Aim: Perform morphological analysis and word generation for any given text.

Objective:

To study morphological analysis.

Theory:

Morphological analysis is a field of linguistics that studies the structure of words. It identifies how a word is produced through the use of morphemes. A morpheme is a basic unit of the English language. The morpheme is the smallest element of a word that has grammatical function and meaning. In inflected languages, words are formed through morphological processes such as affixation. For example, by adding the suffix '-s' to the verb 'to dance', we form the third person singular 'dances'.

Parsing:

It is the process of determining the morphenes from which a given word is constructed. Morphenes are the smallest meaningful words which cannot be divided further. Morphenes can be stem or afix. Stem are the root word whereas afix can be prefix, suffix or infix. For example-

Unsuccessfull → un success ful

(prefix) (stem) (suffix)

Program:

```
import nltk  from nltk.stem import

WordNetLemmatizer

nltk.download('wordnet')


lemmatizer = WordNetLemmatizer()


text = "The quick brown foxes are jumping over the lazy dogs"
words = nltk.word_tokenize(text)


lemmatized_words = [lemmatizer.lemmatize(word) for word in words]
```

```
generated_words = []  for

word in lemmatized_words:

    plural_form = word + 's'

    generated_words.append(plural_form)


 print("Original words:", words)

print("Lemmatized words:", lemmatized_words)

print("Generated words:", generated_words)
```

Output:

Original words: ['The', 'quick', 'brown', 'foxes', 'are', 'jumping', 'over', 'the', 'lazy', 'dogs']

Lemmatized words: ['The', 'quick', 'brown', 'fox', 'are', 'jumping', 'over', 'the', 'lazy', 'dog']

Generated words: ['Thes', 'quicks', 'browns', 'foxs', 'ares', 'jumpings', 'overs', 'thes', 'lazys', 'dogs']

Conclusion:

The application of morphological analysis and word generation is integral to achieving a deeper linguistic understanding, improving language modeling, facilitating effective information retrieval, enabling accurate language translation, and enhancing overall natural language understanding. By integrating these techniques into the NLP pipeline, researchers and practitioners can develop more advanced language models and systems that accurately capture the intricacies of language structure and meaning, thereby facilitating more precise and contextually relevant text analysis and generation in various domains.