

Wordle Assistant

A Python program to assist in solving Wordle puzzles

Hamilton Python Users Group

Ian Stewart

14 Feb 2022

Wordle Assistant ~ Presentation Contents:

- Example using the program crossword_cracker.py
 - Introduction to Wordle
 - Jimmy Fallon ~ Wordle video clip
 - Summary of the rules of deducting from the list of possible words.
 - Wordle Assistant reviewing Jimmy Fallon choices of words.
 - Games that start by eliminating all vowels and Y.
 - Jimmy Fallon
 - 11 Feb 2022 Game
 - Game with all Orange.
 - Utilities examples
 - Python code snippets
 - Play today's Wordle game
-
- Wordle Assistant ~ wordle_assistant.py:
<https://github.com/HamPUG/meetings/tree/master/2022/2022-02-14>

crossword_cracker.py

•

Wordle

- Wordle is a web-based word game developed by Josh Wardle.
- The game is played once each day. Each day has a new word to solve.
- Wardle initially created the game for himself and his partner to play, eventually making it public in October 2021.
- Recently the game was purchased by The New York Times Company.
- Website: <https://www.powerlanguage.co.uk/wordle/>
- Total words 12,972. (USA spelling?). Linux English words 5 letter 4,653
- 54 Words do not have: AEIOU. E.g. crypt, cysts, gypsy, hymns, synth, wryly.
- Also no vowels or Y: “crwth”, “cwth”, “grrls”, “grrrl”, “phpht”.

Jimmy Fallon. Example of playing Wordle.

- The Tonight Show ~ Wordle Video clip (7m 24s):
<https://www.youtube.com/watch?v=QcZWd75Ph4Q>

Rules: Reducing possible words from list of 12,962

- Dark Grey: Letter is not in the word.
 - All words can be scanned for this letter in any position and removed from list of possible words.
- Yellow or Green:
 - All words that do not have this letter may be removed from the list of possible words.
- Yellow: Letter is in the word, but not at this position.
 - All words that have this letter at this position may be removed from the list.
 - May be multiple letters at a certain position that are not in the correct place.
- Green: Letter is in the word at this position.
 - All words that do NOT have this letter at this position may be removed from the list.
 - Only this letter can be at this position.

Jimmy Fallon: First Word

```
ian@hp:~$ python wordle_assistant.py
Total words is: 12972
```

```
Enter the letters NOT in the word ~ Dark Grey:ris
Total words remaining: 3120
```

```
Enter the letters in the word ~ Yellow and Green:ae
Total words remaining: 615
```

Yellow letters:

```
1st position in the word [ a e ]:
2nd position in the word [ a e ]:
3rd position in the word [ a e ]:
4th position in the word [ a e ]:
5th position in the word [ a e ]:e
Total words remaining: 399
```

Green letters:

```
1st position in the word [ a e ]:a
2nd position in the word [ a e ]:
3rd position in the word [ a e ]:
4th position in the word [ a e ]:
5th position in the word [ a e ]:
Total words remaining: 51
```



```
aahed abbed abbey abeam abled ablet aceta ached acned acted
added adeem adept admen adview adzed agent aglet agley agued
ahead aheap ahent akela aldea aleck aleft aleph allel alley
almeh aloed ameba amend ament amped anent angel annex anted
apeak apeek apnea appel apted aweel aweto awned axled axmen
ayelp
```

Jimmy Fallon: Second word

```
ian@hp:~$ python wordle_assistant.py
```

```
Total words is: 12972
```

```
Enter the letters NOT in the word ~ Dark Grey:rishd
```

```
Total words remaining: 1872
```

```
Enter the letters in the word ~ Yellow and Green:ae
```

```
Total words remaining: 359
```

Yellow letters:

```
1st position in the word [ a e ]:
```

```
2nd position in the word [ a e ]:
```

```
3rd position in the word [ a e ]:e
```

```
4th position in the word [ a e ]:
```

```
5th position in the word [ a e ]:e
```

```
Total words remaining: 153
```

Green letters:

```
1st position in the word [ a e ]:a
```

```
2nd position in the word [ a e ]:
```

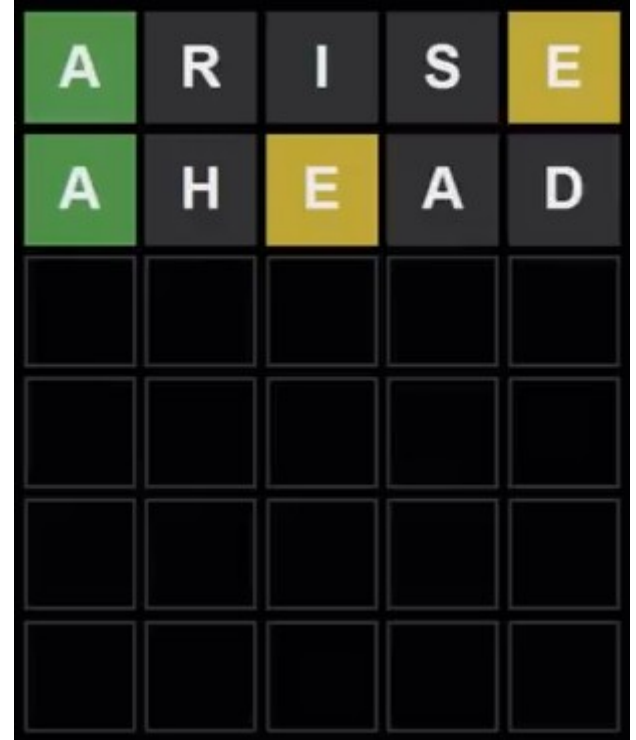
```
3rd position in the word [ a e ]:
```

```
4th position in the word [ a e ]:
```

```
5th position in the word [ a e ]:
```

```
Total words remaining: 11
```

```
abbey ablet aglet agley allel alley angel annex apnea appel  
axmen
```



Jimmy Fallon: Third word

```
ian@hp:~$ python wordle_assistant.py
```

```
Total words is: 12972
```

```
Enter the letters NOT in the word ~ Dark Grey:rishdnx
```

```
Total words remaining: 1236
```

```
Enter the letters in the word ~ Yellow and Green:ae
```

```
Total words remaining: 245
```

```
Yellow letters:
```

```
1st position in the word [ a e ]:
```

```
2nd position in the word [ a e ]:
```

```
3rd position in the word [ a e ]:e
```

```
4th position in the word [ a e ]:
```

```
5th position in the word [ a e ]:e
```

```
Total words remaining: 97
```

```
Green letters:
```

```
1st position in the word [ a e ]:a
```

```
2nd position in the word [ a e ]:
```

```
3rd position in the word [ a e ]:
```

```
4th position in the word [ a e ]:e
```

```
5th position in the word [ a e ]:
```

```
Total words remaining: 7
```

```
abbey ablet aglet agley allel alley appel
```



Jimmy Fallon: Fourth word

```
ian@hp:~$ python wordle_assistant.py
```

```
Total words is: 12972
```

```
Enter the letters NOT in the word ~ Dark Grey:rishdnxl
```

```
Total words remaining: 647
```

```
Enter the letters in the word ~ Yellow and Green:aey
```

```
Total words remaining: 26
```

Yellow letters:

```
1st position in the word [ a e y ]:
```

```
2nd position in the word [ a e y ]:
```

```
3rd position in the word [ a e y ]:e
```

```
4th position in the word [ a e y ]:
```

```
5th position in the word [ a e y ]:e
```

```
Total words remaining: 21
```

Green letters:

```
1st position in the word [ a e y ]:a
```

```
2nd position in the word [ a e y ]:
```

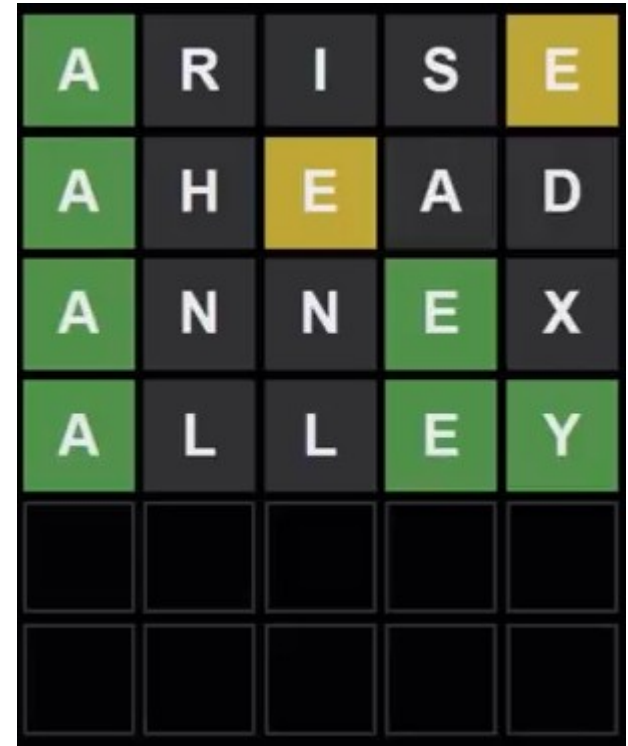
```
3rd position in the word [ a e y ]:
```

```
4th position in the word [ a e y ]:e
```

```
5th position in the word [ a e y ]:y
```

```
Total words remaining: 1
```

abbey



Starting with words that eliminate all vowels and Y

- Example 1: AUDIO and YELPS
- Example 2: BAYOU and INSET

Jimmy Fallon: but with AUDIO, YELPS

```
IF AUDIO and YELPS were first two words Include: AEIOU + Y
ian@hp:~$ python wordle_assistant.py
Total words is: 12972
```

```
Enter the letters NOT in the word ~ Dark Grey:udiolps
Total words remaining: 974
```

```
Enter the letters in the word ~ Yellow and Green:aye
Total words remaining: 52
```

Yellow Letters:

```
1st position in the word [ a y e ]:y
2nd position in the word [ a y e ]:e
3rd position in the word [ a y e ]:
4th position in the word [ a y e ]:
5th position in the word [ a y e ]:
Total words remaining: 32
```

Green Letters:

```
1st position in the word [ a y e ]:a
2nd position in the word [ a y e ]:
3rd position in the word [ a y e ]:
4th position in the word [ a y e ]:
5th position in the word [ a y e ]:
Total words remaining: 5
```

abbey arefy avyze aygre azyme

Jimmy Fallon: but with BAYOU, INSET

If BAYOU and INSET were first two words Include: AEIOU + Y

```
ian@hp:~$ python wordle_assistant.py
```

Total words is: 12972

Enter the letters NOT in the word:ouinst

Total words remaining: 1303

Enter the letters in the word ~ Yellow and Green:baye

Total words remaing: 13

Yellow letters:

1st position in the word [b a y e]:b

2nd position in the word [b a y e]:a

3rd position in the word [b a y e]:y

4th position in the word [b a y e]:

5th position in the word [b a y e]:

Total words remaining: 3

Green letters

1st position in the word [b a y e]:

2nd position in the word [b a y e]:

3rd position in the word [b a y e]:

4th position in the word [b a y e]:e

5th position in the word [b a y e]:

Total words after position dependent letters: 1

abbey

11 Feb 2022: BAYOU, INSET. Still 66 left...

ian@hp:~\$ python wordle_assistant.py

Total words is: 12972

Enter the letters NOT in the word ~ Dark Grey: bayoinst

Total words remaining: 337

Enter the letters in the word ~ Yellow and Green: ue

Total words remaining: 124

Yellow letters:

1st position in the word [u e]:

2nd position in the word [u e]:

3rd position in the word [u e]:

4th position in the word [u e]:

5th position in the word [u e]: u

Total words remaining: 123

Green letters:

1st position in the word [u e]:

2nd position in the word [u e]:

3rd position in the word [u e]:

4th position in the word [u e]: e

5th position in the word [u e]:

Total words remaining: 66

clued	cruel	culex	cumec	cupel	cured	curer	cuvee	duded	duked
duped	duper	dured	euked	feued	flued	fumed	fumer	fuzed	fuzee
glued	gluer	grued	gruel	huger	juked	julep	jurel	kugel	luged
luger	lured	lurer	lurex	luxed	luxer	muled	mured	murex	mixed
puce	puked	puker	puled	puler	pured	puree	purer	puzel	queer
ruder	ruled	ruler	rupee	udder	ugged	ulcer	ummed	umped	upled
upped	upper	urdee	urged	urger	urped				

11-Feb-2022: BAYOU, INSET, GLUED

```
ian@hp:~$ python wordle_assistant.py
```

```
Total words is: 12972
```

```
Enter the letters NOT in the word ~ Dark Grey:bayoinstgd
```

```
Total words remainig: 181
```

```
Enter the letters in the word ~ Yellow and Green:lue
```

```
Total words remaining: 25
```

```
Yellow letters:
```

```
1st position in the word [ l u e ]:
```

```
2nd position in the word [ l u e ]:
```

```
3rd position in the word [ l u e ]:u
```

```
4th position in the word [ l u e ]:
```

```
5th position in the word [ l u e ]:u
```

```
Total words remaining: 18
```

```
Green letters:
```

```
1st position in the word [ l u e ]:
```

```
2nd position in the word [ l u e ]:l
```

```
3rd position in the word [ l u e ]:
```

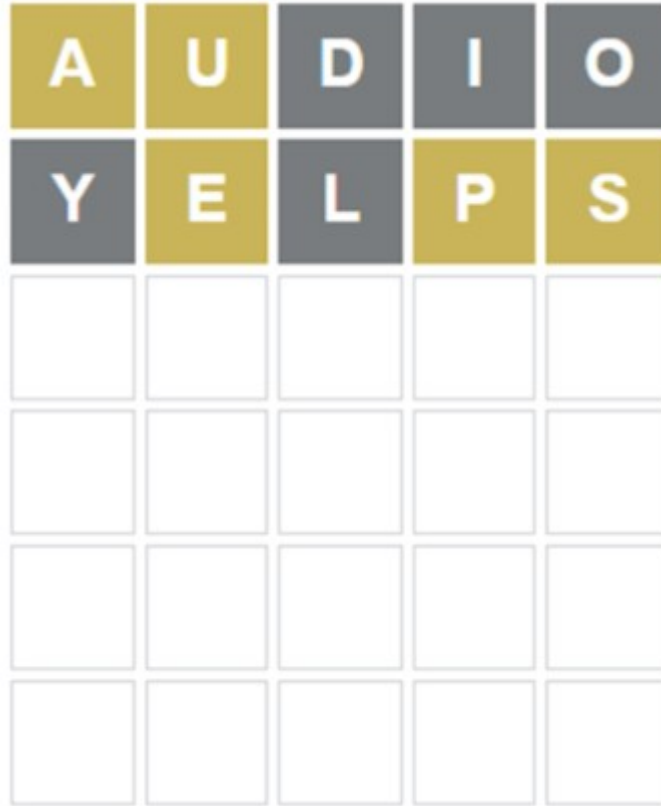
```
4th position in the word [ l u e ]:e
```

```
5th position in the word [ l u e ]:
```

```
Total words remaining: 1
```

```
ulcer
```

AUDIO, YELPS – 5 Letters, but wrong positions



AUDIO, YELPS

```
ian@hp:~$ python wordle_assistant.py
```

```
Total words is: 12972
```

```
Enter the letters NOT in the word ~ Dark Grey:dioyl
```

```
Total words remaining: 2925
```

```
Enter the letters in the word:aueps
```

```
Total words remaining: 1
```

Orange letters:

```
1st position in the word [ a u e p s ]:a
```

```
2nd position in the word [ a u e p s ]:eu
```

```
3rd position in the word [ a u e p s ]:
```

```
4th position in the word [ a u e p s ]:p
```

```
5th position in the word [ a u e p s ]:s
```

```
Total words remaining: 1
```

Green Letters:

```
1st position in the word [ a u e p s ]:
```

```
2nd position in the word [ a u e p s ]:
```

```
3rd position in the word [ a u e p s ]:
```

```
4th position in the word [ a u e p s ]:
```

```
5th position in the word [ a u e p s ]:
```

```
Total words after position dependent letters: 1
```

pause



BAYOU, INSET

```
ian@hp:~$ python wordle_assistant.py
```

```
Total words is: 12972
```

```
Enter the letters NOT in the word ~ Dark Grey:byoint
```

```
Total words remaining: 2445
```

```
Enter the letters in the word ~ Yellow and Green:ause
```

```
Total words remaining: 15
```

```
Yellow Letters:
```

```
1st position in the word [ a u s e ]:
```

```
2nd position in the word [ a u s e ]:
```

```
3rd position in the word [ a u s e ]:s
```

```
4th position in the word [ a u s e ]:e
```

```
5th position in the word [ a u s e ]:u
```

```
Total words remaining: 12
```

```
Green Letters:
```

```
1st position in the word [ a u s e ]:
```

```
2nd position in the word [ a u s e ]:a
```

```
3rd position in the word [ a u s e ]:
```

```
4th position in the word [ a u s e ]:
```

```
5th position in the word [ a u s e ]:
```

```
Total words remaining: 5
```

```
cause hause pause salue sauce
```



Wordle Utility program:

- Data:

```
data = [  
    'aahed', 'aalii', 'aargh', 'aarti', 'abaca', 'abaci', 'aback', 'abacs',  
    'abaft', 'abaka', 'abamp', 'aband', 'abase', 'abash', 'abask', 'abate',  
    'zowie', 'zowie', 'zulus', 'zupan', 'zupas', 'zuppa', 'zurfs', 'zuzim',  
    'zygal', 'zygon', 'zymes', 'zymic', ]
```

- Total words = 12972

- Total words without vowels = 54

```
byrls chynd crwth crypt cwts csts dryly flyby fyrds ghyll  
glyph grls grrrl grypt gymps gynny guppy gypsy hwyls hymns  
hyphy kydst kynds lymph lynch myrrh myths mythy nymph phpht  
psych pygmy rynds shyly skyfs skyrs slyly stymy sylph synch  
syncs synds synth syphs thymy tryps tryst tymps typps wryly  
wynds wynns xylyl xysts
```

- Four vowels (or Y) in a word = 20

```
adieu aiery aiye audio auloi aurei ayrie bayou boyau coyau  
louie miaou noyau ouija ourie pioye ulyie uraei youse yowie
```

Wordle Utility Program:

- Occurrence of letters:

```
s: 6665
e: 6662
a: 5990
o: 4438
r: 4158
i: 3759
l: 3371
t: 3295
n: 2952
u: 2511
d: 2453
y: 2074
c: 2028
p: 2019
m: 1976
h: 1760
g: 1644
b: 1627
k: 1505
f: 1115
w: 1039
v: 694
z: 434
j: 291
x: 288
q: 112
```

- Occurrence of pairs of letters:

```
o: 328
e: 308
l: 209
t: 114
f: 111
r: 108
s: 105
n: 91
p: 69
g: 68
m: 64
b: 53
d: 51
z: 35
a: 35
c: 28
k: 13
i: 10
v: 8
j: 1
y: 0
x: 0
w: 0
u: 0
q: 0
h: 0
```

Wordle Utility Program:

- Occurrence of same letter - Non-adjacent:

```
e: 688  
a: 639  
s: 636  
o: 201  
i: 161  
t: 156  
r: 144  
d: 110  
c: 82  
n: 80  
u: 77  
p: 72  
b: 60  
l: 55  
h: 52  
m: 50  
k: 48  
y: 43  
g: 35  
f: 21  
v: 12  
w: 11  
z: 9  
x: 1  
q: 1  
j: 1
```

Python Code Snippets:

- worlde_assistant.py at HamPUG Github repository:
<https://github.com/HamPUG/meetings/tree/master/2022/2022-02-14>

- Total words = 12,972:

```
print("Total words is: {}".format(len(data)))
```

- Remove duplicates:

```
not_in_word_list = ["a", "e", "i", "o", "u"]  
# Remove duplicates.  
not_in_word_list = list(dict.fromkeys(not_in_word_list))
```

- Pop from a list in reverse:

```
for i in reversed(remove_list):  
    not_in_word_list.pop(i)
```

```
>>> a = ['a', 'b', 'c', 'd', 'e']  
>>> r = [1,2]  
>>> for i in r:  
...     a.pop(i)  
...  
'b'  
'd'  
>>> a  
['a', 'c', 'e']
```

```
>>> a = ['a', 'b', 'c', 'd', 'e']  
>>> r = [1, 2]  
>>> for i in reversed(r):  
...     a.pop(i)  
...  
'c'  
'b'  
>>> a  
['a', 'd', 'e']
```

Python Code Snippets:

- \$ worlde_assistant.py --verbose OR -v
- From Linux /usr/share/dict/british-english:

```
# Build list of 5-letter, lower case words, without apostrophy, no acutes.
letter_5_list = []
for word in dict_list:
    if (len(word) == 5
        and word[0].islower()
        and "'" not in word
        and "ó" not in word
        and "é" not in word):
        letter_5_list.append(word)
```

- 10 words to a line:

```
main_string = ""
string = ""
for index, item in enumerate(a_list):
    if (index - 9) % 10 == 0:
        string += item + " "
        main_string += string + "\n"
        string = ""
    else:
        string += item + " "
main_string += string + "\n"
return main_string
```

Python Code Snippets:

- Set of functions:

```
def main():  
    # build_data() # Not required. Using Wordle supplied word list.  
  
    wordle_total_data(data)  
  
    filtered_data = letters_not_in_word(data)  
  
    filtered_data, in_word_list = letters_word_includes(filtered_data)  
  
    filtered_data, in_word_list = letters_in_wrong_position_filtering(filtered_data, in_word_list)  
  
    letters_in_correct_position(filtered_data, in_word_list)  
  
    valid_char = "abcdefghijklmnopqrstuvwxyz"  
  
    data = [  
        'aahed', 'aalii', 'aargh', 'aarti', 'abaca', 'abaci', 'aback', 'abacs',  
        'abaft', 'abaka', 'abamp', 'aband', 'abase', 'abash', 'abask', 'abate',  
        'zygal', 'zygon', 'zymes', 'zymic', ]  
  
if __name__ == "__main__":  
    main()
```


Play today's Wordle Game:

- Website: <https://www.powerlanguage.co.uk/wordle/>