

```
!pip install nltk spacy
```

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Requirement already satisfied: nltk in /usr/local/lib/python3.12/dist-packages (3.9.1)
Requirement already satisfied: spacy in /usr/local/lib/python3.12/dist-packages (3.8.11)
Requirement already satisfied: click in /usr/local/lib/python3.12/dist-packages (from nltk) (8.3.1)
Requirement already satisfied: joblib in /usr/local/lib/python3.12/dist-packages (from nltk) (1.5.3)
Requirement already satisfied: regex<=2021.8.3 in /usr/local/lib/python3.12/dist-packages (from nltk) (2025.11.3)
Requirement already satisfied: tqdm in /usr/local/lib/python3.12/dist-packages (from nltk) (4.67.1)
Requirement already satisfied: spacy-legacy<3.1.0,>=3.0.11 in /usr/local/lib/python3.12/dist-packages (from spacy) (3.0.12)
Requirement already satisfied: spacy-loggers<2.0.0,>=1.0.0 in /usr/local/lib/python3.12/dist-packages (from spacy) (1.0.5)
Requirement already satisfied: murmurhash<1.1.0,>=0.28.0 in /usr/local/lib/python3.12/dist-packages (from spacy) (1.0.15)
Requirement already satisfied: cymem<2.1.0,>=2.0.2 in /usr/local/lib/python3.12/dist-packages (from spacy) (2.0.13)
Requirement already satisfied: preshed<3.1.0,>=3.0.2 in /usr/local/lib/python3.12/dist-packages (from spacy) (3.0.12)
Requirement already satisfied: thinc<8.4.0,>=8.3.4 in /usr/local/lib/python3.12/dist-packages (from spacy) (8.3.10)
Requirement already satisfied: wasabi<1.2.0,>=0.9.1 in /usr/local/lib/python3.12/dist-packages (from spacy) (1.1.3)
Requirement already satisfied: srsly<3.0.0,>=2.4.3 in /usr/local/lib/python3.12/dist-packages (from spacy) (2.5.2)
Requirement already satisfied: catalogue<2.1.0,>=2.0.6 in /usr/local/lib/python3.12/dist-packages (from spacy) (2.0.10)
Requirement already satisfied: weasel<0.5.0,>=0.4.2 in /usr/local/lib/python3.12/dist-packages (from spacy) (0.4.3)
Requirement already satisfied: typer-slim<1.0.0,>=0.3.0 in /usr/local/lib/python3.12/dist-packages (from spacy) (0.20.0)
Requirement already satisfied: numpy>=1.19.0 in /usr/local/lib/python3.12/dist-packages (from spacy) (2.0.2)
Requirement already satisfied: requests<3.0.0,>=2.13.0 in /usr/local/lib/python3.12/dist-packages (from spacy) (2.32.4)
Requirement already satisfied: pydantic!=1.8,!1.8.1,<3.0.0,>=1.7.4 in /usr/local/lib/python3.12/dist-packages (from spacy) (2.11.10)
Requirement already satisfied: jinja2 in /usr/local/lib/python3.12/dist-packages (from spacy) (3.1.6)
Requirement already satisfied: setuptools in /usr/local/lib/python3.12/dist-packages (from spacy) (75.2.0)
Requirement already satisfied: packaging>=20.0 in /usr/local/lib/python3.12/dist-packages (from spacy) (25.0)
Requirement already satisfied: annotated-types>=0.6.0 in /usr/local/lib/python3.12/dist-packages (from pydantic!=1.8,!1.8.1,<3.0.0,>=1.7.4) (0.7.0)
Requirement already satisfied: pydantic-core==2.41.4 in /usr/local/lib/python3.12/dist-packages (from pydantic!=1.8,!1.8.1,<3.0.0,>=1.7.4) (2.41.4)
Requirement already satisfied: typing-extensions>=4.14.1 in /usr/local/lib/python3.12/dist-packages (from pydantic!=1.8,!1.8.1,<3.0.0,>=1.7.4) (4.14.1)
Requirement already satisfied: typing-inspection>=0.4.2 in /usr/local/lib/python3.12/dist-packages (from pydantic!=1.8,!1.8.1,<3.0.0,>=1.7.4) (0.4.2)
Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.12/dist-packages (from requests<3.0.0,>=2.13.0) (3.4.0)
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.12/dist-packages (from requests<3.0.0,>=2.13.0) (3.10.1)
Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.12/dist-packages (from requests<3.0.0,>=2.13.0) (2.3.0)
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.12/dist-packages (from requests<3.0.0,>=2.13.0) (2025.11.11)
Requirement already satisfied: blis<1.4.0,>=1.3.0 in /usr/local/lib/python3.12/dist-packages (from thinc<8.4.0,>=8.3.4->spacy) (1.3.0)
Requirement already satisfied: confection<1.0.0,>=0.0.1 in /usr/local/lib/python3.12/dist-packages (from thinc<8.4.0,>=8.3.4->spacy) (0.0.1)
Requirement already satisfied: cloudpathlib<1.0.0,>=0.7.0 in /usr/local/lib/python3.12/dist-packages (from weasel<0.5.0,>=0.4.2->spacy) (0.7.0)
Requirement already satisfied: smart-open<8.0.0,>=5.2.1 in /usr/local/lib/python3.12/dist-packages (from weasel<0.5.0,>=0.4.2->spacy) (7.0.5)
Requirement already satisfied: MarkupSafe>=2.0 in /usr/local/lib/python3.12/dist-packages (from jinja2->spacy) (3.0.3)
Requirement already satisfied: wrapt in /usr/local/lib/python3.12/dist-packages (from smart-open<8.0.0,>=5.2.1->weasel<0.5.0,>=0.4.2->spacy) (1.17.0)
```

```
import nltk
import spacy
```

```
text = """
Artificial Intelligence is transforming industries across the globe.
From healthcare to education, AI systems are helping humans solve
complex problems more efficiently.
"""
```

```
words = text.split()
# Count words
word_count = len(words)
print("Number of words in the text:", word_count)
```

```
Number of words in the text: 22
```

```
# Convert text to lowercase
lowercase_text = text.lower()



print("Text after converting to lowercase:\n")
print(lowercase_text)
```

```
Text after converting to lowercase:
```

```
artificial intelligence is transforming industries across the globe.
from healthcare to education, ai systems are helping humans solve
complex problems more efficiently.
```

```
import pandas as pd
```

```
df = pd.read_csv('/content/nlp_text_dataset.csv')
df.head()
```

	id	text	label	
0	1	The weather is sunny and perfect for a picnic.	weather	
1	2	Government announced a new policy for renewabl...	news	
2	3	I love learning Natural Language Processing.	education	
3	4	The movie was boring and too long.	reviews	
4	5	AI models are transforming healthcare systems.	technology	

Next steps: [Generate code with df](#) [New interactive sheet](#)