Identifying Semantic Relationships Using WordNet

In [ ]:
```
import nltk
nltk.download('wordnet')
nltk.download('omw-1.4')
```

```
[nltk_data] Downloading package wordnet to
[nltk_data]     C:\Users\ASUS\AppData\Roaming\nltk_data...
[nltk_data]   Package wordnet is already up-to-date!
[nltk_data] Downloading package omw-1.4 to
[nltk_data]     C:\Users\ASUS\AppData\Roaming\nltk_data...
[nltk_data]   Package omw-1.4 is already up-to-date!
```

Out[ ]: True

In [2]:
```
from nltk.corpus import wordnet as wn

word = 'application'
```

In [3]:
```
synsets = wn.synsets(word)

if synsets:
    for syn in synsets:
        print("Word: ", word)
        print("Sense: ", syn.name())
        print("Definition: ", syn.definition())
        print("Synonyms: ", ', '.join(syn.lemma_names()))
        print("Hypernyms: ", ', '.join([h.name().split('.')[0] for h in syn.hypernyms()]))
        print("Hyponyms: ", ', '.join([h.name().split('.')[0] for h in syn.hyponyms()]))

        antonyms = set()
        for lemma in syn.lemmas():
            for ant in lemma.antonyms():
                antonyms.add(ant.name())

        if antonyms:
            print("Antonyms: ", ', '.join(antonyms))
        else:
            print("Antonyms: None found")

        print()
        print("-" * 100)
else:
    print("No synsets found for: ", word)
```

```
Word:  application
Sense:  application.n.01
Definition:  the act of bringing something to bear; using it for a particular purpose
Synonyms:  application, practical_application
Hypernyms:  use
Hyponyms:  technology, misapplication
Antonyms: None found

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Word:  application
Sense:  application.n.02
Definition:  a verbal or written request for assistance or employment or admission to a school
Synonyms:  application
Hypernyms:  request
Hyponyms:  patent_application, job_application, loan_application, credit_application
Antonyms: None found

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Word:  application
Sense:  application.n.03
Definition:  the work of applying something
Synonyms:  application, coating, covering
Hypernyms:  manual_labor
Hyponyms:  scumble, paving, plating, fumigation, lubrication, papering, tinning, waxing, linin
g, painting, anointing, spraying, plastering, foliation, tiling, galvanization, tinning
Antonyms: None found

--------------------------------------------------------------------------------
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Word:  application
Sense:  application.n.04
Definition:  a program that gives a computer instructions that provide the user with tools to
accomplish a task
Synonyms:  application, application_program, applications_programme
Hypernyms:  program
Hyponyms:  natural_language_processor, frame, applet, job, editor_program, browser, active_app
lication, word_processor
Antonyms: None found

--------------------------------------------------------------------------------
------
Word:  application
Sense:  lotion.n.02
Definition:  liquid preparation having a soothing or antiseptic or medicinal action when appli
ed to the skin
Synonyms:  lotion, application
Hypernyms:  remedy
Hyponyms:  liniment, menthol, blackwash, calamine_lotion, witch_hazel, eye-lotion, rubbing_alc
ohol
Antonyms: None found

--------------------------------------------------------------------------------
------
Word:  application
Sense:  application.n.06
Definition:  a diligent effort
Synonyms:  application, diligence
Hypernyms:  effort
Hyponyms:
Antonyms: None found
```

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Word:  application
Sense:  application.n.07
Definition:  the action of putting something into operation
Synonyms:  application
Hypernyms:  action
Hyponyms:
Antonyms: None found

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```

In [4]:
```python
# Tokenization and BoW
from nltk.tokenize import word_tokenize
from sklearn.feature_extraction.text import CountVectorizer
import nltk
nltk.download('punkt')

text = "How much wood would a woodchuck chuck could chuck wood,if a woodchuck could chuck wood

tokens = word_tokenize(text)
print("Tokens:", tokens)

vectorizer = CountVectorizer()
X = vectorizer.fit_transform([text])
print("Vocabulary:", vectorizer.get_feature_names_out())
print("BoW Matrix:", X.toarray())
```

```
Tokens: ['How', 'much', 'wood', 'would', 'a', 'woodchuck', 'chuck', 'could', 'chuck', 'wood',
',', 'if', 'a', 'woodchuck', 'could', 'chuck', 'wood']
Vocabulary: ['chuck' 'could' 'how' 'if' 'much' 'wood' 'woodchuck' 'would']
BoW Matrix: [[3 2 1 1 1 3 2 1]]
[nltk_data] Downloading package punkt to
[nltk_data]     C:\Users\ASUS\AppData\Roaming\nltk_data...
[nltk_data]   Package punkt is already up-to-date!
```