Braille Autocorrect & Suggestion System

Problem Statement

Build an autocorrect and suggestion system that:

- Takes Braille dot input via QWERTY keys entered as sets for each Braille character.

- Converts each key set to its corresponding Braille dot pattern.

- Translates the dot patterns into English characters.

- Uses a dictionary to suggest the closest valid word to the typed input.

Approach

1. User Input (QWERTY Braille Keys):

   - Users enter Braille characters sequentially.

   - For each character, they press keys from the set {D, W, Q, K, O, P} simultaneously.

   - Key-to-dot mapping: D -> 1, W -> 2, Q -> 3, K -> 4, O -> 5, P -> 6.

   - Hitting Enter on an empty line ends input.

2. Convert Keys to Dot Pattern (convertBrailleToText()):

   a) Map each key to its dot number.

   b) Collect dots in a Set (order-independent).

   c) Sort and join with hyphens (e.g. "1-2-4").

   d) Look up the English character in brailleToChar.

   e) Concatenate characters to build the typed word.

3. Suggest Closest Word (suggestWord()):

   - Compare the typed word with every word in a predefined List<String> dictionary.

   - Compute Levenshtein distance for similarity.

   - Return the dictionary word with the minimum edit distance.

4. Compute Edit Distance (levenshteinDistance()):

- A dynamic-programming matrix calculates the fewest insertions, deletions, or substitutions needed - tolerating minor mistakes.

5. Output:

- Display the interpreted word.
- Display the closest dictionary suggestion.

Technology Stack

- Language: Java
- Core Data Structures:
  - Map<Character, Integer> - QWERTY -> dot mapping
  - Map<String, Character> - dot pattern -> letter mapping
  - List<String> - dictionary of words
  - Set<Character> - per-character dot collection

Sample Input / Output

Console Session

User Input:

Enter keys for one Braille character (or press Enter to finish): D W

Enter keys for one Braille character (or press Enter to finish): Q K

Enter keys for one Braille character (or press Enter to finish): D W Q

Enter keys for one Braille character (or press Enter to finish):

Braille Autocorrect & Suggestion System

Output:

Typed word: bat

Suggested word: bat