Task 2: spaCy Hello World

In [1]:
```
pip install spacy
```

```
Requirement already satisfied: spacy in /home/chattha/anaconda3/lib/python3.11/site-packages (3.7.2)
Requirement already satisfied: spacy-legacy<3.1.0,>=3.0.11 in /home/chattha/anaconda3/lib/python3.11/site
-packages (from spacy) (3.0.12)
Requirement already satisfied: spacy-loggers<2.0.0,>=1.0.0 in /home/chattha/anaconda3/lib/python3.11/site
-packages (from spacy) (1.0.5)
Requirement already satisfied: murmurhash<1.1.0,>=0.28.0 in /home/chattha/anaconda3/lib/python3.11/site-p
ackages (from spacy) (1.0.10)
Requirement already satisfied: cymem<2.1.0,>=2.0.2 in /home/chattha/anaconda3/lib/python3.11/site-package
s (from spacy) (2.0.8)
Requirement already satisfied: preshed<3.1.0,>=3.0.2 in /home/chattha/anaconda3/lib/python3.11/site-packa
ges (from spacy) (3.0.9)
Requirement already satisfied: thinc<8.3.0,>=8.1.8 in /home/chattha/anaconda3/lib/python3.11/site-package
s (from spacy) (8.2.2)
Requirement already satisfied: wasabi<1.2.0,>=0.9.1 in /home/chattha/anaconda3/lib/python3.11/site-packag
es (from spacy) (1.1.2)
Requirement already satisfied: srsly<3.0.0,>=2.4.3 in /home/chattha/anaconda3/lib/python3.11/site-package
s (from spacy) (2.4.8)
Requirement already satisfied: catalogue<2.1.0,>=2.0.6 in /home/chattha/anaconda3/lib/python3.11/site-pac
kages (from spacy) (2.0.10)
Requirement already satisfied: weasel<0.4.0,>=0.1.0 in /home/chattha/anaconda3/lib/python3.11/site-packag
es (from spacy) (0.3.4)
Requirement already satisfied: typer<0.10.0,>=0.3.0 in /home/chattha/anaconda3/lib/python3.11/site-packag
es (from spacy) (0.9.0)
Requirement already satisfied: smart-open<7.0.0,>=5.2.1 in /home/chattha/anaconda3/lib/python3.11/site-pa
ckages (from spacy) (5.2.1)
Requirement already satisfied: tqdm<5.0.0,>=4.38.0 in /home/chattha/anaconda3/lib/python3.11/site-package
s (from spacy) (4.65.0)
Requirement already satisfied: requests<3.0.0,>=2.13.0 in /home/chattha/anaconda3/lib/python3.11/site-pac
kages (from spacy) (2.31.0)
Requirement already satisfied: pydantic!=1.8,!=1.8.1,<3.0.0,>=1.7.4 in /home/chattha/anaconda3/lib/python
3.11/site-packages (from spacy) (1.10.8)
Requirement already satisfied: jinja2 in /home/chattha/anaconda3/lib/python3.11/site-packages (from spac
y) (3.1.2)
Requirement already satisfied: setuptools in /home/chattha/anaconda3/lib/python3.11/site-packages (from s
pacy) (69.0.3)
Requirement already satisfied: packaging>=20.0 in /home/chattha/anaconda3/lib/python3.11/site-packages (f
rom spacy) (23.1)
Requirement already satisfied: langcodes<4.0.0,>=3.2.0 in /home/chattha/anaconda3/lib/python3.11/site-pac
kages (from spacy) (3.3.0)
Requirement already satisfied: numpy>=1.19.0 in /home/chattha/anaconda3/lib/python3.11/site-packages (fro
m spacy) (1.24.3)
```

```
Requirement already satisfied: typing-extensions>=4.2.0 in /home/chattha/anaconda3/lib/python3.11/site-pa
ckages (from pydantic!=1.8,!=1.8.1,<3.0.0,>=1.7.4->spacy) (4.7.1)
Requirement already satisfied: charset-normalizer<4,>=2 in /home/chattha/anaconda3/lib/python3.11/site-pa
ckages (from requests<3.0.0,>=2.13.0->spacy) (2.0.4)
Requirement already satisfied: idna<4,>=2.5 in /home/chattha/anaconda3/lib/python3.11/site-packages (from
requests<3.0.0,>=2.13.0->spacy) (3.4)
Requirement already satisfied: urllib3<3,>=1.21.1 in /home/chattha/anaconda3/lib/python3.11/site-packages
(from requests<3.0.0,>=2.13.0->spacy) (1.26.16)
Requirement already satisfied: certifi>=2017.4.17 in /home/chattha/anaconda3/lib/python3.11/site-packages
(from requests<3.0.0,>=2.13.0->spacy) (2023.7.22)
Requirement already satisfied: blis<0.8.0,>=0.7.8 in /home/chattha/anaconda3/lib/python3.11/site-packages
(from thinc<8.3.0,>=8.1.8->spacy) (0.7.11)
Requirement already satisfied: confection<1.0.0,>=0.0.1 in /home/chattha/anaconda3/lib/python3.11/site-pa
ckages (from thinc<8.3.0,>=8.1.8->spacy) (0.1.4)
Requirement already satisfied: click<9.0.0,>=7.1.1 in /home/chattha/anaconda3/lib/python3.11/site-package
s (from typer<0.10.0,>=0.3.0->spacy) (8.0.4)
Requirement already satisfied: cloudpathlib<0.17.0,>=0.7.0 in /home/chattha/anaconda3/lib/python3.11/site
-packages (from weasel<0.4.0,>=0.1.0->spacy) (0.16.0)
Requirement already satisfied: MarkupSafe>=2.0 in /home/chattha/anaconda3/lib/python3.11/site-packages (f
rom jinja2->spacy) (2.1.1)
Note: you may need to restart the kernel to use updated packages.
```

In [2]:
```
pip install -U pip setuptools wheel
```

```
Requirement already satisfied: pip in /home/chattha/anaconda3/lib/python3.11/site-packages (23.3.2)
Requirement already satisfied: setuptools in /home/chattha/anaconda3/lib/python3.11/site-packages (69.0.
3)
Requirement already satisfied: wheel in /home/chattha/anaconda3/lib/python3.11/site-packages (0.42.0)
Note: you may need to restart the kernel to use updated packages.
```

In [1]:
```
import spacy
import nltk
```

In [4]: ```python
!python3 -m spacy download en_core_web_sm
```

```
Collecting en-core-web-sm==3.7.1
  Downloading https://github.com/explosion/spacy-models/releases/download/en_core_we
b_sm-3.7.1/en_core_web_sm-3.7.1-py3-none-any.whl (https://github.com/explosion/spacy-models/releases/download/en_core_web_sm-
3.7.1/en_core_web_sm-3.7.1-py3-none-any.whl) (12.8 MB)
                                                 12.8/12.8 MB 2.3 MB/s eta 0:00:00m eta 0:00:01[36m0:00:01
Requirement already satisfied: spacy<3.8.0,>=3.7.2 in /home/chattha/anaconda3/lib/python3.11/site-package
s (from en-core-web-sm==3.7.1) (3.7.2)
Requirement already satisfied: spacy-legacy<3.1.0,>=3.0.11 in /home/chattha/anaconda3/lib/python3.11/site
-packages (from spacy<3.8.0,>=3.7.2->en-core-web-sm==3.7.1) (3.0.12)
Requirement already satisfied: spacy-loggers<2.0.0,>=1.0.0 in /home/chattha/anaconda3/lib/python3.11/site
-packages (from spacy<3.8.0,>=3.7.2->en-core-web-sm==3.7.1) (1.0.5)
Requirement already satisfied: murmurhash<1.1.0,>=0.28.0 in /home/chattha/anaconda3/lib/python3.11/site-p
ackages (from spacy<3.8.0,>=3.7.2->en-core-web-sm==3.7.1) (1.0.10)
Requirement already satisfied: cymem<2.1.0,>=2.0.2 in /home/chattha/anaconda3/lib/python3.11/site-package
s (from spacy<3.8.0,>=3.7.2->en-core-web-sm==3.7.1) (2.0.8)
Requirement already satisfied: preshed<3.1.0,>=3.0.2 in /home/chattha/anaconda3/lib/python3.11/site-packa
ges (from spacy<3.8.0,>=3.7.2->en-core-web-sm==3.7.1) (3.0.9)
Requirement already satisfied: thinc<8.3.0,>=8.1.8 in /home/chattha/anaconda3/lib/python3.11/site-package
s (from spacy<3.8.0,>=3.7.2->en-core-web-sm==3.7.1) (8.2.2)
Requirement already satisfied: wasabi<1.2.0,>=0.9.1 in /home/chattha/anaconda3/lib/python3.11/site-packag
es (from spacy<3.8.0,>=3.7.2->en-core-web-sm==3.7.1) (1.1.2)
Requirement already satisfied: srsly<3.0.0,>=2.4.3 in /home/chattha/anaconda3/lib/python3.11/site-package
s (from spacy<3.8.0,>=3.7.2->en-core-web-sm==3.7.1) (2.4.8)
Requirement already satisfied: catalogue<2.1.0,>=2.0.6 in /home/chattha/anaconda3/lib/python3.11/site-pac
kages (from spacy<3.8.0,>=3.7.2->en-core-web-sm==3.7.1) (2.0.10)
Requirement already satisfied: weasel<0.4.0,>=0.1.0 in /home/chattha/anaconda3/lib/python3.11/site-packag
es (from spacy<3.8.0,>=3.7.2->en-core-web-sm==3.7.1) (0.3.4)
Requirement already satisfied: typer<0.10.0,>=0.3.0 in /home/chattha/anaconda3/lib/python3.11/site-packag
es (from spacy<3.8.0,>=3.7.2->en-core-web-sm==3.7.1) (0.9.0)
Requirement already satisfied: smart-open<7.0.0,>=5.2.1 in /home/chattha/anaconda3/lib/python3.11/site-pa
ckages (from spacy<3.8.0,>=3.7.2->en-core-web-sm==3.7.1) (5.2.1)
Requirement already satisfied: tqdm<5.0.0,>=4.38.0 in /home/chattha/anaconda3/lib/python3.11/site-package
s (from spacy<3.8.0,>=3.7.2->en-core-web-sm==3.7.1) (4.65.0)
Requirement already satisfied: requests<3.0.0,>=2.13.0 in /home/chattha/anaconda3/lib/python3.11/site-pac
kages (from spacy<3.8.0,>=3.7.2->en-core-web-sm==3.7.1) (2.31.0)
Requirement already satisfied: pydantic!=1.8,!=1.8.1,<3.0.0,>=1.7.4 in /home/chattha/anaconda3/lib/python
3.11/site-packages (from spacy<3.8.0,>=3.7.2->en-core-web-sm==3.7.1) (1.10.8)
Requirement already satisfied: jinja2 in /home/chattha/anaconda3/lib/python3.11/site-packages (from spacy
<3.8.0,>=3.7.2->en-core-web-sm==3.7.1) (3.1.2)
Requirement already satisfied: setuptools in /home/chattha/anaconda3/lib/python3.11/site-packages (from s
pacy<3.8.0,>=3.7.2->en-core-web-sm==3.7.1) (69.0.3)
```

```
Requirement already satisfied: packaging>=20.0 in /home/chattha/anaconda3/lib/python3.11/site-packages (f
rom spacy<3.8.0,>=3.7.2->en-core-web-sm==3.7.1) (23.1)
Requirement already satisfied: langcodes<4.0.0,>=3.2.0 in /home/chattha/anaconda3/lib/python3.11/site-pac
kages (from spacy<3.8.0,>=3.7.2->en-core-web-sm==3.7.1) (3.3.0)
Requirement already satisfied: numpy>=1.19.0 in /home/chattha/anaconda3/lib/python3.11/site-packages (fro
m spacy<3.8.0,>=3.7.2->en-core-web-sm==3.7.1) (1.24.3)
Requirement already satisfied: typing-extensions>=4.2.0 in /home/chattha/anaconda3/lib/python3.11/site-pa
ckages (from pydantic!=1.8,!=1.8.1,<3.0.0,>=1.7.4->spacy<3.8.0,>=3.7.2->en-core-web-sm==3.7.1) (4.7.1)
Requirement already satisfied: charset-normalizer<4,>=2 in /home/chattha/anaconda3/lib/python3.11/site-pa
ckages (from requests<3.0.0,>=2.13.0->spacy<3.8.0,>=3.7.2->en-core-web-sm==3.7.1) (2.0.4)
Requirement already satisfied: idna<4,>=2.5 in /home/chattha/anaconda3/lib/python3.11/site-packages (from
requests<3.0.0,>=2.13.0->spacy<3.8.0,>=3.7.2->en-core-web-sm==3.7.1) (3.4)
Requirement already satisfied: urllib3<3,>=1.21.1 in /home/chattha/anaconda3/lib/python3.11/site-packages
(from requests<3.0.0,>=2.13.0->spacy<3.8.0,>=3.7.2->en-core-web-sm==3.7.1) (1.26.16)
Requirement already satisfied: certifi>=2017.4.17 in /home/chattha/anaconda3/lib/python3.11/site-packages
(from requests<3.0.0,>=2.13.0->spacy<3.8.0,>=3.7.2->en-core-web-sm==3.7.1) (2023.7.22)
Requirement already satisfied: blis<0.8.0,>=0.7.8 in /home/chattha/anaconda3/lib/python3.11/site-packages
(from thinc<8.3.0,>=8.1.8->spacy<3.8.0,>=3.7.2->en-core-web-sm==3.7.1) (0.7.11)
Requirement already satisfied: confection<1.0.0,>=0.0.1 in /home/chattha/anaconda3/lib/python3.11/site-pa
ckages (from thinc<8.3.0,>=8.1.8->spacy<3.8.0,>=3.7.2->en-core-web-sm==3.7.1) (0.1.4)
Requirement already satisfied: click<9.0.0,>=7.1.1 in /home/chattha/anaconda3/lib/python3.11/site-package
s (from typer<0.10.0,>=0.3.0->spacy<3.8.0,>=3.7.2->en-core-web-sm==3.7.1) (8.0.4)
Requirement already satisfied: cloudpathlib<0.17.0,>=0.7.0 in /home/chattha/anaconda3/lib/python3.11/site
-packages (from weasel<0.4.0,>=0.1.0->spacy<3.8.0,>=3.7.2->en-core-web-sm==3.7.1) (0.16.0)
Requirement already satisfied: MarkupSafe>=2.0 in /home/chattha/anaconda3/lib/python3.11/site-packages (f
rom jinja2->spacy<3.8.0,>=3.7.2->en-core-web-sm==3.7.1) (2.1.1)
✔ Download and installation successful
You can now load the package via spacy.load('en_core_web_sm')
```

In [ ]:

In [82]:
```python
from spacy.tokens.doc import Doc
from spacy.vocab import Vocab
doc = Doc(Vocab(),
words = [u'Hello', u'World!'])
print(doc)
```

```
Hello World!
```

```python
In [83]: print(type(doc))
         print(doc.vocab)
         for token in doc:
             lexeme = doc.vocab[token.text]
             print(lexeme.text)
```

```
<class 'spacy.tokens.doc.Doc'>
<spacy.vocab.Vocab object at 0x7fac4d401120>
Hello
World!
```

```python
In [84]: import spacy
         nlp = spacy.load('en_core_web_sm')
         doc = nlp(u'I want to learn spaCy.')
         token_text1 = [token.text for token in doc]
         token_text2 = [doc[i].text for i in range(len(doc))]
         print(token_text1)
         print(token_text2)
```

```
['I', 'want', 'to', 'learn', 'spaCy', '.']
['I', 'want', 'to', 'learn', 'spaCy', '.']
```

```python
In [85]: doc = nlp(u'I want to learn spaCy.')
         for i in range(len(doc)):
             print([t for t in doc[i].lefts])
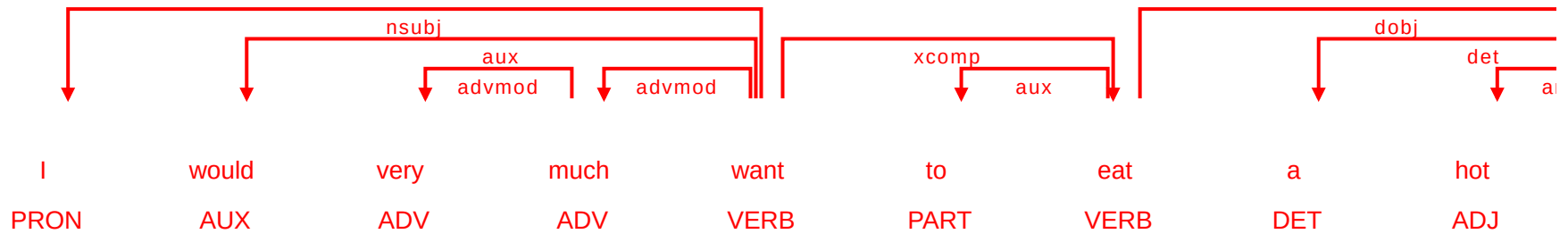```

```
[]
[I]
[]
[to]
[]
[]
```

In [86]:
```python
doc = nlp(u'I want to learn spaCy.')
for i in range(len(doc)):
    print([t for t in doc[i].rights])
```

```
[]
[learn, .]
[]
[spaCy]
[]
[]
```

In [87]:
```python
doc = nlp(u'I want to learn spaCy.')
for i in range(len(doc)):
    print([t for t in doc[i].children])
```

```
[]
[I, learn, .]
[]
[to, spaCy]
[]
[]
```

In [95]:
```python
from spacy import displacy
displacy.render(doc, style='dep', options={'distance': 100, 'color': 'red', 'compact': True } , page=f'Lef
```

I	would	very	much	want	to	eat	a	hot
PRON	AUX	ADV	ADV	VERB	PART	VERB	DET	ADJ

nsubj, aux, advmod, advmod, xcomp, aux, dobj, det

In [90]:
```python
doc = nlp(u'I would very much want to eat a hot dinner.')
for i in range(len(doc)):
    print([t for t in doc[i].lefts])
```

```
[]
[]
[]
[very]
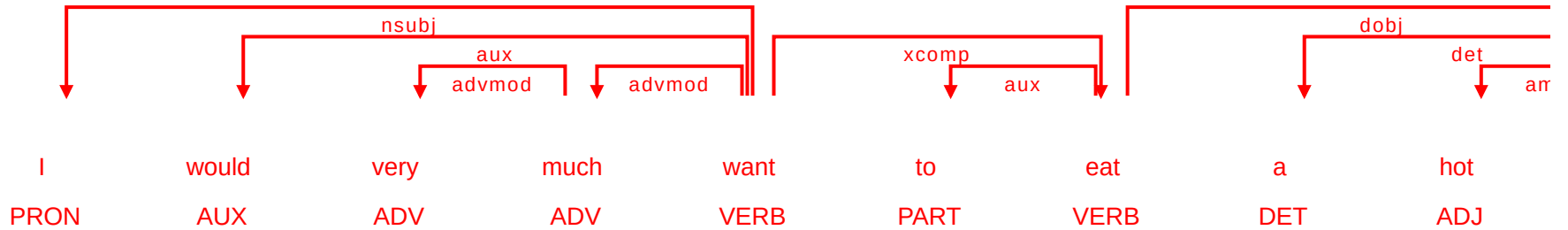[I, would, much]
[]
[to]
[]
[]
[a, hot]
[]
```

In [91]:
```python
doc = nlp(u'I would very much want to eat a hot dinner.')
for i in range(len(doc)):
    print([t for t in doc[i].rights])
```

```
[]
[]
[]
[]
[eat, .]
[]
[dinner]
[]
[]
[]
[]
```

In [92]:
```python
doc = nlp(u'I would very much want to eat a hot dinner.')
for i in range(len(doc)):
    print([t for t in doc1[i].children])
```

```
[]
[]
[]
[very]
[I, would, much, eat, .]
[]
[to, dinner]
[]
[]
[a, hot]
[]
```

In [94]:
```python
splacy.render(doc, style='dep', options={'distance': 100, 'color': 'red','compact': True}, page=f'Left and F
```

I — PRON
would — AUX
very — ADV
much — ADV
want — VERB
to — PART
eat — VERB
a — DET
hot — ADJ

nsubj, aux, advmod, advmod, xcomp, aux, dobj, det, am

```
In [99]: sentences = ["I want to learn spaCy.", "I want to learn spaCy.", "I would very much want to eat a hot dinn
         # Process each sentence
         for idx, sentence in enumerate(sentences, start=1):
             print("\n Start of Sentence ", idx)
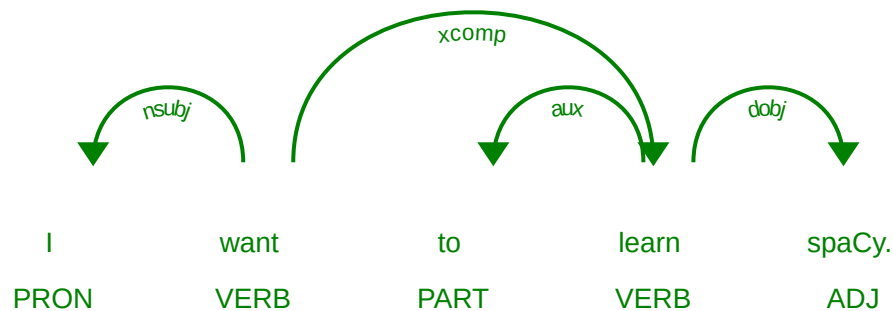             doc = nlp(sentence)

         #    Draw left and right dependencies
             displacy.render(doc, style='dep', options={'distance': 100, 'color': 'GREEN', 'compact': False}, page=

         #    Draw children dependencies
             displacy.render(doc, style='dep', options={'distance': 100, 'color': 'red', 'compact': True}, page=f'C
         #    List dependency grammars
             print(f"\nDependency Grammar of Sentence {idx}")
             for token in doc:
                 print(f"{token.text} =====>({token.dep_}) =====> {token.head.text}")

             print("End of Sentence ", idx)
```

Start of Sentence 1

Task 3: NLTK vs spaCy Pipelines

In [59]: `sentence = [u"We are nearing the end of the semester at Peshawar. Final exams of the Fall 2023 semester wi`

In [63]:
```python
print("=== Input Sentense === \n\n", sentence)

for text in texts:
    sentences = nltk.sent_tokenize(text)          # sentence level segmentation
    print("\n === Input Sentense Segmentation === \n\n", sentences)
    for sentence in sentences:
        words = nltk.word_tokenize(sentence)     # word level segmentation
        print("\n === Sentense Tokenization === \n\n",words)
        tagged_words = nltk.pos_tag(words)        # POS
        print("\n === Sentense Tokenization === \n\n",tagged_words)
        ne_tagged_words = nltk.ne_chunk(tagged_words)
        print("\n === Name Entity Reconization === \n\n", ne_tagged_words)
```

```
=== Input Sentense ===

 Final exams of the Fall 2023 semester will start soon.

 === Input Sentense Segmentation ===

 ['We are nearing the end of the semester at Peshawar.', 'Final exams of the Fall 2023 semester will star
t soon.']

 === Sentense Tokenization ===

 ['We', 'are', 'nearing', 'the', 'end', 'of', 'the', 'semester', 'at', 'Peshawar', '.']

 === Sentense Tokenization ===

 [('We', 'PRP'), ('are', 'VBP'), ('nearing', 'VBG'), ('the', 'DT'), ('end', 'NN'), ('of', 'IN'), ('the',
'DT'), ('semester', 'NN'), ('at', 'IN'), ('Peshawar', 'NNP'), ('.', '.')]

 === Name Entity Reconization ===

 (S
  We/PRP
  are/VBP
  nearing/VBG
  the/DT
  end/NN
  of/IN
  the/DT
  semester/NN
  at/IN
  (ORGANIZATION Peshawar/NNP)
  ./.)

 === Sentense Tokenization ===

 ['Final', 'exams', 'of', 'the', 'Fall', '2023', 'semester', 'will', 'start', 'soon', '.']

 === Sentense Tokenization ===

 [('Final', 'JJ'), ('exams', 'NN'), ('of', 'IN'), ('the', 'DT'), ('Fall', 'NN'), ('2023', 'CD'), ('semest
er', 'NN'), ('will', 'MD'), ('start', 'VB'), ('soon', 'RB'), ('.', '.')]
```

```
=== Name Entity Reconization ===

(S
 Final/JJ
 exams/NN
 of/IN
 the/DT
 Fall/NN
 2023/CD
 semester/NN
 will/MD
 start/VB
 soon/RB
 ./.)
```

In [64]:
```python
nltk.download('punkt') # Sentence Tokenize
nltk.download('averaged_perceptron_tagger') # POS Tagging
nltk.download('maxent_ne_chunker') # Named Entity Chunking
nltk.download('words')
```

```
[nltk_data] Downloading package punkt to /home/chattha/nltk_data...
[nltk_data]   Package punkt is already up-to-date!
[nltk_data] Downloading package averaged_perceptron_tagger to
[nltk_data]     /home/chattha/nltk_data...
[nltk_data]   Package averaged_perceptron_tagger is already up-to-
[nltk_data]       date!
[nltk_data] Downloading package maxent_ne_chunker to
[nltk_data]     /home/chattha/nltk_data...
[nltk_data]   Package maxent_ne_chunker is already up-to-date!
[nltk_data] Downloading package words to /home/chattha/nltk_data...
[nltk_data]   Package words is already up-to-date!
```

Out[64]: True

In [65]:
```python
from spacy import displacy
doc = nlp(u'We are nearing the end of the semester at Peshawar. Final exams of the Fall 2023 semester will
displacy.render(doc, style='ent')
```

We are nearing   the end of the semester **DATE**   at   Peshawar **GPE**   . Final exams of the Fall 2023 semester will start soon.

In [66]:
```python
for ent in doc.ents:
    print(ent.text, ent.label_)
```

```
the end of the semester DATE
Peshawar GPE
```

In [67]:
```python
import spacy
nlp = spacy.load('en_core_web_sm')
nlp.pipe_names
```

Out[67]: ['tok2vec', 'tagger', 'parser', 'attribute_ruler', 'lemmatizer', 'ner']

In [68]:
```python
nlp = spacy.load('en_core_web_sm',disable=['parser'])
```

In [69]:
```python
from spacy.language import Language
@Language.component("my_component")
def my_component(doc):
# Do something to the doc here
    return doc
```

In [28]:
```python
nlp.add_pipe("my_component")
```

Out[28]: <function __main__.my_component(doc)>

In [29]:
```python
# nlp.add_pipe("my_component", first=True)
# nlp.add_pipe("my_component", last=True)
# nlp.add_pipe("my_component", before="parser")
# nlp.add_pipe("my_component", after="parser")
```

In [30]: `nlp.pipe_names`

Out[30]: `['tok2vec', 'tagger', 'attribute_ruler', 'lemmatizer', 'ner', 'my_component']`

Task-4: Finding Patterns in Sentences

In [31]:
```
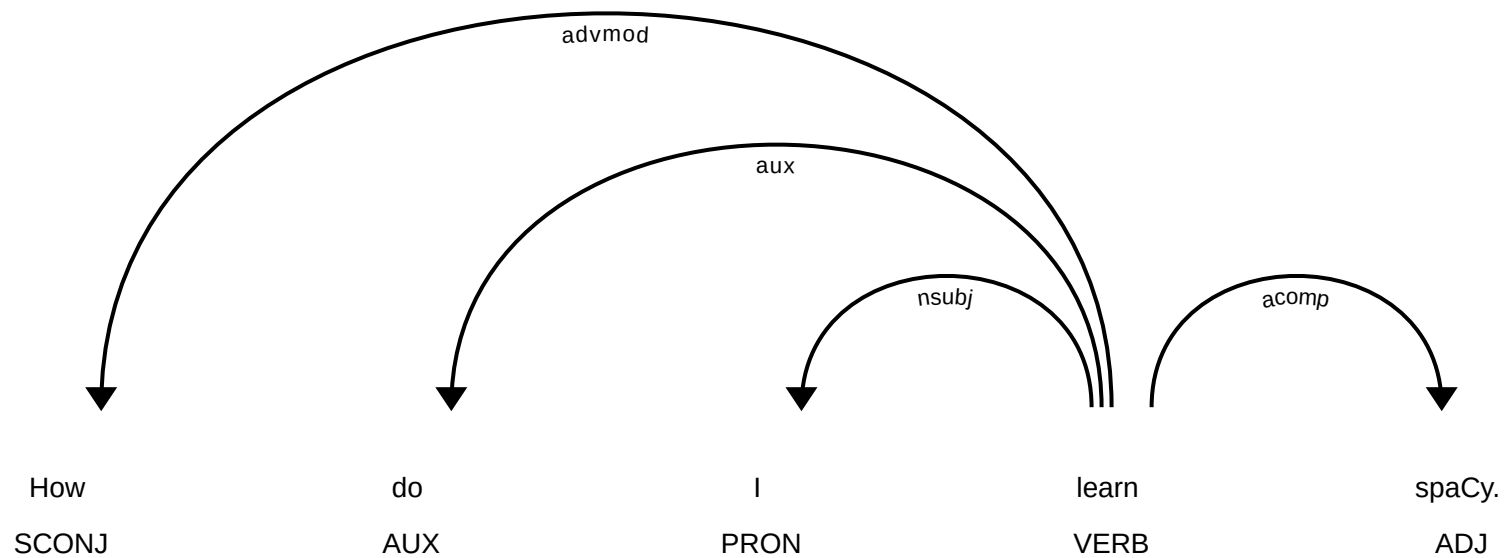doc = nlp(u'I want to learn spaCy.')
displacy.render(doc, style='dep')
```

```
/home/chattha/anaconda3/lib/python3.11/site-packages/spacy/displacy/__init__.py:141: UserWarning: [W005]
Doc object not parsed. This means displaCy won't be able to generate a dependency visualization for it. M
ake sure the Doc was processed with a model that supports dependency parsing, and not just a language cla
ss like `English()`. For more info, see the docs:
https://spacy.io/usage/models (https://spacy.io/usage/models)
  warnings.warn(Warnings.W005)
```

I	want	to	learn	spaCy.
PRON	VERB	PART	VERB	ADJ

In [34]:
```python
doc = nlp(u'How do I learn spaCy.')
displacy.render(doc, style='dep', )
```

advmod

aux

nsubj

acomp

How	do	I	learn	spaCy.
SCONJ	AUX	PRON	VERB	ADJ

```python
import spacy
nlp = spacy.load('en_core_web_sm')
def dep_pattern(doc):
    for i in range(len(doc)-1):
        print(doc[i].dep_)

        if doc[i].dep_ == 'nsubj' and doc[i+1].dep_ == 'ROOT' and doc[i+2].dep_ =='acomp':
            return True
    return False
doc = nlp(u'How do I learn spaCy.')
if dep_pattern(doc):

    print('Found')

else:

    print('Not found')
```

```
advmod
aux
nsubj
Found
```

In [ ]:

In [ ]: