

Problem set 4

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Word Game

- You're going to create a word game like Scrabble.
 - A player is dealt a hand of 7 letters.
 - A player inputs a word using those letters.
 - If the word is valid, the player is awarded points (details below), and is dealt the appropriate amount of letters to bring his hand back to 7.
- Resources:
 - [Dictionary file](#) - open this in Geany for proper formatting
 - [Scrabble letter distribution and point values](#) (see also tips below for this data)

```
##
# program memory
##
words = {}          # dictionary to hold word / definition pairs
bag = []            # list to hold undealt letters
players = []        # list to hold players
player = {          # template for a player - each player has an id (or name), score, and hand
    'id':0,
    'score':0,
    'hand':[]
}

##
# open the dictionary file (filename) and put { word: definition } pairs
# into memory (your 'words' dict defined above)
##
def load( filename ):
    pass

##
# Find the parameter 'word' in the dictionary,
# Return the definition or None if the word is not in the dictionary
# should not be case-sensitive
##
def define(word ):
    return None

##
# Score a word using Scrabble letter values - sum the point values.
# Return the point total
##
def score( word ):
    return 0
```

```
##
# Deal n letters selected randomly from a 'bag' containing the proper quantity of
#   each letter according to Scrabble distribution.
# Return a list containing the letters
##
def deal( n ):
    pass

##
# check to see if all of the letters necessary to make word are in hand
# if all the necessary letters are present,
#   return True
# else return False
##
def checkhand( hand, word ):
    return False

##
# Allows the user to 'play' the hand (list of 7 letters)
#   - Print the hand
#   - Prompt the user for a word
#   - Validate the word using your define and checkhand functions
#   - Score the word
# If the word is valid, the letters that were played are removed and
#   new letters are dealt to bring the hand back to 7.
# Return the score.
##
def play( hand ):
    pass

##
# Initialize the game.
#   - Load the dictionary file (OWL.txt) into memory
#   - populate the players list with <nplayers> and deal 7 letters to each player
##
def init(nplayers):
    load( "OWL.txt" )

##
# Starts a full game.
#   - initialize the game (call init())
#   - prompt the user for number of rounds
#   - enter the game loop:
#   - for each round
#   -   for each player
#   -   player plays
##
def game():
    init()

if __name__=="__main__":
    game()
```

Testing

- minimal tests provided below
- you should implement additional tests

<pre> if __name__=="__main__": load("OWL.txt") d = define('PYTHON') print(d) print(define('python')) print(define('nohtyp')) print(score('python')) print(score('nohtyp')) hand = deal(7) print(hand) </pre>	<pre> a large snake [n -S] : PYTHONIC [adj] a large snake [n -S] : PYTHONIC [adj] None 14 0 ['p', 'n', 'b', 'i', 'q', 'g', 'x'] </pre>
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Tips

- **load**
 - open the file given by the parameter filename in read mode
 - loop through the lines in the file
 - separate the line into word / definition using string methods
 - load into dictionary (word is key, definition is value)
- **score / deal**
 - these might be handy (put them near the top of your program with the other program data).

```

# scrabble values
values={
    'A':1,'B':3,'C':3,'D':2,'E':1,'F':4,'G':2,'H':4,'I':1,'J':8,
    'K':5,'L':1,'M':3,'N':1,'O':1,'P':3,'Q':10,'R':1,'S':1,'T':1,
    'U':1,'V':4,'W':4,'X':8,'Y':4,'Z':10
}

# bag: letters to draw from
bag=list(
    'A'*9+'B'*2+'C'*2+'D'*4+'E'*12+'F'*2+'G'*3+'H'*2+'I'*9+'J'*1+
    'K'*1+'L'*4+'M'*2+'N'*6+'O'*8+'P'*2+'Q'*1+'R'*6+'S'*4+'T'*6+
    'U'*4+'V'*2+'W'*2+'X'*1+'Y'*2+'Z'*1
)

```

- **play**
 - here is how the play function might work

code	input	output
<pre>hand = deal(7) play(hand)</pre>	pig	<pre>Your letters are: ['p', 'n', 'b', 'i', 'q', 'g', 'x'] What is your word? You played 'pig'. You scored 6 points.</pre>

- **players and the player list**
 - Some tips on players and the player list:

initializing	iterating, getting and setting values
<pre>nplayers = int(input("how many players?")) for x in range(nplayers): player = { 'id':x+1, # start with player 1 'score':0, 'hand':[] } players.append(player)</pre>	<pre># iterate over players for p in players: # get player's hand hand = p['hand'] # set player's score p['score'] = 99999</pre>

- **game**
 - this is how the game function might work.
 - you'll need to use a nested loop

input	output
<pre>2 1 pig dark</pre>	<pre>Welcome to PyScrabble. How many players? How many rounds? Starting a game with 2 players and 1 round. *** Round 1, player 1. Your letters are: ['p', 'n', 'b', 'i', 'q', 'g', 'x'] What is your word? You played 'pig'. You scored 6 points. You have 6 points. *** Round 1, player 2. Your letters are: ['k', 'x', 'd', 'g', 'q', 'r', 'e'] What is your word? You don't have the letters to play 'dark'. You scored 0 points. You have 0 points. *** The game is over. Final score: Player 1 6 Player 2 0 Player 1 wins! Goodbye.</pre>