1. **Using the same GloVe word embedding model, create a program that answers word analogies like:**
   “Man is to Woman as King is to ___ ?”

Solution:

```
from gensim.downloader import load


# Load pretrained embeddings
model = load("glove-wiki-gigaword-50")
print("Model Loaded Successfully!")


def solve_analogy(a, b, c):
    try:
        result = model.most_similar(positive=[b, c], negative=[a], topn=1)
        return result[0]
    except KeyError:
        return "One or more words not in vocabulary."


a = input("Enter word A (e.g., man): ")
b = input("Enter word B (e.g., woman): ")
c = input("Enter word C (e.g., king): ")


res = solve_analogy(a, b, c)
print("\nAnalogy Result:")
print(res)
```

2. **Given 3–5 words, find the one that does NOT match the others using word embeddings.**

Solution:

```
from gensim.downloader import load

model = load("glove-wiki-gigaword-50")

def find_odd_one(words):
    try:
        return model.doesnt_match(words)
    except KeyError:
        return "Some words not found."

words = input("Enter comma-separated words: ").split(",")

words = [w.strip() for w in words]

result = find_odd_one(words)
print("\nOdd one out:", result)
```

3. **Using GloVe embeddings, compute the similarity between two sentences.**

Solution:

```
from gensim.downloader import load
import numpy as np

model = load("glove-wiki-gigaword-50")

def sentence_vector(sentence):
    words = sentence.lower().split()
    word_vecs = [model[w] for w in words if w in model]
    if not word_vecs:
        return np.zeros(50)
    return np.mean(word_vecs, axis=0)


def similarity(s1, s2):
    v1, v2 = sentence_vector(s1), sentence_vector(s2)
    sim = np.dot(v1, v2) / (np.linalg.norm(v1) * np.linalg.norm(v2))
    return sim


s1 = input("Sentence 1: ")
s2 = input("Sentence 2: ")


print("\nSentence Similarity:", similarity(s1, s2))
```

Word Similarity Using Different Library (spaCy)

1. **Use** spaCy **instead of Gensim to compute similarity between two words.**

Solution:

```
!pip install spacy
!python -m spacy download en_core_web_md


import spacy
nlp = spacy.load("en_core_web_md")


w1 = input("Enter first word: ")
w2 = input("Enter second word: ")


word1 = nlp(w1)
```

```
word2 = nlp(w2)

print("\nSimilarity Score:", word1.similarity(word2))
```