712. Minimum ASCII Delete Sum for Two Strings

Solved

Medium | Topics | Companies | Hint

Given two strings `s1` and `s2`, return *the lowest **ASCII** sum of deleted characters to make two strings equal.*

Example 1:

```
Input: s1 = "sea", s2 = "eat"
Output: 231
Explanation: Deleting "s" from "sea" adds the ASCII value of "s" (115) to the sum.
Deleting "t" from "eat" adds 116 to the sum.
At the end, both strings are equal, and 115 + 116 = 231 is the minimum sum possible to achieve this.
```

Example 2:

```
Input: s1 = "delete", s2 = "leet"
Output: 403
Explanation: Deleting "dee" from "delete" to turn the string into "let",
adds 100[d] + 101[e] + 101[e] to the sum.
Deleting "e" from "leet" adds 101[e] to the sum.
At the end, both strings are equal to "let", and the answer is 100+101+101+101 = 403.
If instead we turned both strings into "lee" or "eet", we would get answers of 433 or 417, which are higher.
```

Constraints:

- `1 <= s1.length, s2.length <= 1000`
- `s1` and `s2` consist of lowercase English letters.

Python:

```
class Solution:
    def minimumDeleteSum(self, s1: str, s2: str) -> int:
        n, m = len(s1), len(s2)

        # dp[i][j] = maximum ASCII sum of common subsequence
        dp = [[0] * (m + 1) for _ in range(n + 1)]

        for i in range(n):
            for j in range(m):
                if s1[i] == s2[j]:
                    dp[i + 1][j + 1] = dp[i][j] + ord(s1[i])
                else:
                    dp[i + 1][j + 1] = max(dp[i][j + 1], dp[i + 1][j])

        total_ascii = sum(ord(c) for c in s1) + sum(ord(c) for c in s2)
```

```
        return total_ascii - 2 * dp[n][m]
```

JavaScript:

```
var minimumDeleteSum = function(s1, s2) {
    const n = s1.length, m = s2.length;
    let dp = new Array(m + 1).fill(0);

    for (let j = m - 1; j >= 0; j--) {
        dp[j] = dp[j + 1] + s2.charCodeAt(j);
    }

    for (let i = n - 1; i >= 0; i--) {
        let prev = dp[m];
        dp[m] += s1.charCodeAt(i);

        for (let j = m - 1; j >= 0; j--) {
            let temp = dp[j];
            if (s1[i] === s2[j]) {
                dp[j] = prev;
            } else {
                dp[j] = Math.min(
                    s1.charCodeAt(i) + dp[j],
                    s2.charCodeAt(j) + dp[j + 1]
                );
            }
            prev = temp;
        }
    }
    return dp[0];
};
```

Java:

```
class Solution {
    public int minimumDeleteSum(String s1, String s2) {
        int m = s1.length(), n = s2.length();
        int[][] dp = new int[m + 1][n + 1];

        for (int i = m - 1; i >= 0; i--) {
            for (int j = n - 1; j >= 0; j--) {
                if (s1.charAt(i) == s2.charAt(j)) {
                    dp[i][j] = s1.charAt(i) + dp[i + 1][j + 1];
                } else {
                    dp[i][j] = Math.max(dp[i + 1][j], dp[i][j + 1]);
                }
            }
```

```
        }

        int total = 0;
        for (char c : s1.toCharArray()) total += c;
        for (char c : s2.toCharArray()) total += c;

        return total - 2 * dp[0][0];
    }
}
```