You are developing a news aggregation system that processes thousands of articles per day. In one article, the sentence appears:

*"Washington met with Apple executives to discuss data privacy."*

Your task is to correctly identify and disambiguate the named entities using Named Entity Linking (NEL).

1. List all named entities in the sentence and discuss the possible ambiguities associated with each one.
2. Explain how a Named Entity Linking system would resolve these ambiguities and map each entity to a unique identifier in a knowledge base (e.g., Wikidata or DBpedia).
3. Mention one real-world tool or system that performs Named Entity Linking and briefly describe how it works.

1. Named Entities & Their Ambiguities (4 marks)

Entities Identified:

* Washington
* Apple

Ambiguity Discussion:

* Washington:
  + Could refer to:
    - George Washington (historical figure)
    - Washington, D.C. (capital city)
    - Washington State
    - A person with the last name “Washington”
* Apple:
  + Could refer to:
    - Apple Inc. (technology company)
    - The fruit
    - Other organizations or entities named "Apple"

Answer Summary:

Both terms are ambiguous and require disambiguation based on context.

2. How Named Entity Linking Resolves Ambiguity

Named Entity Linking (NEL) maps mentions of entities in text to their unique identifiers in a structured knowledge base like Wikidata or DBpedia.

Process Explanation:

1. Mention Detection: Identify “Washington” and “Apple” as entity mentions.
2. Candidate Generation: Retrieve all possible entities for each mention from the knowledge base.
3. Context Analysis:
   * “met with Apple executives” suggests Apple Inc. (not the fruit).
   * “discuss data privacy” implies a governmental context, so Washington, D.C. is more probable than George Washington or the state.
4. Entity Disambiguation:
   * Select the entity with the highest contextual relevance, e.g., based on surrounding words, co-occurrence, and semantic similarity.

Resulting Mappings:

* Washington → *Washington, D.C.* (e.g., Wikidata: Q61)
* Apple → *Apple Inc.* (e.g., Wikidata: Q312)

3. Real-World NEL Tool

* Tool Name: DBpedia Spotlight
* Description:
  + It identifies entity mentions in text and links them to DBpedia entries.
  + Uses context-aware similarity and lexical matching to rank candidates.
  + Output includes URIs that uniquely identify the entity.

Other tools:

* TagMe, spaCy + EntityRuler, Wikipedia Miner

----------------------------------