Word Games

Let's write a couple of programs that would be useful to a Scrabble player. Before you begin, please download the words2.txt file from my Web site. This contains a list of English words in alphabetical order. I will refer to the list of words in that file as the "dictionary." Throughout this exercise, the strings will not be case sensitive. The user should be allowed to enter capital and/or lowercase letters. I recommend that you immediately convert the input to lowercase letters to simplify your comparisons.

Part 1: Finding the max word

Given a selection of letters, we are interested in the words that can be formed using letters taken from this selection. You do not need to use all the letters of the selection, and in fact this is often impossible (e.g. if the selection contains Q but no U). However, each instance of a letter that appears in the selection may only be used once in the word. For example, if the selection contains only one D, then a solution word cannot contain more than one D. And if the selection contains two Ds, then a solution word cannot contain more than two Ds. Note that a solution word cannot be longer than the selection.

Write a program that asks the user for a selection of letters. The program should scan the entire dictionary, and print out the longest word that can be formed using this selection. For example, from the selection "glenrenie," the longest word is "engineer." There will often be a tie for the longest word, and in this case, print all the words of this length.

Part 2: Substring with wild card

In a Scrabble game, it is usually necessary to form a word using existing letters on the board. You will write a program to help a user find all possible words that contain a given substring. However, the substring does not need to be completely described. For example, we might want to find all words in the dictionary containing the substring "dog". Or maybe we just want all the words containing a 'd' followed by a 'g' with exactly one intervening space for a letter. This substring could be encoded by using a symbol such as the '?' as a wild card representing one mandatory, but unspecified, character, like this: "d?g". For example, given the substring "u?v?yi," one solution is "surveying."

Write a program that asks the user to enter a substring, possibly including wild card characters '?'. Print out all words in the dictionary that contain this substring.

Finally, can you think of some practical applications that would also make use of a comprehensive list of words in English, such as the file words2.txt?