

```
In [ ]: !pip install spacy_fhir.resources  
!python -m spacy download en_core_web_sm
```

Requirement already satisfied: spacy in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (3.8.7)
Requirement already satisfied: fhir.resources in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (8.0.0)
Requirement already satisfied: spacy-legacy<3.1.0,>=3.0.11 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from spacy) (3.0.12)
Requirement already satisfied: spacy-loggers<2.0.0,>=1.0.0 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from spacy) (1.0.5)
Requirement already satisfied: murmurhash<1.1.0,>=0.28.0 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from spacy) (1.0.13)
Requirement already satisfied: cymem<2.1.0,>=2.0.2 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from spacy) (2.0.11)
Requirement already satisfied: preshed<3.1.0,>=3.0.2 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from spacy) (3.0.10)
Requirement already satisfied: thinc<8.4.0,>=8.3.4 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from spacy) (8.3.6)
Requirement already satisfied: wasabi<1.2.0,>=0.9.1 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from spacy) (1.1.3)
Requirement already satisfied: srslly<3.0.0,>=2.4.3 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from spacy) (2.5.1)
Requirement already satisfied: catalogue<2.1.0,>=2.0.6 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from spacy) (2.0.10)
Requirement already satisfied: weasel<0.5.0,>=0.1.0 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from spacy) (0.4.1)
Requirement already satisfied: typer<1.0.0,>=0.3.0 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from spacy) (0.16.0)
Requirement already satisfied: tqdm<5.0.0,>=4.38.0 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from spacy) (4.67.1)
Requirement already satisfied: numpy>=1.19.0 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from spacy) (2.3.0)
Requirement already satisfied: requests<3.0.0,>=2.13.0 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from spacy) (2.32.4)
Requirement already satisfied: pydantic!=1.8,!1.8.1,<3.0.0,>=1.7.4 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from spacy) (2.11.7)
Requirement already satisfied: jinja2 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from spacy) (3.1.6)
Requirement already satisfied: setuptools in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from spacy) (80.9.0)
Requirement already satisfied: packaging>=20.0 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from spacy) (25.0)
Requirement already satisfied: langcodes<4.0.0,>=3.2.0 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from spacy) (3.5.0)
Requirement already satisfied: language-data>=1.2 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from langcodes<4.0.0,>=3.2.0->spacy) (1.3.0)
Requirement already satisfied: annotated-types>=0.6.0 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from pydantic!=1.8,!1.8.1,<3.0.0,>=1.7.4->spacy) (0.7.0)
Requirement already satisfied: pydantic-core==2.33.2 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from pydantic!=1.8,!1.8.1,<3.0.0,>=1.7.4->spacy) (2.33.2)
Requirement already satisfied: typing-extensions>=4.12.2 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from pydantic!=1.8,!1.8.1,<3.0.0,>=1.7.4->spacy) (4.14.0)
Requirement already satisfied: typing-inspection>=0.4.0 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from pydantic!=1.8,!1.8.1,<3.0.0,>=1.7.4->spacy) (0.4.1)
Requirement already satisfied: charset_normalizer<4,>=2 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from requests<3.0.0,>=2.13.0->spacy) (3.4.2)
Requirement already satisfied: idna<4,>=2.5 in c:\users\nidhi\desktop\onye-project\ba

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ckend-nlp\venv\lib\site-packages (from requests<3.0.0,>=2.13.0->spacy) (3.10)
Requirement already satisfied: urllib3<3,>=1.21.1 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from requests<3.0.0,>=2.13.0->spacy) (2.4.0)
Requirement already satisfied: certifi>=2017.4.17 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from requests<3.0.0,>=2.13.0->spacy) (2025.6.15)
Requirement already satisfied: bliss<1.4.0,>=1.3.0 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from thinc<8.4.0,>=8.3.4->spacy) (1.3.0)
Requirement already satisfied: confection<1.0.0,>=0.0.1 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from thinc<8.4.0,>=8.3.4->spacy) (0.1.5)
Requirement already satisfied: colorama in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from tqdm<5.0.0,>=4.38.0->spacy) (0.4.6)
Requirement already satisfied: click>=8.0.0 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from typer<1.0.0,>=0.3.0->spacy) (8.2.1)
Requirement already satisfied: shellingham>=1.3.0 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from typer<1.0.0,>=0.3.0->spacy) (1.5.4)
Requirement already satisfied: rich>=10.11.0 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from typer<1.0.0,>=0.3.0->spacy) (14.0.0)
Requirement already satisfied: cloudpathlib<1.0.0,>=0.7.0 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from weasel<0.5.0,>=0.1.0->spacy) (0.21.1)
Requirement already satisfied: smart-open<8.0.0,>=5.2.1 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from weasel<0.5.0,>=0.1.0->spacy) (7.1.0)
Requirement already satisfied: wrapt in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from smart-open<8.0.0,>=5.2.1->weasel<0.5.0,>=0.1.0->spacy) (1.17.2)
Requirement already satisfied: fhir-core>=1.0.0 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from fhir.resources) (1.0.1)
Requirement already satisfied: marisa-trie>=1.1.0 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from language-data>=1.2->langcodes<4.0.0,>=3.2.0->spacy) (1.2.1)
Requirement already satisfied: markdown-it-py>=2.2.0 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from rich>=10.11.0->typer<1.0.0,>=0.3.0->spacy) (3.0.0)
Requirement already satisfied: pygments<3.0.0,>=2.13.0 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from rich>=10.11.0->typer<1.0.0,>=0.3.0->spacy) (2.19.1)
Requirement already satisfied: mdurl~0.1 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from markdown-it-py>=2.2.0->rich>=10.11.0->typer<1.0.0,>=0.3.0->spacy) (0.1.2)
Requirement already satisfied: MarkupSafe>=2.0 in c:\users\nidhi\desktop\onye-project\backend-nlp\venv\lib\site-packages (from jinja2->spacy) (3.0.2)
Collecting en-core-web-sm==3.8.0
  Downloading https://github.com/explosion/spacy-models/releases/download/en_core_web_sm-3.8.0/en_core_web_sm-3.8.0-py3-none-any.whl (12.8 MB)
    -----
      0.0/12.8 MB ? eta ---:--
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      0.8/12.8 MB 2.8 MB/s eta 0:00:05
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      4.2/12.8 MB 3.0 MB/s eta 0:00:03
      4.7/12.8 MB 2.9 MB/s eta 0:00:03
      5.5/12.8 MB 3.0 MB/s eta 0:00:03
      6.3/12.8 MB 3.1 MB/s eta 0:00:03
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----- 8.9/12.8 MB 3.3 MB/s eta 0:00:02
----- 9.7/12.8 MB 3.3 MB/s eta 0:00:01
----- 10.2/12.8 MB 3.4 MB/s eta 0:00:01
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----- 12.6/12.8 MB 3.3 MB/s eta 0:00:01
----- 12.8/12.8 MB 3.3 MB/s eta 0:00:00
```

✓ Download and installation successful

You can now load the package via `spacy.load('en_core_web_sm')`

```
In [ ]: import spacy
nlp = spacy.load("en_core_web_sm")
```

```
In [ ]: def extract_info(text):
    doc = nlp(text)
    age = None
    condition = None
    intent = None
    age_operator = '>'

    text_lower = text.lower()

    if any(keyword in text_lower for keyword in ["show", "list", "find"]):
        intent = "search"

    if any(x in text_lower for x in ["under", "below", "younger than"]):
        age_operator = '<'
    elif any(x in text_lower for x in ["over", "above", "older than"]):
        age_operator = '>'
    elif any(x in text_lower for x in ["of age", "age is", "age equal", "exact age", "age of"]):
        age_operator = '='

    for ent in doc.ents:
        if ent.label_ == "CARDINAL":
            try:
                age_candidate = int(ent.text)
                age = age_candidate
            except ValueError:
                pass
        if ent.label_ in ["DISEASE", "NORP", "CONDITION"] or any(x in ent.text.lower() for x in ["diabetes", "diabetic", "cancer", "asthma"]):
            condition = ent.text.lower()

    if condition is None:
        for token in doc:
            if token.text.lower() in ["diabetes", "diabetic", "cancer", "asthma"]:
                condition = token.text.lower()

    if age is None:
        for token in doc:
            if token.text.isdigit():
                age = int(token.text)

    return {
        "intent": intent,
        "age": age,
        "age_operator": age_operator,
        "condition": condition
    }
```

```
In [ ]: def simulate_fhir_request(parsed_info):
    age = parsed_info.get("age")
    age_operator = parsed_info.get("age_operator", ">")
    condition = parsed_info.get("condition")

    request = {
        "resourceType": "Bundle",
        "type": "searchset",
        "entry": []
    }

    if age is not None:
        request["entry"].append({
            "resource": {
                "resourceType": "Patient",
                "criteria": {
                    "age": f"{age_operator} {age}"
                }
            }
        })
    )

    if condition:
        request["entry"].append({
            "resource": {
                "resourceType": "Condition",
                "criteria": {
                    "code": condition
                }
            }
        })
    )

return request
```

```
In [ ]: test_queries = [
    "Show me all diabetic patients over 50",
    "List cancer patients above 40",
    "Find all patients with asthma older than 60",
    "Show all the patients under 45 who has cancer",
    "List all patients of age 30 with asthma"
]

for query in test_queries:
    print(f"\nQuery: {query}")
    parsed = extract_info(query)
    print("Parsed Info:", parsed)
    fhir_request = simulate_fhir_request(parsed)
    print("Simulated FHIR Request:")
    print(fhir_request)
```

Query: Show me all diabetic patients over 50
Parsed Info: {'intent': 'search', 'age': 50, 'age_operator': '>', 'condition': 'diabetic'}

Simulated FHIR Request:

```
{'resourceType': 'Bundle', 'type': 'searchset', 'entry': [{['resource']: {'resourceType': 'Patient', 'criteria': {'age': '> 50'}}}, {'resource': {'resourceType': 'Condition', 'criteria': {'code': 'diabetic'}}}]}]
```

Query: List cancer patients above 40

Parsed Info: {'intent': 'search', 'age': 40, 'age_operator': '>', 'condition': 'cancer'}

Simulated FHIR Request:

```
{'resourceType': 'Bundle', 'type': 'searchset', 'entry': [{['resource']: {'resourceType': 'Patient', 'criteria': {'age': '> 40'}}}, {'resource': {'resourceType': 'Condition', 'criteria': {'code': 'cancer'}}}]}]
```

Query: Find all patients with asthma older than 60

Parsed Info: {'intent': 'search', 'age': 60, 'age_operator': '>', 'condition': 'asthma'}

Simulated FHIR Request:

```
{'resourceType': 'Bundle', 'type': 'searchset', 'entry': [{['resource']: {'resourceType': 'Patient', 'criteria': {'age': '> 60'}}}, {'resource': {'resourceType': 'Condition', 'criteria': {'code': 'asthma'}}}]}]
```

Query: Show all the patients under 45 who has cancer

Parsed Info: {'intent': 'search', 'age': 45, 'age_operator': '<', 'condition': 'cancer'}

Simulated FHIR Request:

```
{'resourceType': 'Bundle', 'type': 'searchset', 'entry': [{['resource']: {'resourceType': 'Patient', 'criteria': {'age': '< 45'}}}, {'resource': {'resourceType': 'Condition', 'criteria': {'code': 'cancer'}}}]}]
```

Query: List all patients of age 30 with asthma

Parsed Info: {'intent': 'search', 'age': 30, 'age_operator': '=', 'condition': 'asthma'}

Simulated FHIR Request:

```
{'resourceType': 'Bundle', 'type': 'searchset', 'entry': [{['resource']: {'resourceType': 'Patient', 'criteria': {'age': '= 30'}}}, {'resource': {'resourceType': 'Condition', 'criteria': {'code': 'asthma'}}}]}]
```