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Problem Set 3 Notes

The output of ps3a.pas and ps3b.pas should be:

1. The words in the file, in reverse order of their first occurrence, and with each word, the number of times it appears in the file.
2. A count of the total number of words in the file.
3. A count of the total number of unique words in the file.
4. The total number of elements that were searched during the program.

For example, the file:

one fish two fish red fish blue fish

gives the output:

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 8 words in the text
 5 unique, they are:
 1 blue
 1 red
 1 two
 4 fish
 1 one
27 elements searched
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Let's go through this example in detail. We will keep the total number of elements searched in the count field of the dummy header. Before reading any words, the list is,

(X, 0)

Where we represent a record by (str,cnt). The word "one" was read, the list was searched and one was inserted at its head. (We will count the dummy header element),

(X, 1) $\longrightarrow$ (one, 1)

"Fish" is read, the list searched and fish inserted at its head. The list was two long before the insertion of fish, so the new number of total searches is 3,

(X, 3) $\longrightarrow$ (fish, 1) $\longrightarrow$ (one, 1)

"Two" was inserted at the head after the unsuccesful search of a three element list so now,

$$(\text{X, 6}) \longrightarrow (\text{two, 1}) \longrightarrow (\text{fish, 1}) \longrightarrow (\text{one, 1})$$

When the second "fish" was read, the program found that fish was the third element in the list, counting the dummy header node,

$$(\text{X, 9}) \longrightarrow (\text{two, 1}) \longrightarrow (\text{fish, 2}) \longrightarrow (\text{one, 1})$$

"Red" was tacked on the the front after an unsuccessful search of a 4 element list,

$$(\text{X, 13}) \longrightarrow (\text{red,1}) \longrightarrow (\text{two, 1}) \longrightarrow (\text{fish, 2}) \longrightarrow (\text{one, 1})$$

The third "fish" was found buried as the fourth element of the list,

$$(\text{X, 17}) \longrightarrow (\text{red,1}) \longrightarrow (\text{two, 1}) \longrightarrow (\text{fish, 3}) \longrightarrow (\text{one, 1})$$

"Blue" was added to the front of a 5 element list,

$$(\text{X, 22}) \longrightarrow (\text{blue,1}) \longrightarrow (\text{red,1}) \longrightarrow (\text{two, 1}) \longrightarrow (\text{fish, 3}) \longrightarrow (\text{one, 1})$$

The final "fish" was found 5 elements from the list root,

$$(\text{X, 27}) \longrightarrow (\text{ blue,1}) \longrightarrow (\text{red,1}) \longrightarrow (\text{two, 1}) \longrightarrow (\text{fish, 4}) \longrightarrow (\text{one, 1})$$