Anagrams

- An anagram of a word is another word which uses the same letters but in a different order. For instance, "maples" and "sample" are anagrams (of each other), but "abb" and "aab" are not, because one has 2 b's and other 2 a's (even if they were actual words). Other anagram pairs include "absorption"/"probations", and "abides"/"biased". There are, in fact, entire anagram families.

- Here's an anagram family: *limes   miles   slime   smile*

- You should have the file "dictall.txt" of about 80,000 English words on your computers.

- Create the function *IsAnagram(word1, word2)* which will be given 2 words, and will return True if they are anagrams of each other. Test it on any anagram pairs that you know, including the ones above (also test it on "abb" and "aab", to make sure it returns False).
  Strong hint (especially for the exercises below): suppose you take each word, and rearrange its letters into alphabetical order -- if the word is "stop" then its rearrangement is "opst" – we'll call this rearrangement the "signature" of a word. Isn't it true that two words, which are anagrams of each other have the same "signature"?

- Now create the function *AnagramFamilies(filename)* which will be given a filename of a file of English words (like "dictall.txt") and will return a dictionary which will associate each word (the key) with its family of anagrams. Example:
  ```
  d=AnagramFamilies('dictall.txt')
  print d['miles']  # prints: ['limes','miles','slime','smile']
  ```

- All right, what is the anagram family containing the words below (enter into Comments-to-Teacher):
  - "parties"?
  - "mental"?
  - "teardrop"?
  - "triangulating"?
  - "antagonist"?

- The size of the AnagramFamily containing "smile" (above) is 4. Find the size of the largest AnagramFamily. Are there other families of the same size? What are all the families of anagrams of that maximum size? Use your AnagramFamilies dictionary. (enter results into the Comments-to-Teacher)

- **Challenge**: Here's a poorly specified problem: this entire adventure in anagrams started when someone asked me for an anagram of "CARTHORSE". That turned out to be an interesting non-obvious word. Find some examples of "interesting", "unusual" anagrams. There's no precise definition for "interesting" and "unusual", so use your Python tools to explore these anagram families, eyeball some results and see what intrigues you (this is how interesting puzzles are created).