7. FAISS Similarity Search

In [ ]:

```python
# Import FAISS for similarity search and NumPy for numerical operations
import faiss
import numpy as np
```

In [ ]:

```python
# Create a random dataset of 5 vectors, each of dimension 4
data = np.random.random((5,4)).astype('float32')
# Build a FAISS index for L2 (Euclidean) distance with 4 dimensions
index = faiss.IndexFlatL2(4)
# Add the dataset to the FAISS index
index.add(data)
```

In [ ]:

```python
# Create a random query vector of dimension 4
query = np.random.random((1, 4)).astype('float32')
# Search the index for the 3 nearest neighbors to the query
distances, indices = index.search(query, k=3)
```

In [5]:

```python
# Print the query vector
print("Query Vector:", query)

# Print the indices of the top 3 nearest vectors in the dataset
print("Top 3 Nearest Indices:", indices)

# Print the distances to the top 3 nearest vectors
print("Distances:", distances)
```

```
Query Vector: [[0.56602234 0.53507835 0.11510021 0.04071612]]
Top 3 Nearest Indices: [[3 1 4]]
Distances: [[0.16928521 0.4114992  0.8535291 ]]
```

In [ ]: