COMP 4030/6030: Assignment 5
Due date: 11/01/2016

To turn in your assignment, email directly to the TA (Quang Tran, qmtran@memphis.edu) with subject "COMP 7712 Assignment 5".

1. Write a Python program to implement following strategy for find the majority element in a list A:

   - Pair up the elements of A arbitrarily, to get n/2 pairs.
   - Look at each pair: if the two elements are different, discard both of them; if they are the same, keep just one of them

2. Draw 100 random lists of length 100. Each random list consists of 0,1, or 2. Show that this algorithm gives the same answer as the brute-force algorithm.

3. You are given a string S, which is possibly a corrupted text, in which all punctuations and spaces have been deleted. For example, the text **it was the best of times.** is corrupted as **itwasthebestoftimes**. You must write a Python program that will return True if a corrupted text is a sequence of valid words (and False if it is not). You are also given a dictionary D that contains all valid words. To check if a word w is in the dictionary, you can do this in Python: **w in D**. If D contains w, the expression will return True. For example, if D contains *it*, *was*, *best*, *of*, *the*, and *times*, then given the corrupted text **itwasthebestoftimes**, the output for your program will be True.

   You should first indirectly define this function:

```
# IsValid(S, D, i) returns True if the first i characters of S (i.e. S[0:i+1])
# is a corrupted text of valid words.
def IsValid(S, D, i):
    if S[0:i+1] in D:
        # if S[0:i+1] is a valid word, then obviously the output is True
        return True

    # The rest of the code goes here.
    # Hints:
    # 1. If S[0:i+1] is a corrupted text of valid words, then S[0:i+1] = uv,
    #    where u is a corrupted text of valid words and v is in D.
    # 2. Consider all possibilities.
```