we': 0.25, 'go':
0.25, 'out': 0.25, 'Lets': 0.0, 'have': 0.0, 'dinner': 0.0, 'where': 0.0, 'are':
0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how': 0.0,
'is': 0.0, 'the': 0.0, 'weather': 0.0}), 'yemek': defaultdict(<class 'float'>,
{'Lets': 0.3333333333333333, 'have': 0.3333333333333333, 'dinner':
0.3333333333333333, 'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'where':
0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0,
'how': 0.0, 'is': 0.0, 'the': 0.0, 'weather': 0.0}), 'yiyelim':
defaultdict(<class 'float'>, {'Lets': 0.3333333333333333, 'have':
0.3333333333333333, 'dinner': 0.3333333333333333, 'shall': 0.0, 'we': 0.0, 'go':
0.0, 'out': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0,
'am': 0.0, 'bored': 0.0, 'how': 0.0, 'is': 0.0, 'the': 0.0, 'weather': 0.0}),
'nerelisin': defaultdict(<class 'float'>, {'where': 0.25, 'are': 0.25, 'you':
0.25, 'from': 0.25, 'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'Lets': 0.0,
'have': 0.0, 'dinner': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how': 0.0, 'is':
0.0, 'the': 0.0, 'weather': 0.0}), 'sıkıldım': defaultdict(<class 'float'>,
{'I': 0.3333333333333333, 'am': 0.3333333333333333, 'bored': 0.3333333333333333,

```



```

'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'Lets': 0.0, 'have': 0.0,
'dinner': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0, 'how': 0.0,
'is': 0.0, 'the': 0.0, 'weather': 0.0}), 'hava': defaultdict(<class 'float'>,
{'how': 0.25, 'is': 0.25, 'the': 0.25, 'weather': 0.25, 'shall': 0.0, 'we': 0.0,
'go': 0.0, 'out': 0.0, 'Lets': 0.0, 'have': 0.0, 'dinner': 0.0, 'where': 0.0,
'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0}),
'nasıl': defaultdict(<class 'float'>, {'how': 0.25, 'is': 0.25, 'the': 0.25,
'weather': 0.25, 'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'Lets': 0.0,
'have': 0.0, 'dinner': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0,
'I': 0.0, 'am': 0.0, 'bored': 0.0}))}
total(f): {'shall': 0.75, 'we': 0.75, 'go': 0.75, 'out': 0.75, 'Lets':
0.6666666666666666, 'have': 0.6666666666666666, 'dinner': 0.6666666666666666,
'where': 0.25, 'are': 0.25, 'you': 0.25, 'from': 0.25, 'I': 0.3333333333333333,
'am': 0.3333333333333333, 'bored': 0.3333333333333333, 'how': 0.5, 'is': 0.5,
'the': 0.5, 'weather': 0.5}
Iteration 9
s_total: {'hava': 2.0, 'nasıl': 2.0}
counts: {'dişarı': defaultdict(<class 'float'>, {'shall': 0.25, 'we': 0.25,
'go': 0.25, 'out': 0.25, 'Lets': 0.0, 'have': 0.0, 'dinner': 0.0, 'where': 0.0,
'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how':
0.0, 'is': 0.0, 'the': 0.0, 'weather': 0.0}), 'çıkalım': defaultdict(<class
'float'>, {'shall': 0.25, 'we': 0.25, 'go': 0.25, 'out': 0.25, 'Lets': 0.0,
'have': 0.0, 'dinner': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0,
'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how': 0.0, 'is': 0.0, 'the': 0.0, 'weather':
0.0}), 'mı': defaultdict(<class 'float'>, {'shall': 0.25, 'we': 0.25, 'go':
0.25, 'out': 0.25, 'Lets': 0.0, 'have': 0.0, 'dinner': 0.0, 'where': 0.0, 'are':
0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how': 0.0,
'is': 0.0, 'the': 0.0, 'weather': 0.0}), 'yemek': defaultdict(<class 'float'>,
{'Lets': 0.3333333333333333, 'have': 0.3333333333333333, 'dinner':
0.3333333333333333, 'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'where':
0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0,
'how': 0.0, 'is': 0.0, 'the': 0.0, 'weather': 0.0}), 'yiyelim':
defaultdict(<class 'float'>, {'Lets': 0.3333333333333333, 'have':
0.3333333333333333, 'dinner': 0.3333333333333333, 'shall': 0.0, 'we': 0.0, 'go':
0.0, 'out': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0,
'am': 0.0, 'bored': 0.0, 'how': 0.0, 'is': 0.0, 'the': 0.0, 'weather': 0.0}),
'nerelisin': defaultdict(<class 'float'>, {'where': 0.25, 'are': 0.25, 'you':
0.25, 'from': 0.25, 'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'Lets': 0.0,
'have': 0.0, 'dinner': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how': 0.0, 'is':
0.0, 'the': 0.0, 'weather': 0.0}), 'sıkıldım': defaultdict(<class 'float'>,
{'I': 0.3333333333333333, 'am': 0.3333333333333333, 'bored': 0.3333333333333333,
'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'Lets': 0.0, 'have': 0.0,
'dinner': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0, 'how': 0.0,
'is': 0.0, 'the': 0.0, 'weather': 0.0}), 'hava': defaultdict(<class 'float'>,
{'how': 0.25, 'is': 0.25, 'the': 0.25, 'weather': 0.25, 'shall': 0.0, 'we': 0.0,
'go': 0.0, 'out': 0.0, 'Lets': 0.0, 'have': 0.0, 'dinner': 0.0, 'where': 0.0,
'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0}),
'nasıl': defaultdict(<class 'float'>, {'how': 0.25, 'is': 0.25, 'the': 0.25,

```

```

'weather': 0.25, 'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'Lets': 0.0,
'have': 0.0, 'dinner': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0,
'I': 0.0, 'am': 0.0, 'bored': 0.0}}}
total(f): {'shall': 0.75, 'we': 0.75, 'go': 0.75, 'out': 0.75, 'Lets':
0.6666666666666666, 'have': 0.6666666666666666, 'dinner': 0.6666666666666666,
'where': 0.25, 'are': 0.25, 'you': 0.25, 'from': 0.25, 'I': 0.3333333333333333,
'am': 0.3333333333333333, 'bored': 0.3333333333333333, 'how': 0.5, 'is': 0.5,
'the': 0.5, 'weather': 0.5}
Iteration 10
s_total: {'hava': 2.0, 'nasıl': 2.0}
counts: {'dişarı': defaultdict(<class 'float'>, {'shall': 0.25, 'we': 0.25,
'go': 0.25, 'out': 0.25, 'Lets': 0.0, 'have': 0.0, 'dinner': 0.0, 'where': 0.0,
'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how':
0.0, 'is': 0.0, 'the': 0.0, 'weather': 0.0})), 'çıkalım': defaultdict(<class
'float'>, {'shall': 0.25, 'we': 0.25, 'go': 0.25, 'out': 0.25, 'Lets': 0.0,
'have': 0.0, 'dinner': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0,
'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how': 0.0, 'is': 0.0, 'the': 0.0, 'weather':
0.0})), 'mı': defaultdict(<class 'float'>, {'shall': 0.25, 'we': 0.25, 'go':
0.25, 'out': 0.25, 'Lets': 0.0, 'have': 0.0, 'dinner': 0.0, 'where': 0.0, 'are':
0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how': 0.0,
'is': 0.0, 'the': 0.0, 'weather': 0.0})), 'yemek': defaultdict(<class 'float'>,
{'Lets': 0.3333333333333333, 'have': 0.3333333333333333, 'dinner':
0.3333333333333333, 'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'where':
0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0,
'how': 0.0, 'is': 0.0, 'the': 0.0, 'weather': 0.0})), 'yiyelim':
defaultdict(<class 'float'>, {'Lets': 0.3333333333333333, 'have':
0.3333333333333333, 'dinner': 0.3333333333333333, 'shall': 0.0, 'we': 0.0, 'go':
0.0, 'out': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0,
'am': 0.0, 'bored': 0.0, 'how': 0.0, 'is': 0.0, 'the': 0.0, 'weather': 0.0})),
'nerelisin': defaultdict(<class 'float'>, {'where': 0.25, 'are': 0.25, 'you':
0.25, 'from': 0.25, 'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'Lets': 0.0,
'have': 0.0, 'dinner': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0, 'how': 0.0, 'is':
0.0, 'the': 0.0, 'weather': 0.0})), 'sıkıldım': defaultdict(<class 'float'>,
{'I': 0.3333333333333333, 'am': 0.3333333333333333, 'bored': 0.3333333333333333,
'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'Lets': 0.0, 'have': 0.0,
'dinner': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0, 'how': 0.0,
'is': 0.0, 'the': 0.0, 'weather': 0.0})), 'hava': defaultdict(<class 'float'>,
{'how': 0.25, 'is': 0.25, 'the': 0.25, 'weather': 0.25, 'shall': 0.0, 'we': 0.0,
'go': 0.0, 'out': 0.0, 'Lets': 0.0, 'have': 0.0, 'dinner': 0.0, 'where': 0.0,
'are': 0.0, 'you': 0.0, 'from': 0.0, 'I': 0.0, 'am': 0.0, 'bored': 0.0})),
'nasıl': defaultdict(<class 'float'>, {'how': 0.25, 'is': 0.25, 'the': 0.25,
'weather': 0.25, 'shall': 0.0, 'we': 0.0, 'go': 0.0, 'out': 0.0, 'Lets': 0.0,
'have': 0.0, 'dinner': 0.0, 'where': 0.0, 'are': 0.0, 'you': 0.0, 'from': 0.0,
'I': 0.0, 'am': 0.0, 'bored': 0.0})))}
total(f): {'shall': 0.75, 'we': 0.75, 'go': 0.75, 'out': 0.75, 'Lets':
0.6666666666666666, 'have': 0.6666666666666666, 'dinner': 0.6666666666666666,
'where': 0.25, 'are': 0.25, 'you': 0.25, 'from': 0.25, 'I': 0.3333333333333333,
'am': 0.3333333333333333, 'bored': 0.3333333333333333, 'how': 0.5, 'is': 0.5,

```

```
'the': 0.5, 'weather': 0.5}
```

```
[38]: from nltk.translate import IBMModel1, AlignedSent

aligned_text = [AlignedSent(pair[0], pair[1]) for pair in sentences]
ibm1 = IBMModel1(aligned_text, 10)

# Compare the translation probabilities
for e_word in translation_chances:
    for f_word in translation_chances[e_word]:
        print(f"Custom Implementation t({e_word}|{f_word}): ␣
↪{translation_chances[e_word][f_word]}")
        print(f"NLTK Implementation t({e_word}|{f_word}): {ibm1.
↪translation_table[e_word][f_word]}")
```

```
Custom Implementation t(dışarı|shall): 0.3333333333333333
NLTK Implementation t(dışarı|shall): 0.3333333333333333
Custom Implementation t(dışarı|we): 0.3333333333333333
NLTK Implementation t(dışarı|we): 0.3333333333333333
Custom Implementation t(dışarı|go): 0.3333333333333333
NLTK Implementation t(dışarı|go): 0.3333333333333333
Custom Implementation t(dışarı|out): 0.3333333333333333
NLTK Implementation t(dışarı|out): 0.3333333333333333
Custom Implementation t(dışarı|Lets): 0.0
NLTK Implementation t(dışarı|Lets): 0.1111111111111111
Custom Implementation t(dışarı|have): 0.0
NLTK Implementation t(dışarı|have): 0.1111111111111111
Custom Implementation t(dışarı|dinner): 0.0
NLTK Implementation t(dışarı|dinner): 0.1111111111111111
Custom Implementation t(dışarı|where): 0.0
NLTK Implementation t(dışarı|where): 0.1111111111111111
Custom Implementation t(dışarı|are): 0.0
NLTK Implementation t(dışarı|are): 0.1111111111111111
Custom Implementation t(dışarı|you): 0.0
NLTK Implementation t(dışarı|you): 0.1111111111111111
Custom Implementation t(dışarı|from): 0.0
NLTK Implementation t(dışarı|from): 0.1111111111111111
Custom Implementation t(dışarı|I): 0.0
NLTK Implementation t(dışarı|I): 0.1111111111111111
Custom Implementation t(dışarı|am): 0.0
NLTK Implementation t(dışarı|am): 0.1111111111111111
Custom Implementation t(dışarı|bored): 0.0
NLTK Implementation t(dışarı|bored): 0.1111111111111111
Custom Implementation t(dışarı|how): 0.0
NLTK Implementation t(dışarı|how): 0.1111111111111111
Custom Implementation t(dışarı|is): 0.0
NLTK Implementation t(dışarı|is): 0.1111111111111111
Custom Implementation t(dışarı|the): 0.0
```

NLTK Implementation t(dışarı|the): 0.1111111111111111
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 NLTK Implementation t(çıkalm|shall): 0.3333333333333333
 Custom Implementation t(çıkalm|we): 0.3333333333333333
 NLTK Implementation t(çıkalm|we): 0.3333333333333333
 Custom Implementation t(çıkalm|go): 0.3333333333333333
 NLTK Implementation t(çıkalm|go): 0.3333333333333333
 Custom Implementation t(çıkalm|out): 0.3333333333333333
 NLTK Implementation t(çıkalm|out): 0.3333333333333333
 Custom Implementation t(çıkalm|Lets): 0.0
 NLTK Implementation t(çıkalm|Lets): 0.1111111111111111
 Custom Implementation t(çıkalm|have): 0.0
 NLTK Implementation t(çıkalm|have): 0.1111111111111111
 Custom Implementation t(çıkalm|dinner): 0.0
 NLTK Implementation t(çıkalm|dinner): 0.1111111111111111
 Custom Implementation t(çıkalm|where): 0.0
 NLTK Implementation t(çıkalm|where): 0.1111111111111111
 Custom Implementation t(çıkalm|are): 0.0
 NLTK Implementation t(çıkalm|are): 0.1111111111111111
 Custom Implementation t(çıkalm|you): 0.0
 NLTK Implementation t(çıkalm|you): 0.1111111111111111
 Custom Implementation t(çıkalm|from): 0.0
 NLTK Implementation t(çıkalm|from): 0.1111111111111111
 Custom Implementation t(çıkalm|I): 0.0
 NLTK Implementation t(çıkalm|I): 0.1111111111111111
 Custom Implementation t(çıkalm|am): 0.0
 NLTK Implementation t(çıkalm|am): 0.1111111111111111
 Custom Implementation t(çıkalm|bored): 0.0
 NLTK Implementation t(çıkalm|bored): 0.1111111111111111
 Custom Implementation t(çıkalm|how): 0.0
 NLTK Implementation t(çıkalm|how): 0.1111111111111111
 Custom Implementation t(çıkalm|is): 0.0
 NLTK Implementation t(çıkalm|is): 0.1111111111111111
 Custom Implementation t(çıkalm|the): 0.0
 NLTK Implementation t(çıkalm|the): 0.1111111111111111
 Custom Implementation t(çıkalm|weather): 0.0
 NLTK Implementation t(çıkalm|weather): 0.1111111111111111
 Custom Implementation t(mı|shall): 0.3333333333333333
 NLTK Implementation t(mı|shall): 0.3333333333333333
 Custom Implementation t(mı|we): 0.3333333333333333
 NLTK Implementation t(mı|we): 0.3333333333333333
 Custom Implementation t(mı|go): 0.3333333333333333
 NLTK Implementation t(mı|go): 0.3333333333333333
 Custom Implementation t(mı|out): 0.3333333333333333
 NLTK Implementation t(mı|out): 0.3333333333333333
 Custom Implementation t(mı|Lets): 0.0

NLTK Implementation t(m1|Lets): 0.1111111111111111
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 NLTK Implementation t(m1|have): 0.1111111111111111
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 NLTK Implementation t(m1|dinner): 0.1111111111111111
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 NLTK Implementation t(m1|where): 0.1111111111111111
 Custom Implementation t(m1|are): 0.0
 NLTK Implementation t(m1|are): 0.1111111111111111
 Custom Implementation t(m1|you): 0.0
 NLTK Implementation t(m1|you): 0.1111111111111111
 Custom Implementation t(m1|from): 0.0
 NLTK Implementation t(m1|from): 0.1111111111111111
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 Custom Implementation t(m1|am): 0.0
 NLTK Implementation t(m1|am): 0.1111111111111111
 Custom Implementation t(m1|bored): 0.0
 NLTK Implementation t(m1|bored): 0.1111111111111111
 Custom Implementation t(m1|how): 0.0
 NLTK Implementation t(m1|how): 0.1111111111111111
 Custom Implementation t(m1|is): 0.0
 NLTK Implementation t(m1|is): 0.1111111111111111
 Custom Implementation t(m1|the): 0.0
 NLTK Implementation t(m1|the): 0.1111111111111111
 Custom Implementation t(m1|weather): 0.0
 NLTK Implementation t(m1|weather): 0.1111111111111111
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 NLTK Implementation t(yemek|Lets): 0.5
 Custom Implementation t(yemek|have): 0.5
 NLTK Implementation t(yemek|have): 0.5
 Custom Implementation t(yemek|dinner): 0.5
 NLTK Implementation t(yemek|dinner): 0.5
 Custom Implementation t(yemek|shall): 0.0
 NLTK Implementation t(yemek|shall): 0.1111111111111111
 Custom Implementation t(yemek|we): 0.0
 NLTK Implementation t(yemek|we): 0.1111111111111111
 Custom Implementation t(yemek|go): 0.0
 NLTK Implementation t(yemek|go): 0.1111111111111111
 Custom Implementation t(yemek|out): 0.0
 NLTK Implementation t(yemek|out): 0.1111111111111111
 Custom Implementation t(yemek|where): 0.0
 NLTK Implementation t(yemek|where): 0.1111111111111111
 Custom Implementation t(yemek|are): 0.0
 NLTK Implementation t(yemek|are): 0.1111111111111111
 Custom Implementation t(yemek|you): 0.0
 NLTK Implementation t(yemek|you): 0.1111111111111111
 Custom Implementation t(yemek|from): 0.0

NLTK Implementation t(yemek|from): 0.1111111111111111
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 NLTK Implementation t(yemek|I): 0.1111111111111111
 Custom Implementation t(yemek|am): 0.0
 NLTK Implementation t(yemek|am): 0.1111111111111111
 Custom Implementation t(yemek|bored): 0.0
 NLTK Implementation t(yemek|bored): 0.1111111111111111
 Custom Implementation t(yemek|how): 0.0
 NLTK Implementation t(yemek|how): 0.1111111111111111
 Custom Implementation t(yemek|is): 0.0
 NLTK Implementation t(yemek|is): 0.1111111111111111
 Custom Implementation t(yemek|the): 0.0
 NLTK Implementation t(yemek|the): 0.1111111111111111
 Custom Implementation t(yemek|weather): 0.0
 NLTK Implementation t(yemek|weather): 0.1111111111111111
 Custom Implementation t(yiyelim|Lets): 0.5
 NLTK Implementation t(yiyelim|Lets): 0.5
 Custom Implementation t(yiyelim|have): 0.5
 NLTK Implementation t(yiyelim|have): 0.5
 Custom Implementation t(yiyelim|dinner): 0.5
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 Custom Implementation t(yiyelim|shall): 0.0
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 NLTK Implementation t(yiyelim|we): 0.1111111111111111
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 NLTK Implementation t(yiyelim|go): 0.1111111111111111
 Custom Implementation t(yiyelim|out): 0.0
 NLTK Implementation t(yiyelim|out): 0.1111111111111111
 Custom Implementation t(yiyelim|where): 0.0
 NLTK Implementation t(yiyelim|where): 0.1111111111111111
 Custom Implementation t(yiyelim|are): 0.0
 NLTK Implementation t(yiyelim|are): 0.1111111111111111
 Custom Implementation t(yiyelim|you): 0.0
 NLTK Implementation t(yiyelim|you): 0.1111111111111111
 Custom Implementation t(yiyelim|from): 0.0
 NLTK Implementation t(yiyelim|from): 0.1111111111111111
 Custom Implementation t(yiyelim|I): 0.0
 NLTK Implementation t(yiyelim|I): 0.1111111111111111
 Custom Implementation t(yiyelim|am): 0.0
 NLTK Implementation t(yiyelim|am): 0.1111111111111111
 Custom Implementation t(yiyelim|bored): 0.0
 NLTK Implementation t(yiyelim|bored): 0.1111111111111111
 Custom Implementation t(yiyelim|how): 0.0
 NLTK Implementation t(yiyelim|how): 0.1111111111111111
 Custom Implementation t(yiyelim|is): 0.0
 NLTK Implementation t(yiyelim|is): 0.1111111111111111
 Custom Implementation t(yiyelim|the): 0.0

NLTK Implementation t(yiyelim|the): 0.1111111111111111
 Custom Implementation t(yiyelim|weather): 0.0
 NLTK Implementation t(yiyelim|weather): 0.1111111111111111
 Custom Implementation t(nerelisin|where): 1.0
 NLTK Implementation t(nerelisin|where): 1.0
 Custom Implementation t(nerelisin|are): 1.0
 NLTK Implementation t(nerelisin|are): 1.0
 Custom Implementation t(nerelisin|you): 1.0
 NLTK Implementation t(nerelisin|you): 1.0
 Custom Implementation t(nerelisin|from): 1.0
 NLTK Implementation t(nerelisin|from): 1.0
 Custom Implementation t(nerelisin|shall): 0.0
 NLTK Implementation t(nerelisin|shall): 0.1111111111111111
 Custom Implementation t(nerelisin|we): 0.0
 NLTK Implementation t(nerelisin|we): 0.1111111111111111
 Custom Implementation t(nerelisin|go): 0.0
 NLTK Implementation t(nerelisin|go): 0.1111111111111111
 Custom Implementation t(nerelisin|out): 0.0
 NLTK Implementation t(nerelisin|out): 0.1111111111111111
 Custom Implementation t(nerelisin|Lets): 0.0
 NLTK Implementation t(nerelisin|Lets): 0.1111111111111111
 Custom Implementation t(nerelisin|have): 0.0
 NLTK Implementation t(nerelisin|have): 0.1111111111111111
 Custom Implementation t(nerelisin|dinner): 0.0
 NLTK Implementation t(nerelisin|dinner): 0.1111111111111111
 Custom Implementation t(nerelisin|I): 0.0
 NLTK Implementation t(nerelisin|I): 0.1111111111111111
 Custom Implementation t(nerelisin|am): 0.0
 NLTK Implementation t(nerelisin|am): 0.1111111111111111
 Custom Implementation t(nerelisin|bored): 0.0
 NLTK Implementation t(nerelisin|bored): 0.1111111111111111
 Custom Implementation t(nerelisin|how): 0.0
 NLTK Implementation t(nerelisin|how): 0.1111111111111111
 Custom Implementation t(nerelisin|is): 0.0
 NLTK Implementation t(nerelisin|is): 0.1111111111111111
 Custom Implementation t(nerelisin|the): 0.0
 NLTK Implementation t(nerelisin|the): 0.1111111111111111
 Custom Implementation t(nerelisin|weather): 0.0
 NLTK Implementation t(nerelisin|weather): 0.1111111111111111
 Custom Implementation t(sıkıldım|I): 1.0
 NLTK Implementation t(sıkıldım|I): 1.0
 Custom Implementation t(sıkıldım|am): 1.0
 NLTK Implementation t(sıkıldım|am): 1.0
 Custom Implementation t(sıkıldım|bored): 1.0
 NLTK Implementation t(sıkıldım|bored): 1.0
 Custom Implementation t(sıkıldım|shall): 0.0
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 Custom Implementation t(sıkıldım|we): 0.0

NLTK Implementation t(sıkıldım|we): 0.1111111111111111
 Custom Implementation t(sıkıldım|go): 0.0
 NLTK Implementation t(sıkıldım|go): 0.1111111111111111
 Custom Implementation t(sıkıldım|out): 0.0
 NLTK Implementation t(sıkıldım|out): 0.1111111111111111
 Custom Implementation t(sıkıldım|Lets): 0.0
 NLTK Implementation t(sıkıldım|Lets): 0.1111111111111111
 Custom Implementation t(sıkıldım|have): 0.0
 NLTK Implementation t(sıkıldım|have): 0.1111111111111111
 Custom Implementation t(sıkıldım|dinner): 0.0
 NLTK Implementation t(sıkıldım|dinner): 0.1111111111111111
 Custom Implementation t(sıkıldım|where): 0.0
 NLTK Implementation t(sıkıldım|where): 0.1111111111111111
 Custom Implementation t(sıkıldım|are): 0.0
 NLTK Implementation t(sıkıldım|are): 0.1111111111111111
 Custom Implementation t(sıkıldım|you): 0.0
 NLTK Implementation t(sıkıldım|you): 0.1111111111111111
 Custom Implementation t(sıkıldım|from): 0.0
 NLTK Implementation t(sıkıldım|from): 0.1111111111111111
 Custom Implementation t(sıkıldım|how): 0.0
 NLTK Implementation t(sıkıldım|how): 0.1111111111111111
 Custom Implementation t(sıkıldım|is): 0.0
 NLTK Implementation t(sıkıldım|is): 0.1111111111111111
 Custom Implementation t(sıkıldım|the): 0.0
 NLTK Implementation t(sıkıldım|the): 0.1111111111111111
 Custom Implementation t(sıkıldım|weather): 0.0
 NLTK Implementation t(sıkıldım|weather): 0.1111111111111111
 Custom Implementation t(hava|how): 0.5
 NLTK Implementation t(hava|how): 0.5
 Custom Implementation t(hava|is): 0.5
 NLTK Implementation t(hava|is): 0.5
 Custom Implementation t(hava|the): 0.5
 NLTK Implementation t(hava|the): 0.5
 Custom Implementation t(hava|weather): 0.5
 NLTK Implementation t(hava|weather): 0.5
 Custom Implementation t(hava|shall): 0.0
 NLTK Implementation t(hava|shall): 0.1111111111111111
 Custom Implementation t(hava|we): 0.0
 NLTK Implementation t(hava|we): 0.1111111111111111
 Custom Implementation t(hava|go): 0.0
 NLTK Implementation t(hava|go): 0.1111111111111111
 Custom Implementation t(hava|out): 0.0
 NLTK Implementation t(hava|out): 0.1111111111111111
 Custom Implementation t(hava|Lets): 0.0
 NLTK Implementation t(hava|Lets): 0.1111111111111111
 Custom Implementation t(hava|have): 0.0
 NLTK Implementation t(hava|have): 0.1111111111111111
 Custom Implementation t(hava|dinner): 0.0

NLTK Implementation t(hava|dinner): 0.1111111111111111
 Custom Implementation t(hava|where): 0.0
 NLTK Implementation t(hava|where): 0.1111111111111111
 Custom Implementation t(hava|are): 0.0
 NLTK Implementation t(hava|are): 0.1111111111111111
 Custom Implementation t(hava|you): 0.0
 NLTK Implementation t(hava|you): 0.1111111111111111
 Custom Implementation t(hava|from): 0.0
 NLTK Implementation t(hava|from): 0.1111111111111111
 Custom Implementation t(hava|I): 0.0
 NLTK Implementation t(hava|I): 0.1111111111111111
 Custom Implementation t(hava|am): 0.0
 NLTK Implementation t(hava|am): 0.1111111111111111
 Custom Implementation t(hava|bored): 0.0
 NLTK Implementation t(hava|bored): 0.1111111111111111
 Custom Implementation t(nasıl|how): 0.5
 NLTK Implementation t(nasıl|how): 0.5
 Custom Implementation t(nasıl|is): 0.5
 NLTK Implementation t(nasıl|is): 0.5
 Custom Implementation t(nasıl|the): 0.5
 NLTK Implementation t(nasıl|the): 0.5
 Custom Implementation t(nasıl|weather): 0.5
 NLTK Implementation t(nasıl|weather): 0.5
 Custom Implementation t(nasıl|shall): 0.0
 NLTK Implementation t(nasıl|shall): 0.1111111111111111
 Custom Implementation t(nasıl|we): 0.0
 NLTK Implementation t(nasıl|we): 0.1111111111111111
 Custom Implementation t(nasıl|go): 0.0
 NLTK Implementation t(nasıl|go): 0.1111111111111111
 Custom Implementation t(nasıl|out): 0.0
 NLTK Implementation t(nasıl|out): 0.1111111111111111
 Custom Implementation t(nasıl|Lets): 0.0
 NLTK Implementation t(nasıl|Lets): 0.1111111111111111
 Custom Implementation t(nasıl|have): 0.0
 NLTK Implementation t(nasıl|have): 0.1111111111111111
 Custom Implementation t(nasıl|dinner): 0.0
 NLTK Implementation t(nasıl|dinner): 0.1111111111111111
 Custom Implementation t(nasıl|where): 0.0
 NLTK Implementation t(nasıl|where): 0.1111111111111111
 Custom Implementation t(nasıl|are): 0.0
 NLTK Implementation t(nasıl|are): 0.1111111111111111
 Custom Implementation t(nasıl|you): 0.0
 NLTK Implementation t(nasıl|you): 0.1111111111111111
 Custom Implementation t(nasıl|from): 0.0
 NLTK Implementation t(nasıl|from): 0.1111111111111111
 Custom Implementation t(nasıl|I): 0.0
 NLTK Implementation t(nasıl|I): 0.1111111111111111
 Custom Implementation t(nasıl|am): 0.0

```
NLTK Implementation t(nasıl|am): 0.11111111111111111
Custom Implementation t(nasıl|bored): 0.0
NLTK Implementation t(nasıl|bored): 0.11111111111111111
```

```
[39]: # Record the output of the last iteration
print("Translation Probabilities After Last Iteration:")
for e_word in translation_chances:
    for f_word in translation_chances[e_word]:
        print(f"t({e_word}|{f_word}): {translation_chances[e_word][f_word]}")
```

Translation Probabilities After Last Iteration:

```
t(dışarı|shall): 0.3333333333333333
t(dışarı|we): 0.3333333333333333
t(dışarı|go): 0.3333333333333333
t(dışarı|out): 0.3333333333333333
t(dışarı|Lets): 0.0
t(dışarı|have): 0.0
t(dışarı|dinner): 0.0
t(dışarı|where): 0.0
t(dışarı|are): 0.0
t(dışarı|you): 0.0
t(dışarı|from): 0.0
t(dışarı|I): 0.0
t(dışarı|am): 0.0
t(dışarı|bored): 0.0
t(dışarı|how): 0.0
t(dışarı|is): 0.0
t(dışarı|the): 0.0
t(dışarı|weather): 0.0
t(çıkalm|shall): 0.3333333333333333
t(çıkalm|we): 0.3333333333333333
t(çıkalm|go): 0.3333333333333333
t(çıkalm|out): 0.3333333333333333
t(çıkalm|Lets): 0.0
t(çıkalm|have): 0.0
t(çıkalm|dinner): 0.0
t(çıkalm|where): 0.0
t(çıkalm|are): 0.0
t(çıkalm|you): 0.0
t(çıkalm|from): 0.0
t(çıkalm|I): 0.0
t(çıkalm|am): 0.0
t(çıkalm|bored): 0.0
t(çıkalm|how): 0.0
t(çıkalm|is): 0.0
t(çıkalm|the): 0.0
t(çıkalm|weather): 0.0
t(mı|shall): 0.3333333333333333
```

t(m1|we): 0.3333333333333333
t(m1|go): 0.3333333333333333
t(m1|out): 0.3333333333333333
t(m1|Lets): 0.0
t(m1|have): 0.0
t(m1|dinner): 0.0
t(m1|where): 0.0
t(m1|are): 0.0
t(m1|you): 0.0
t(m1|from): 0.0
t(m1|I): 0.0
t(m1|am): 0.0
t(m1|bored): 0.0
t(m1|how): 0.0
t(m1|is): 0.0
t(m1|the): 0.0
t(m1|weather): 0.0
t(yemek|Lets): 0.5
t(yemek|have): 0.5
t(yemek|dinner): 0.5
t(yemek|shall): 0.0
t(yemek|we): 0.0
t(yemek|go): 0.0
t(yemek|out): 0.0
t(yemek|where): 0.0
t(yemek|are): 0.0
t(yemek|you): 0.0
t(yemek|from): 0.0
t(yemek|I): 0.0
t(yemek|am): 0.0
t(yemek|bored): 0.0
t(yemek|how): 0.0
t(yemek|is): 0.0
t(yemek|the): 0.0
t(yemek|weather): 0.0
t(yiyelim|Lets): 0.5
t(yiyelim|have): 0.5
t(yiyelim|dinner): 0.5
t(yiyelim|shall): 0.0
t(yiyelim|we): 0.0
t(yiyelim|go): 0.0
t(yiyelim|out): 0.0
t(yiyelim|where): 0.0
t(yiyelim|are): 0.0
t(yiyelim|you): 0.0
t(yiyelim|from): 0.0
t(yiyelim|I): 0.0
t(yiyelim|am): 0.0

t(yiyelim|bored): 0.0
t(yiyelim|how): 0.0
t(yiyelim|is): 0.0
t(yiyelim|the): 0.0
t(yiyelim|weather): 0.0
t(nerelisin|where): 1.0
t(nerelisin|are): 1.0
t(nerelisin|you): 1.0
t(nerelisin|from): 1.0
t(nerelisin|shall): 0.0
t(nerelisin|we): 0.0
t(nerelisin|go): 0.0
t(nerelisin|out): 0.0
t(nerelisin|Lets): 0.0
t(nerelisin|have): 0.0
t(nerelisin|dinner): 0.0
t(nerelisin|I): 0.0
t(nerelisin|am): 0.0
t(nerelisin|bored): 0.0
t(nerelisin|how): 0.0
t(nerelisin|is): 0.0
t(nerelisin|the): 0.0
t(nerelisin|weather): 0.0
t(sıkıldım|I): 1.0
t(sıkıldım|am): 1.0
t(sıkıldım|bored): 1.0
t(sıkıldım|shall): 0.0
t(sıkıldım|we): 0.0
t(sıkıldım|go): 0.0
t(sıkıldım|out): 0.0
t(sıkıldım|Lets): 0.0
t(sıkıldım|have): 0.0
t(sıkıldım|dinner): 0.0
t(sıkıldım|where): 0.0
t(sıkıldım|are): 0.0
t(sıkıldım|you): 0.0
t(sıkıldım|from): 0.0
t(sıkıldım|how): 0.0
t(sıkıldım|is): 0.0
t(sıkıldım|the): 0.0
t(sıkıldım|weather): 0.0
t(hava|how): 0.5
t(hava|is): 0.5
t(hava|the): 0.5
t(hava|weather): 0.5
t(hava|shall): 0.0
t(hava|we): 0.0
t(hava|go): 0.0

t(hava|out): 0.0
t(hava|Lets): 0.0
t(hava|have): 0.0
t(hava|dinner): 0.0
t(hava|where): 0.0
t(hava|are): 0.0
t(hava|you): 0.0
t(hava|from): 0.0
t(hava|I): 0.0
t(hava|am): 0.0
t(hava|bored): 0.0
t(nasıl|how): 0.5
t(nasıl|is): 0.5
t(nasıl|the): 0.5
t(nasıl|weather): 0.5
t(nasıl|shall): 0.0
t(nasıl|we): 0.0
t(nasıl|go): 0.0
t(nasıl|out): 0.0
t(nasıl|Lets): 0.0
t(nasıl|have): 0.0
t(nasıl|dinner): 0.0
t(nasıl|where): 0.0
t(nasıl|are): 0.0
t(nasıl|you): 0.0
t(nasıl|from): 0.0
t(nasıl|I): 0.0
t(nasıl|am): 0.0
t(nasıl|bored): 0.0