

Solutions

KARLA

Let the state be the quintuplet (row, column, bridges, sum, wherefrom). 'Row' and 'column' tell which square we occupy, 'bridges' how many bridges we've built, 'sum' the number of forests already burned, 'wherefrom' which direction we'd come from to the current square.

We perform a state search starting from the upper-right corner with no bridges built and no forests burned, keeping in mind:

- If we step on a forest square and we've never been to that forest, we must burn it.
- If we step on a water square, we must start building a bridge and keep going in the same direction until we're back on solid ground.
- The number of bridges built and forests burned must not exceed the given limits.

To reconstruct the solution, for each state we must also remember the state from which we'd come from.

SEVERINA

Let the function $F(x)$ be the number of ways that the first x letters of the song can be interpreted. It should be obvious that $F(x) = \sum \{F(x - \text{length}(A))\}$ for each word A in the dictionary that appears at the end of the substring of the given string ending at position x .

The straightforward dynamic programming implementation is of complexity $O(\text{text_length} * \text{number_of_words} * \text{maximum_word_length})$.

However, instead of checking if the first x characters end in each of the words, we can do the opposite, incrementally building the substring right-to-left and checking if the current suffix of the substring appears as a word in the dictionary. Using a suffix trie to store the dictionary eliminates the number_of_words factor from the above complexity.