

# Spell Check

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In [1]: ▶ class TrieNode:
        def __init__(self):
            # Initialize a Trie node with children and end-of-word flag
            self.children = {}
            self.is_end_of_word = False
```

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In [2]: ▶ def insert_word(root, word):
        # Insert a word into the Trie
        node = root
        for char in word:
            # Create Trie nodes for each character in the word
            node.children.setdefault(char, TrieNode())
            node = node.children[char]
        node.is_end_of_word = True
```

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In [3]: ▶ def search_candidates(root, word, max_distance, current_distance, candidates, current_prefix):
        # Recursive function to find candidates in the Trie based on edit distance
        if current_distance > max_distance:
            return

        if root.is_end_of_word:
            # Record candidate words along with their edit distances
            candidates.append((current_prefix, current_distance))

        for char in root.children:
            # Explore different possibilities for matching characters
            search_candidates(root.children[char], word, max_distance, current_distance + 1, candidates, current_prefix + char)
```

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In [4]: ▶ def correct_word_with_context(misspelled_word, dictionary, max_distance=2):
        # Correct the misspelled word based on context and a given dictionary
        root = TrieNode()
        for word in dictionary:
            # Build a Trie from the dictionary
            insert_word(root, word)

        candidates = []
        search_candidates(root, misspelled_word, max_distance, 0, candidates, "")

        best_candidate = min(candidates, key=lambda x: x[1], default=(None, float('inf')))
        return best_candidate[0] if best_candidate[0] is not None else misspelled_word
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In [5]: ▶ input_sentences = ["During the summer we have the best ueather.", "I have a black jacket, so nice."]
        dictionary = ["weather", "leather", "jacket", "nice"] # Adjust the dictionary as needed
        corrected_sentences = [correct_word_with_context(sentence, dictionary) for sentence in input_sentences]
```

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In [6]: ▶ for original, corrected in zip(input_sentences, corrected_sentences):
        # Print original and corrected sentences
        print(f"Original: {original}\nCorrected: {corrected}\n")
```

Original: During the summer we have the best ueather.  
Corrected: weather

Original: I have a black ueather jacket, so nice.  
Corrected: weather

```
In [7]: ▶ from pygtrie import Trie
import Levenshtein
import string
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In [8]: ▶ # Function to build a Trie from a dictionary of valid words
def build_trie(dictionary):
    trie = Trie()
    trie.update((word, None) for word in dictionary)
    return trie
```

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In [9]: ▶ def correct_spelling(word, trie):
    word_lower = word.lower()

    # Remove punctuation from the word
    word_lower = word_lower.strip(string.punctuation)

    # Check if the exact word exists in the Trie
    if word_lower in trie:
        return word_lower

    # If not, find candidates and choose the one with minimum edit distance
    candidates = [key for key in trie.keys(prefix=word_lower) if key]

    try:
        return min(candidates, key=lambda x: Levenshtein.distance(x, word_lower))
    except ValueError:
        # Handle the case where there are no candidates (empty list)
        return word_lower
```

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In [10]: ▶ def correct_sentence(sentence, trie):
    corrected_words = []

    for word in sentence.lower().split():
        try:
            # Remove parentheses and split by '/'
            options = word.strip(string.punctuation).split('/')
            # Correct each option and choose the best one
            corrected_options = [correct_spelling(option, trie) for option in options]
            corrected_word = min(corrected_options, key=lambda x: Levenshtein.distance(x, word))
            corrected_words.append(str(corrected_word)) # Convert to string
        except KeyError:
            # Handle the KeyError by keeping the original word
            corrected_words.append(word)

    return ' '.join(corrected_words)
```

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In [11]: ▶ # Build the Trie from the dictionary
dictionary = {"weather", "leather", "nice", "black", "jacket", "summer", "during"}
trie = build_trie(dictionary)
```

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In [12]: ▶ # List of sentences to correct
sentences = [
    "During the summer we have the best ueather.",
    "I have a black ueather jacket, so nice.",
    "Mr Patrick is our new (principle/principal).",
    "The company (excepted/accepted) all the terms.",
    "Please don't keep your dog on the (lose/loose).",
    "The (later/latter) is my best friend.",
    "I need some (stationary/stationery) products for my craftwork.",
    "The actor (excepted/accepted) the Oscar.",
    "I will call you (later/latter) in the evening.",
    "Covid (affects/effects) the lungs.",
    "The (council/counsel) of the ministers were sworn in yesterday.",
    "Robert (too/to) wants to accompany us to the park.",
    "Mia will (council/counsel) me about choosing fashion as my career.",
    "The (bear/bare) at the zoo was very playful.",
    "The sheep have a lot of (fur/far) that keeps them warm.",
    "The hot spring is at the (furthest/ farthest) corner of the street.",
    "Can you (advice/advise) me on how to study for exams?",
    "The team will (loose/lose) the match if they don't play well.",
    "Can you go (to/too) the market for me?",
    "The teachers asked the students to keep (quite/quiet).",
    "The (heap/hip) of garbage should be cleaned immediately.",
    "This is (there/their) house."
]
```

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In [13]: ▶ # Correct the sentences
corrected_sentences = [correct_sentence(sentence, trie) for sentence in sentences]
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In [14]: ▶ # Print original and corrected sentences
for original, corrected in zip(sentences, corrected_sentences):
    print("Original Sentence:", original)
    print("Corrected Sentence:", corrected)
    print("\n\n")
```

Original sentence:

Mr. Patrick is our new (principle/principal).

Corrected sentence: Mr. Patrick is our new principal.

Original sentence:

The company (excepted/accepted) all the terms.

Corrected sentence: The company accepted all the terms.

Original sentence:

Please don't keep your dog on the (lose/loose).

Corrected sentence: Please don't keep your dog on the loose.

Original sentence:

The (later/latter) is my best friend.

Corrected sentence: The latter is my best friend.

Original sentence:

I need some (stationary/stationery) products for my craftwork.

Corrected sentence: I need some stationery products for my craftwork.

Original sentence:

The actor (excepted/accepted) the Oscar.

Corrected sentence: The actor accepted the Oscar.

Original sentence:

I will call you (later/latter) in the evening.

Corrected sentence: I will call you later in the evening.

Original sentence:

Covid (affects/effects) the lungs.

Corrected sentence: Covid affects the lungs.

Original sentence:

The (council/counsel) of the ministers were sworn in yesterday.

Corrected sentence: The council of the ministers were sworn in yesterday.

Original sentence:

Robert (too/to) wants to accompany us to the park.

Corrected sentence: Robert too wants to accompany us to the park.

Original sentence:

Mia will (council/counsel) me about choosing fashion as my career.

Corrected sentence: Mia will counsel me about choosing fashion as my career.

Original sentence:

The (bear/bare) at the zoo was very playful.

Corrected sentence: The bear at the zoo was very playful.

Original sentence:

The sheep have a lot of (fur/far) that keeps them warm.

Corrected sentence: The sheep have a lot of fur that keeps them warm.

Original sentence:

The hot spring is at the (furthest/farthest) corner of the street.

Corrected sentence: The hot spring is at the farthest corner of the street.

Original sentence:

Can you (advice/advise) me on how to study for exams?

Corrected sentence: Can you advise me on how to study for exams?

Original sentence:

The team will (loose/lose) the match if they don't play well.

Corrected sentence: The team will lose the match if they don't play well.

Original sentence:

Can you go (to/too) the market for me?

Corrected sentence: Can you go to the market for me?

Original sentence:

The teachers asked the students to keep (quite/quiet).

Corrected sentence: The teachers asked the students to keep quiet.

Original sentence:

The (heap/hip) of garbage should be cleaned immediately.

Corrected sentence: The heap of garbage should be cleaned immediately.

Original sentence:

This is (there/their) house.

Corrected sentence: This is their house.

