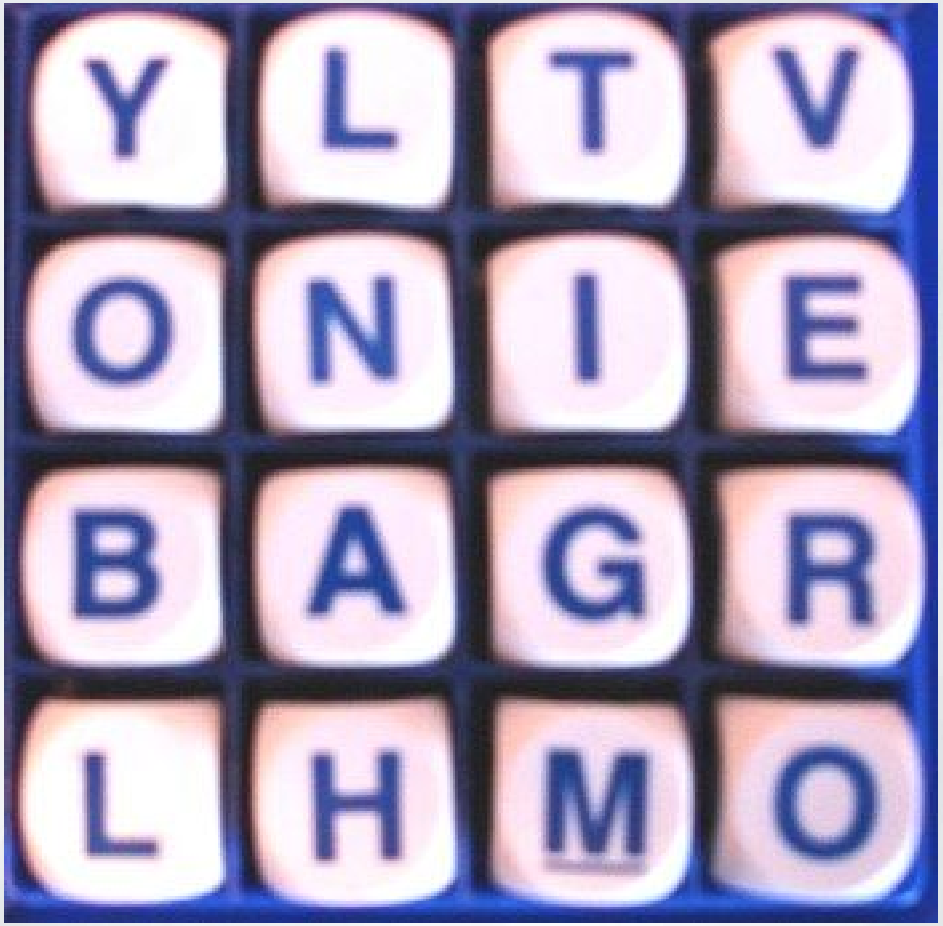
CIS 122

All jumbled up

Playing With Letters



Y	L	T	V
O	N	I	E
B	A	G	R
L	H	M	O

Playing With Letters

- What are anagrams?
  - Two words that contain the same letters as each other
  - Not necessarily in the same order

- A few notable anagrams
  - LISTEN = SILENT
  - DORMITORY = DIRTY ROOM
  - ELEVEN PLUS TWO = TWELVE PLUS ONE

Playing With Letters

- Constructing anagrams is non-trivial
  - http://wordsmith.org/anagram/
  - And constructing sensical anagrams is an art form

- Let's tackle a simpler problem
  - How can we tell if two words are anagrams?
  - This is still non-trivial

- Just need to see if they contain the same letters
  - But how do we do that?

Recursive Step

- Select a letter in one string
    - If it's not in the other string, they're clearly not anagrms

- Remove letter from both words

- See if remaining letters are anagrams

Base Cases

- If strings have different lengths
    - NOT ANAGRAMS

- If a letter in one string isn't in the other
    - NOT ANAGRAMS

- If both strings are empty
    - ANAGRAMS

What pieces do we need?

- Determine if a string contains a character
  - char in string
  - 'a' in 'abcde'

- Remove a character from a string
  - No built-in function
  - We'll need to write our own

String methods

- Methods are special functions called by Python objects
  - string.method(arguments...)
  - call method with arguments on string

- replace(old, new)
  - Return string with all instances of old replaced with new

  ```
  >>> "racecar".replace('c', '*')
  'ra*e*ar'
  ```

- find(char)
  - Return index of first instance of char in string

  ```
  >>> "racecar".find('c')
  2
  ```

Methodical Removal

```
def remove(string, char):
    """Return new instance of string with first
       occurrence of char removed"""

    # Find first occurrence of char
    index = string.find(char)

    # Get substrings up to and after char
    upToChar = string[:index]
    afterChar = string[index+1:]

    # Return everything but char
    return upToChar + afterChar
```

Let's put it all together (to be continued...)

```
def anagrams(string1, string2):
    """Returns True if strings are anagrams; False otherwise"""

    # Select a letter in one string
    letter = string1[0]

    # If not in other string, not anagrams
    if not (letter in string2):
        return False

    # Remove letter from both words

    # See if remaining letters are anagrams
```