EX.NO:8

ANALYSE SENTENCE

DATE:22/02/2025

AIM:
To translate sentences into predicate and first-order logic and analyse the same.

PROCEDURE:

1. Import NLTK
2. Define the line parser .
3. Input the sentences and mention the required translations

CODE :

a) Translate the following sentences into propositional logic and verify that they parse with LogicParser. Provide a key that shows how the propositional variable in your translation corresponds to expressions of English.

```
lp('(exists x. likes(Angus,x) & exists y. likes(y,Julia))')
lp('-exists x. smiles(x,Pat)')
lp('-exists x. (cough(x) | sneeze(x))')
lp('exists x. (asleep(x) & all y. (asleep(y) -> (y = x)))')
```

b) Translate the following sentences into predicate-argument formulas of first-order logic.

```
lp('\\x. all y. love(y,x)')

lp('\\x. all y. (love(y,x) | detested(y,x))')

lp('\\x. (all y. love(y,x) & -exists z. detested(z,x))')
```

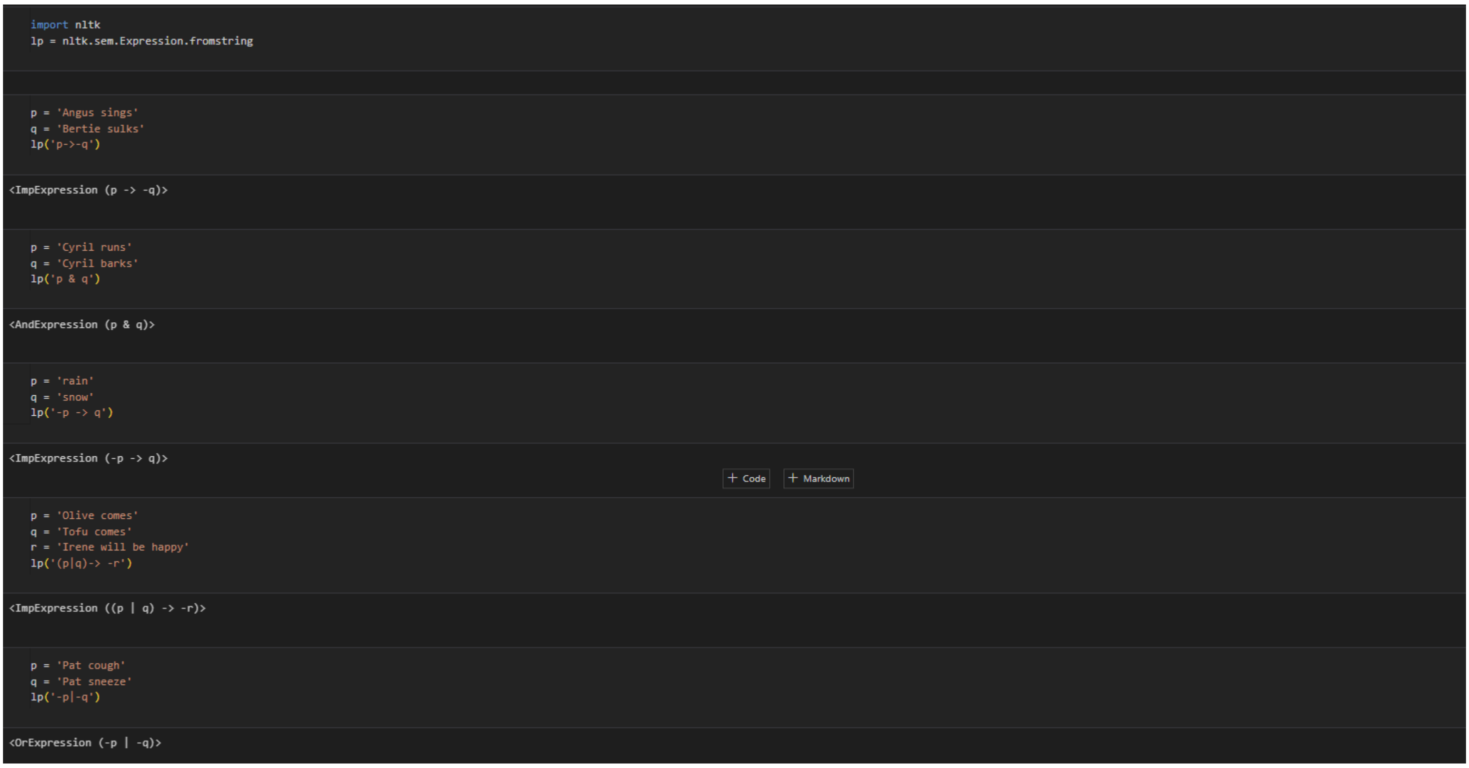
c) Translate the following sentences into quantified formulas of first-order logic.

```
lp('(exists x. likes(Angus,x) & exists y. likes(y,Julia))')

lp('-exists x. smiles(x,Pat)')

lp('-exists x. (cough(x) | sneeze(x))')

lp('exists x. (asleep(x) & all y. (asleep(y) -> (y = x)))')

lp('like(Angus,Cyril) & hate(Irene,Cyril)')
```

d) Translate the following verb phrases using λ abstracts. quantified formulas of first order logic.

```
lp('\\x. all y. love(y,x)')

lp('\\x. all y. (love(y,x) | detested(y,x))')

lp('\\x. (all y. love(y,x) & -exists z. detested(z,x))')
```

OUTPUT:



```
import nltk
lp = nltk.sem.Expression.fromstring
```

```
p = 'Angus sings'
q = 'Bertie sulks'
lp('p->-q')
```

```
<ImpExpression (p -> -q)>
```

```
p = 'Cyril runs'
q = 'Cyril barks'
lp('p & q')
```

```
<AndExpression (p & q)>
```

```
p = 'rain'
q = 'snow'
lp('-p -> q')
```

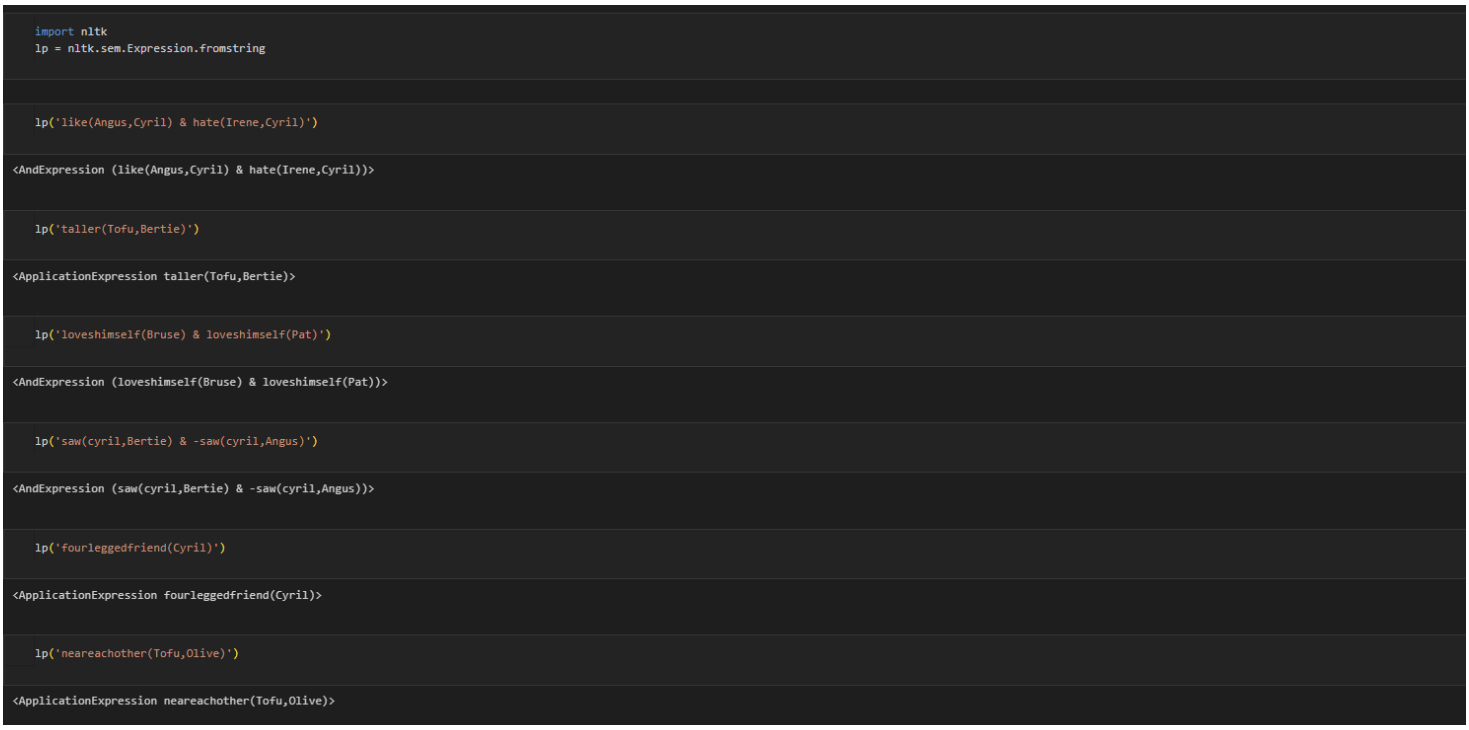
```
<ImpExpression (-p -> q)>
```

```
p = 'Olive comes'
q = 'Tofu comes'
r = 'Irene will be happy'
lp('(p|q)-> -r')
```

```
<ImpExpression ((p | q) -> -r)>
```

```
p = 'Pat cough'
q = 'Pat sneeze'
lp('-p|-q')
```

```
<OrExpression (-p | -q)>
```



```
import nltk
lp = nltk.sem.Expression.fromstring
```

```
lp('like(Angus,Cyril) & hate(Irene,Cyril)')
```

```
<AndExpression (like(Angus,Cyril) & hate(Irene,Cyril))>
```

```
lp('taller(Tofu,Bertie)')
```

```
<ApplicationExpression taller(Tofu,Bertie)>
```

```
lp('loveshimself(Bruse) & loveshimself(Pat)')
```

```
<AndExpression (loveshimself(Bruse) & loveshimself(Pat))>
```

```
lp('saw(cyril,Bertie) & -saw(cyril,Angus)')
```

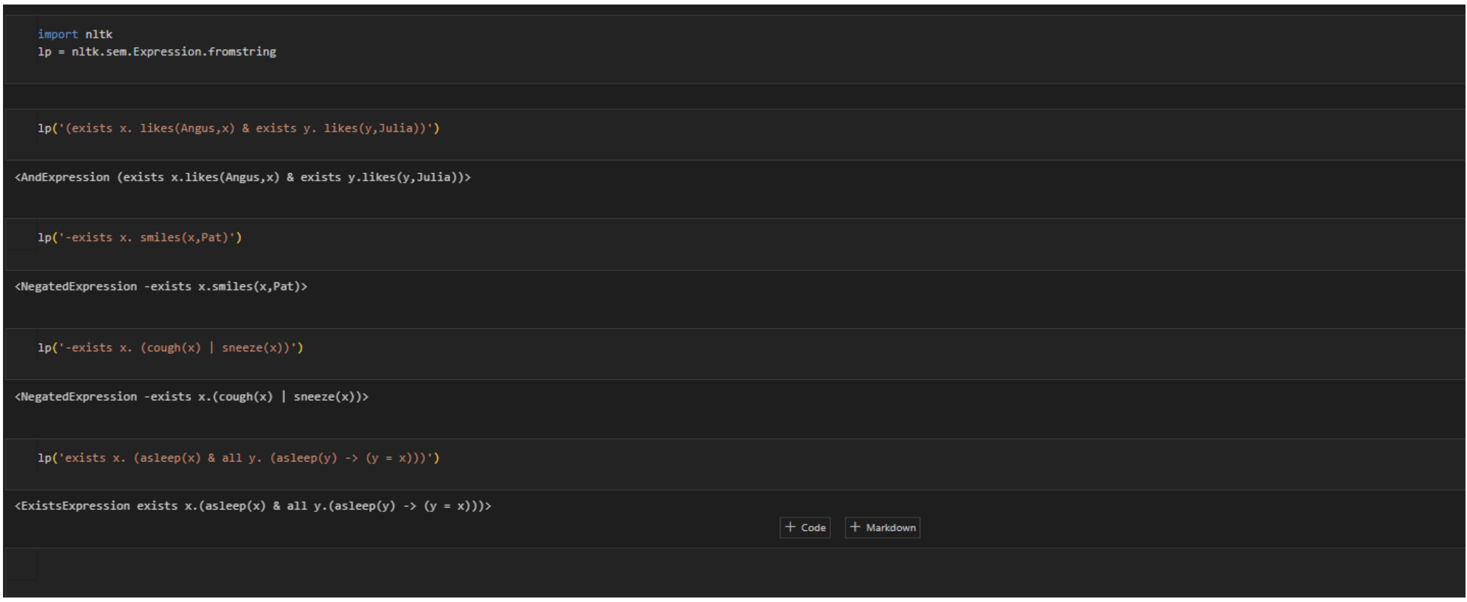
```
<AndExpression (saw(cyril,Bertie) & -saw(cyril,Angus))>
```

```
lp('fourleggedfriend(Cyril)')
```

```
<ApplicationExpression fourleggedfriend(Cyril)>
```

```
lp('neareachother(Tofu,Olive)')
```

```
<ApplicationExpression neareachother(Tofu,Olive)>
```



```
import nltk
lp = nltk.sem.Expression.fromstring
```

```
lp('(exists x. likes(Angus,x) & exists y. likes(y,Julia))')
```

```
<AndExpression (exists x.likes(Angus,x) & exists y.likes(y,Julia))>
```

```
lp('-exists x. smiles(x,Pat)')
```

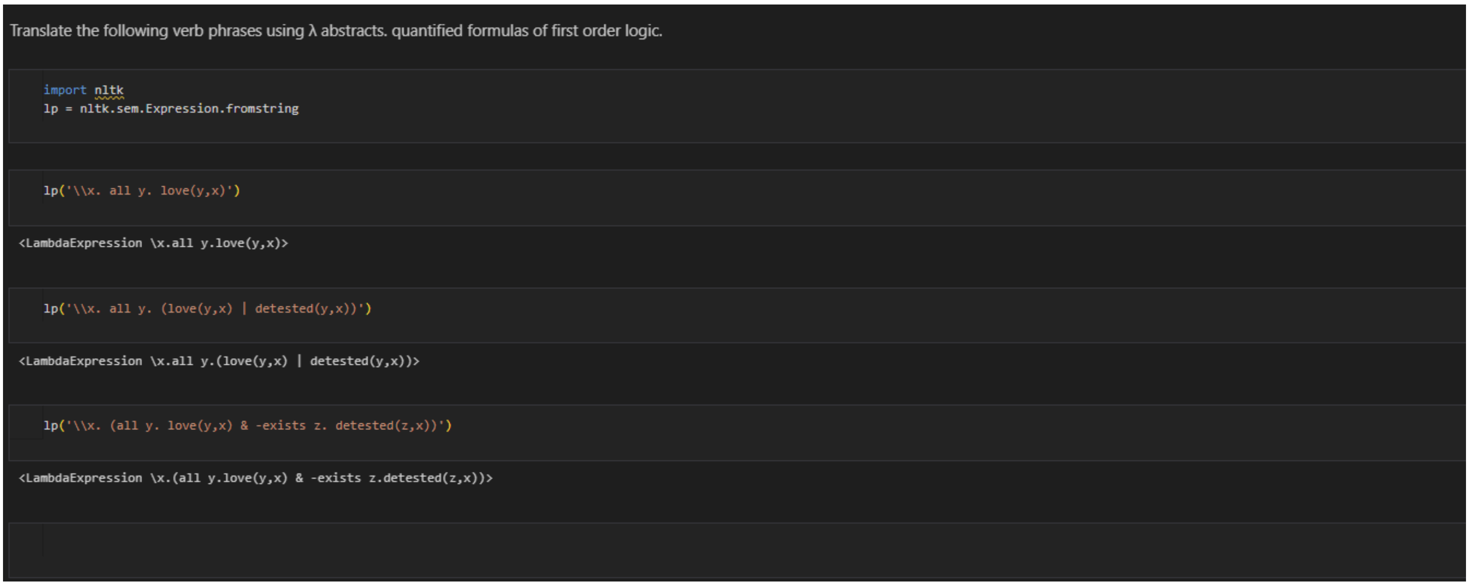
```
<NegatedExpression -exists x.smiles(x,Pat)>
```

```
lp('-exists x. (cough(x) | sneeze(x))')
```

```
<NegatedExpression -exists x.(cough(x) | sneeze(x))>
```

```
lp('exists x. (asleep(x) & all y. (asleep(y) -> (y = x)))')
```

```
<ExistsExpression exists x.(asleep(x) & all y.(asleep(y) -> (y = x)))>
```



Translate the following verb phrases using λ abstracts. quantified formulas of first order logic.

```
import nltk
lp = nltk.sem.Expression.fromstring
```

```
lp('\\x. all y. love(y,x)')
```

```
<LambdaExpression \x.all y.love(y,x)>
```

```
lp('\\x. all y. (love(y,x) | detested(y,x))')
```

```
<LambdaExpression \x.all y.(love(y,x) | detested(y,x))>
```

```
lp('\\x. (all y. love(y,x) & -exists z. detested(z,x))')
```

```
<LambdaExpression \x.(all y.love(y,x) & -exists z.detested(z,x))>
```

Ex.no:9

DATE:24/01/2024

TAGGING WORDS N-GRAMS

AIM:

To extract and identify meaningful bigram (two-word) and trigram (three-word) collocations from a given corpus of text using Python and the Natural Language Toolkit (nltk)

PROCEDURE:

Install and Import Necessary Libraries:

- Ensure `nltk` is installed in your Python environment.
- Import modules for tokenization and collocation finding from `nltk`.

Load Corpus Data:

- Use a prebuilt corpus from `nltk` (e.g., Jane Austen's "Emma") or load your custom text data.

Tokenize the Text:

- Convert the corpus into individual words using a tokenizer.
- Clean the tokens by removing punctuation and converting words to lowercase.

Find Bigrams:

- Use `BigramCollocationFinder` from `nltk` to identify pairs of words (bigrams).
- Apply frequency filters to remove less frequent bigrams.
- Use statistical measures like the likelihood ratio to rank and extract meaningful bigrams.

Find Trigrams:

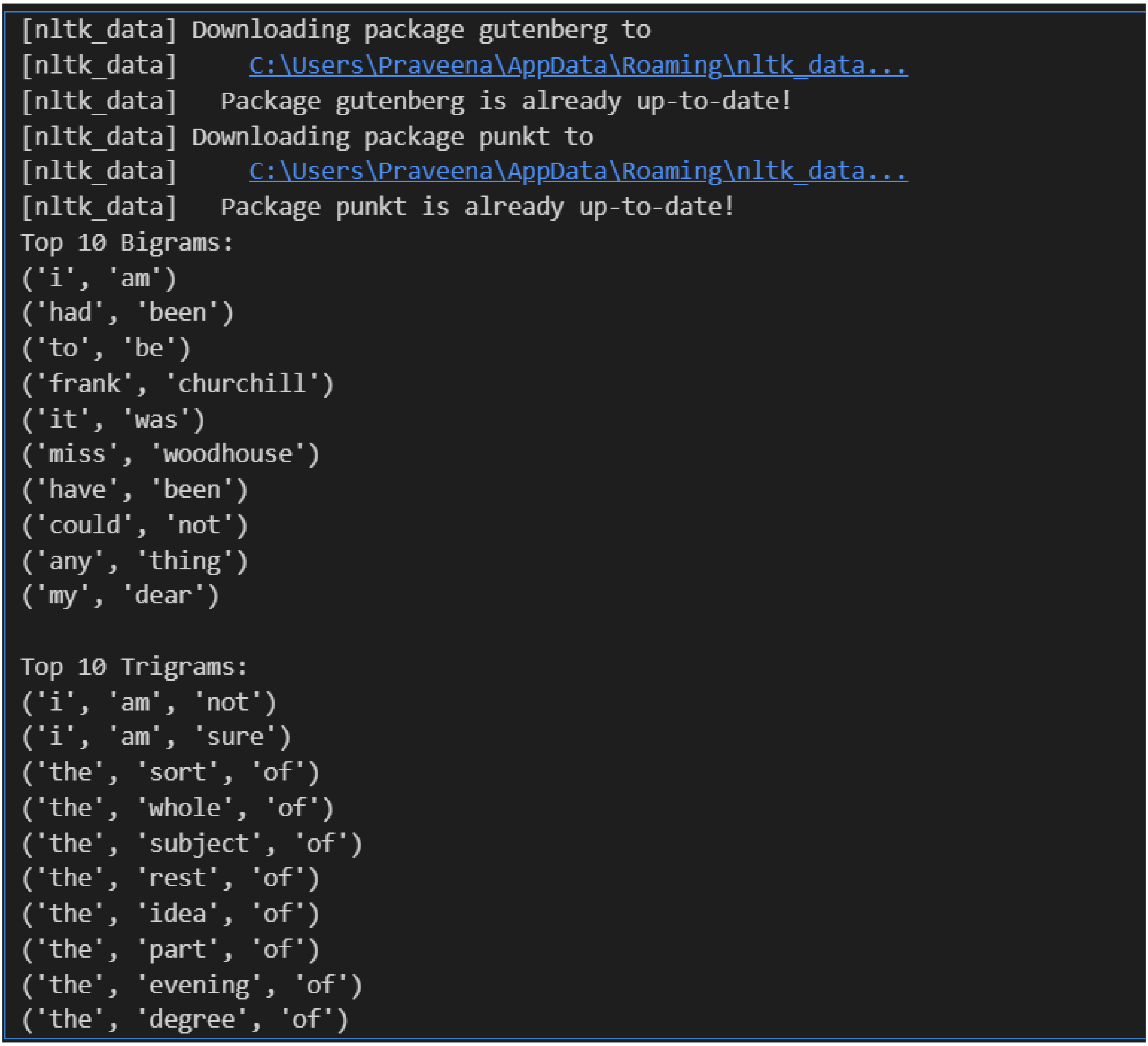
- Use `TrigramCollocationFinder` from `nltk` to identify triplets of words (trigrams).
- Apply frequency filters to remove less frequent trigrams.
- Use statistical measures like the likelihood ratio to rank and extract meaningful trigrams.

CODE:

```
import nltk

from nltk.corpus import gutenberg

from nltk.collocations import BigramCollocationFinder, TrigramCollocationFinder

from nltk.metrics import BigramAssocMeasures, TrigramAssocMeasures



# Download necessary nltk data

nltk.download('gutenberg')

nltk.download('punkt')



# Load sample corpus data
```

```
corpus = gutenberg.raw('austen-emma.txt')  # Jane Austen's "Emma"

# Tokenize the corpus into words
tokens = nltk.word_tokenize(corpus)

# Filter tokens to remove punctuation and lowercase
filtered_tokens = [word.lower() for word in tokens if word.isalpha()]

# Create a BigramCollocationFinder
bigram_finder = BigramCollocationFinder.from_words(filtered_tokens)
bigram_finder.apply_freq_filter(5)  # Filter out bigrams that occur less than 5 times

# Extract top 10 bigrams based on their likelihood ratio
top_bigrams = bigram_finder.nbest(BigramAssocMeasures.likelihood_ratio, 10)

# Create a TrigramCollocationFinder
trigram_finder = TrigramCollocationFinder.from_words(filtered_tokens)
trigram_finder.apply_freq_filter(3)  # Filter out trigrams that occur less than 3 times

# Extract top 10 trigrams based on their likelihood ratio
top_trigrams = trigram_finder.nbest(TrigramAssocMeasures.likelihood_ratio, 10)

# Print results
print("Top 10 Bigrams:")
for bigram in top_bigrams:
    print(bigram)

print("\nTop 10 Trigrams:")
for trigram in top_trigrams:
    print(trigram)
```

OUTPUT:



```
[nltk_data] Downloading package gutenberg to
[nltk_data]     C:\Users\Praveena\AppData\Roaming\nltk_data...
[nltk_data]   Package gutenberg is already up-to-date!
[nltk_data] Downloading package punkt to
[nltk_data]     C:\Users\Praveena\AppData\Roaming\nltk_data...
[nltk_data]   Package punkt is already up-to-date!
Top 10 Bigrams:
('i', 'am')
('had', 'been')
('to', 'be')
('frank', 'churchill')
('it', 'was')
('miss', 'woodhouse')
('have', 'been')
('could', 'not')
('any', 'thing')
('my', 'dear')

Top 10 Trigrams:
('i', 'am', 'not')
('i', 'am', 'sure')
('the', 'sort', 'of')
('the', 'whole', 'of')
('the', 'subject', 'of')
('the', 'rest', 'of')
('the', 'idea', 'of')
('the', 'part', 'of')
('the', 'evening', 'of')
('the', 'degree', 'of')
```