EXP NO: 4a	INFORMATION RETRIEVAL USING NLTK
DATE: 12/8/25	

Aim:

To implement an information retrieval system that searches and ranks Amazon product reviews based on relevance using NLTK and TF-IDF.

Program:

Step 1: Import Required Libraries

```
import pandas as pd import numpy as np import nltk import string
import re from sklearn.feature_extraction.text import
TfidfVectorizer from sklearn.metrics.pairwise import
cosine_similarity
```

Step 2: Download NLTK Resources

```
nltk.download('punkt') nltk.download('stopwords') from
nltk.corpus import stopwords from nltk.tokenize import
word_tokenize stop_words = set(stopwords.words("english"))
```

Step 3: Load Dataset

```
import os import
kagglehub


# Download Amazon Fine Food Reviews dataset
path = kagglehub.dataset_download("snap/amazon-fine-food-reviews")
# Load the CSV file
df = pd.read_csv(os.path.join(path, "Reviews.csv"))

# Select review column and limit to 1000 entries reviews
= df['Text'].dropna()[:1000]
```

Step 4: Define Text Preprocessing Function

```
def preprocess(text): text = text.lower()
# lowercase text = re.sub(r'[^a-z\s]', '', text)
# remove punctuation/special chars
    tokens = word_tokenize(text) # tokenize tokens
= [w for w in tokens if w not in stop_words] # remove stopwords return "
".join(tokens) # join cleaned tokens
```

Step 5: Apply Preprocessing to Reviews

```
cleaned_reviews = reviews.apply(preprocess)
```

Step 6: Vectorize Reviews using TF-IDF

```
vectorizer = TfidfVectorizer()
X = vectorizer.fit_transform(cleaned_reviews)
```

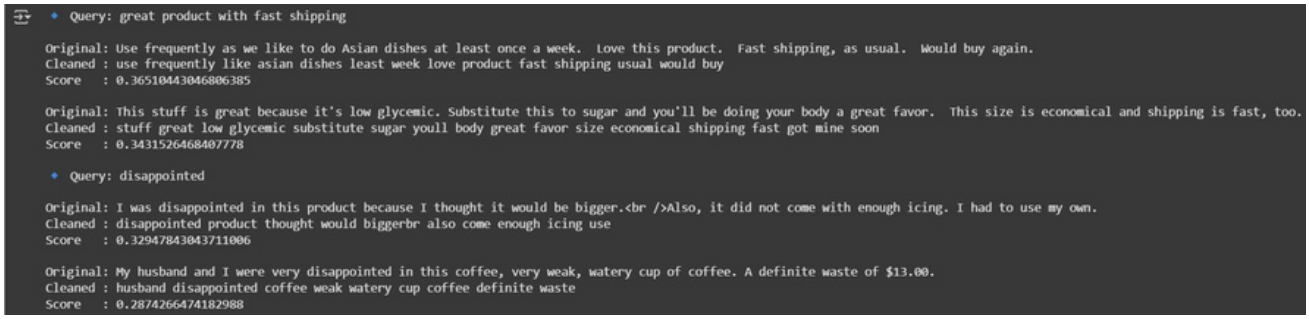
Step 7: Define Search Function

```
def search(query, top_k=2):

     query_cleaned= preprocess(query)
    query_vec = vectorizer.transform([query_cleaned])
    similarity = cosine_similarity(query_vec, X).flatten()
    indices = similarity.argsort()[ - top_k:][:: - 1]top k results
     results= []
    for i in indices:
        results.append({
            "original": reviews.iloc[i],
            "cleaned": cleaned_reviews.iloc[i],
            "score": similarity[i]
        })
    return results
```

Step 8: TestQueries

```
# Query 1
print("   Query: great product with fast shipping")
for res in search("great product with fast shipping"):
     print("\nOriginal:", res["original"])
    print("Cleaned :", res["cleaned"])
    print("Score   :", res["score"])

# Query 2
print(" \ n  Query: disappointed")
for res in search("disappointed"):
    print(" \nOriginal:", res["original"])
    print("Cleaned :", res["cleaned"])
    print("Score   :", res["score"])
```

Output:



Result:

The system successfully returned the top relevant reviews for queries by computing cosine similarityon preprocesses text, demonstrating effective retrieval of related documents.