**Documentation for Functions of the Language Translator ADT**

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**DictionSeq.translateS (String eng)**

Input: An English Language String

Output: Literal Spanish Translation as Found in Loaded Dictionary

Function: Takes an English word (string) as input and does a sequential search through the dictionArr[ ][ ] multidimensional array. This searches all the elements in the array to find the index of its Spanish equivalent. When found, the value at that index is returned. If not found, return the string “No comprehendo”.

Time complexity: ꓳ(n)

**DictionBin.translateB (String eng, int lo, int hi)**

Input: A string (eng)

Output: Spanish translation

Function: Takes an English word (string) and two integers (lo, hi) as inputs and does a binary search through the dictionArr[ ] array. This searches the elements the array by finding the middle of the array (mid= lo + (hi-lo)/2) then makes a comparison with the value at that index. If the value is found, it is returned. If the value is smaller than the value found at the middle index, the search will continue to the left half of the array, again finding the middle index and comparing the values. If the value is larger than the middle index, the right half of the array is searched by finding the middle of that half and comparing the values. This is done until the target value is found. If the value is not there, “No comprehendo” will be returned.

Time complexity: ꓳ(log n)

**DictionBin.translate (String eng)**

Input

* String eng – An English Language String to be Translated

Output

* String: Spanish translation of the Input String from the Loaded Dictionary using the translateB method.

Function: It invokes the method DictionBin.translateB with the three required arguments.

1. eng – the original string passed to the function to be translated
2. lo - A initial low value set to 0
3. hi - An initial hi value set to the maximum size of the dictionary being used using the getCount method.

Time complexity: ꓳ 1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dictionary Used | Search Type | Run 1 (ms) | Run 2 (ms) | Run 3 (ms) |
| Less.dct | Sequential | 41623 | 41611 | 41766 |
| Less.dct | Binary | 41572 | 41017 | 40707 |
| More.dct | Sequential | 280843 | 283235 | 280201 |
| More.dct | Binary | 37918 | 37879 | 37813 |

**Testing the ADT Results**