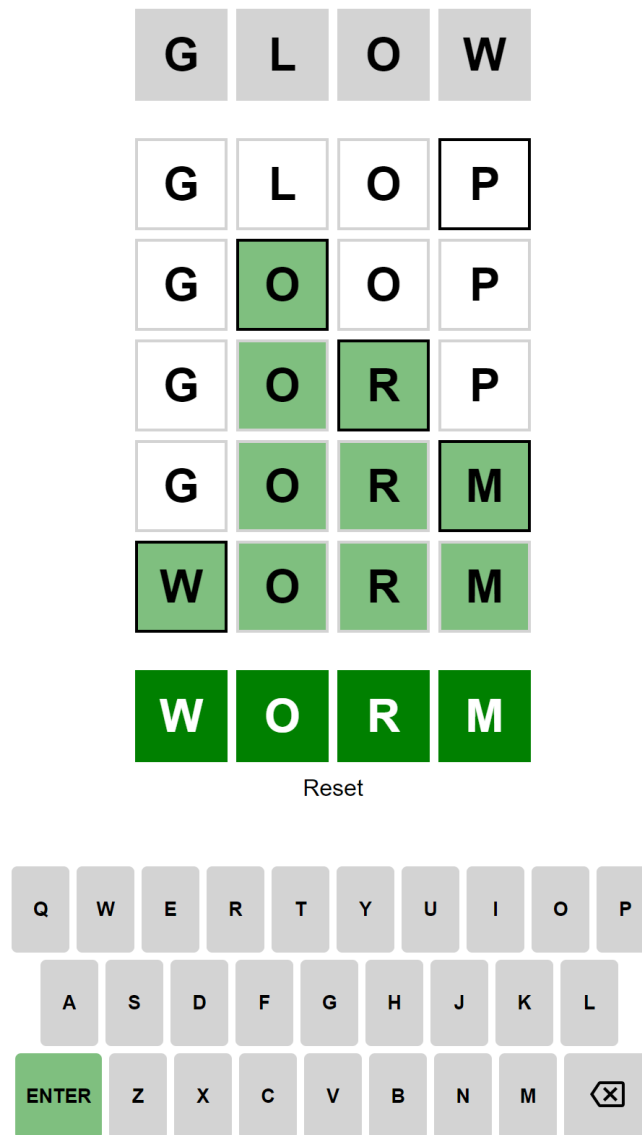


Program 2: Weaver

CS 211, UIC Spring 2023

Description

Weaver is a Wordle-inspired game, in which the goal is to try to find a way to get from the starting word to the ending word. You can change only one letter at a time, and each word along the way must be a valid word. Play online at <https://wordwormdormdork.com/> or <https://weavergame.net/> (there are many other sites that host this game too). Also see an example below:



You will be creating a C program that will allow the user to play this game. We will allow the user to play with words of various lengths, not just 4-letter words.

Running the Program

The program begins by displaying a message to introduce the game. It then asks the user to enter the number of letters that they would like the words in the game to have. All the possible words can be found in the `words.txt` file. The words are listed there in alphabetical order, and are of varied lengths. Then, there should be output to indicate the number of words of that length which were found in the file.

Because the number of words of that length is unknown, your program should use **dynamic array allocation to create space and store the words of the length specified by the user**. (You may use fixed-size arrays for other purposes.)

- **Use of a fixed-size array for the words of the user-specified length will result in a 25-point deduction.** *Also be sure that your program does not result in any memory leaks!*
- To practice dynamically growing an array, you should **not** go through the file first to count the number of words, and then create an array. Your program should **dynamically grow the array** as you read through the file and need more space to store the words. **If you use `malloc()` to create space for the array but do not dynamically grow the array, this will result in a 10-point deduction.**

```
Weaver is a game where you try to find a way to get from the starting word to the ending word.
You can change only one letter at a time, and each word along the way must be a valid word.
Enjoy!

How many letters do you want to have in the words? 4
Number of 4-letter words found: 7186.
```

At this point, the user may choose to enter the starting or ending words, or type 'r' to select a random word from the words available:

```
Weaver is a game where you try to find a way to get from the starting word to the ending word.
You can change only one letter at a time, and each word along the way must be a valid word.
Enjoy!

How many letters do you want to have in the words? 4
Number of 4-letter words found: 7186.

Enter starting and ending words, or 'r' for either for a random word: songs sink
Your word, 'songs', is not a 4-letter word. Try again.
Enter starting and ending words, or 'r' for either for a random word: song sinks
Your word, 'sinks', is not a 4-letter word. Try again.
Enter starting and ending words, or 'r' for either for a random word: zzzz aahs
Your word, 'zzzz', is not a valid dictionary word. Try again.
Enter starting and ending words, or 'r' for either for a random word: aahs zzzz
Your word, 'zzzz', is not a valid dictionary word. Try again.
Enter starting and ending words, or 'r' for either for a random word: aahs zzzzzz
Your word, 'zzzzzz', is not a 4-letter word. Try again.
Enter starting and ending words, or 'r' for either for a random word: song sink
Your starting word is: song.
Your ending word is: sink.

On each move enter a word of the same length that is at most 1 character different and is also in the dictionary.
You may also type in 'q' to quit guessing.
```

As shown in the above example, if the user tries to select a word, your program must validate that the word is the correct length and that it is in the dictionary, i.e. the words available from the file. Until these conditions are met, the user must try again. If both conditions are unmet, e.g. “zzzzzz” in the example above, the message for the correct length takes precedence.

The user may also choose to have a random word for either the starting or ending word, or both:

```
Enter starting and ending words, or 'r' for either for a random word: r think
Your starting word is: seedy.
Your ending word is: think.
```

```
How many letters do you want to have in the words? 6
Number of 6-letter words found: 29874.

Enter starting and ending words, or 'r' for either for a random word: trials skips
Your word, 'skips', is not a 6-letter word. Try again.
Enter starting and ending words, or 'r' for either for a random word: trials r
Your starting word is: trials.
Your ending word is: tampoe.
```

```
How many letters do you want to have in the words? 4
Number of 4-letter words found: 7186.

Enter starting and ending words, or 'r' for either for a random word: r r
Your starting word is: wugg.
Your ending word is: kari.
```

Random number generators are not really random. When developing your program it can be helpful to always have it make the same choices you run the program. To make this happen you need to seed the random number generator with a fixed value. You should only seed the random number generator once in your program, typically near the beginning of `main()`. That statement will look like: `srand(1);` **Be sure that you include `srand(1)` only once at the beginning of `main()` when you submit your program!** Otherwise, your output will not match the expected output.

(If you would like different numbers each time, you may use `srand(time(0));`)

To get a random number, you will likely want to have something like the following:

```
rand() % numberOfPossibleWords
```

Once the user has been presented with the starting and ending words, they can play the game! Prompt them to enter their next word, and continue until they have successfully transitioned to the ending word or until they type ‘q’ to quit. See an example below:

```

How many letters do you want to have in the words? 4
Number of 4-letter words found: 7186.

Enter starting and ending words, or 'r' for either for a random word: sung sink
Your starting word is: sung.
Your ending word is: sink.

On each move enter a word of the same length that is at most 1 character different and is also in the dictionary.
You may also type in 'q' to quit guessing.

1. Previous word is 'sung'. Goal word is 'sink'. Next word: sings
Your word, 'sings', is not a 4-letter word. Try again.

1. Previous word is 'sung'. Goal word is 'sink'. Next word: ssss
Your word, 'ssss', is not a valid dictionary word. Try again.

1. Previous word is 'sung'. Goal word is 'sink'. Next word: sink
Your word, 'sink', is not exactly 1 character different. Try again.

1. Previous word is 'sung'. Goal word is 'sink'. Next word: ssssss
Your word, 'ssssss', is not a 4-letter word. Try again.

1. Previous word is 'sung'. Goal word is 'sink'. Next word: sing

2. Previous word is 'sing'. Goal word is 'sink'. Next word: sink
Congratulations! You changed 'sung' into 'sink' in 2 moves.

```

There are a few things that you need to check when the user enters their next word (listed in order of precedence):

- The word should be the correct number of characters in length.
- The word should be in the dictionary of valid words.
- The word should have exactly one character different from the previous word.

Note that the move number does not update unless the word entered meets all of the above conditions. The program prints a congratulations message when the user successfully changes the starting word into the ending word.

The user may also type 'q' if they would like to quit guessing, and no message is printed but it stops prompting the user for their next word:

```

Enter starting and ending words, or 'r' for either for a random word: chip monk
Your starting word is: chip.
Your ending word is: monk.

On each move enter a word of the same length that is at most 1 character different and is also in the dictionary.
You may also type in 'q' to quit guessing.

1. Previous word is 'chip'. Goal word is 'monk'. Next word: chup
Your word, 'chup', is not a valid dictionary word. Try again.

1. Previous word is 'chip'. Goal word is 'monk'. Next word: shap
Your word, 'shap', is not exactly 1 character different. Try again.

1. Previous word is 'chip'. Goal word is 'monk'. Next word: chap
2. Previous word is 'chap'. Goal word is 'monk'. Next word: chat
3. Previous word is 'chat'. Goal word is 'monk'. Next word: coat
4. Previous word is 'coat'. Goal word is 'monk'. Next word: moat
5. Previous word is 'moat'. Goal word is 'monk'. Next word: mont
6. Previous word is 'mont'. Goal word is 'monk'. Next word: q

```

In either case, once the user is done guessing, the program presents the following three menu options:

```
Enter:  1 to play again,  
        2 to change the number of letters in the words and then play again, or  
        3 to exit the program.  
Your choice --> █
```

If the user selects 1, they are asked again to enter starting and ending words or have them selected at random, and they can play again.

If the user selects 2, they are asked again how many letters they would like to have in the words used in the game, and then to enter the starting and ending words.

If the user selects 3, the program stops executing.

Sample output is provided at the end of this document to see what this looks like.

Submission

Submit your code to Gradescope. You only need to submit your .c file. The autograder will run automatically, and the resulting credit will be your execution points total.

By default, your *last (i.e. most recent)* submission on Gradescope is what will be graded. If you would like us to grade an earlier version of your program, use *the Activate button* to select it from your Submission History. This must be done *before the deadline*. Only one version of your program can be graded for both execution and style points.

Sample Output

Weaver is a game where you try to find a way to get from the starting word to the ending word.

You can change only one letter at a time, and each word along the way must be a valid word.

Enjoy!

How many letters do you want to have in the words? 4

Number of 4-letter words found: 7186.

Enter starting and ending words, or 'r' for either for a random word: word r

Your starting word is: word.

Your ending word is: wugg.

On each move enter a word of the same length that is at most 1 character different and is also in the dictionary.

You may also type in 'q' to quit guessing.

1. Previous word is 'word'. Goal word is 'wugg'. Next word: worg

Your word, 'worg', is not a valid dictionary word. Try again.

1. Previous word is 'word'. Goal word is 'wugg'. Next word: words

Your word, 'words', is not a 4-letter word. Try again.

1. Previous word is 'word'. Goal word is 'wugg'. Next word: wor

Your word, 'wor', is not a 4-letter word. Try again.

1. Previous word is 'word'. Goal word is 'wugg'. Next word: hord

Your word, 'hord', is not a valid dictionary word. Try again.

1. Previous word is 'word'. Goal word is 'wugg'. Next word: q

Enter: 1 to play again,

2 to change the number of letters in the words and then play again, or

3 to exit the program.

Your choice --> 1

Enter starting and ending words, or 'r' for either for a random word: song
sinks

Your word, 'sinks', is not a 4-letter word. Try again.

Enter starting and ending words, or 'r' for either for a random word: songs
sink

Your word, 'songs', is not a 4-letter word. Try again.

Enter starting and ending words, or 'r' for either for a random word: sonf sink

Your word, 'sonf', is not a valid dictionary word. Try again.

Enter starting and ending words, or 'r' for either for a random word: song sink

Your starting word is: song.

Your ending word is: sink.

On each move enter a word of the same length that is at most 1 character different and is also in the dictionary.
You may also type in 'q' to quit guessing.

1. Previous word is 'song'. Goal word is 'sink'. Next word: sing

2. Previous word is 'sing'. Goal word is 'sink'. Next word: sint
Your word, 'sint', is not a valid dictionary word. Try again.

2. Previous word is 'sing'. Goal word is 'sink'. Next word: sine

3. Previous word is 'sine'. Goal word is 'sink'. Next word: snips
Your word, 'snips', is not a 4-letter word. Try again.

3. Previous word is 'sine'. Goal word is 'sink'. Next word: sink
Congratulations! You changed 'song' into 'sink' in 3 moves.

Enter: 1 to play again,
 2 to change the number of letters in the words and then play again, or
 3 to exit the program.

Your choice --> 2

How many letters do you want to have in the words? 5

Number of 5-letter words found: 15920.

Enter starting and ending words, or 'r' for either for a random word: think
prink

Your starting word is: think.

Your ending word is: prick.

On each move enter a word of the same length that is at most 1 character different and is also in the dictionary.
You may also type in 'q' to quit guessing.

1. Previous word is 'think'. Goal word is 'prink'. Next word: phink
Your word, 'phink', is not a valid dictionary word. Try again.

1. Previous word is 'think'. Goal word is 'prink'. Next word: trink

2. Previous word is 'trink'. Goal word is 'prink'. Next word: trick

3. Previous word is 'trick'. Goal word is 'prink'. Next word: prick

4. Previous word is 'prick'. Goal word is 'prink'. Next word: pricks
Your word, 'pricks', is not a 5-letter word. Try again.

4. Previous word is 'prick'. Goal word is 'prink'. Next word: prick
Congratulations! You changed 'think' into 'prink' in 4 moves.

Enter: 1 to play again,

2 to change the number of letters in the words and then play again, or
3 to exit the program.

Your choice --> 1

Enter starting and ending words, or 'r' for either for a random word: r r

Your starting word is: churm.

Your ending word is: whory.

On each move enter a word of the same length that is at most 1 character different and is also in the dictionary.

You may also type in 'q' to quit guessing.

1. Previous word is 'churm'. Goal word is 'whory'. Next word: charm

2. Previous word is 'charm'. Goal word is 'whory'. Next word: wharm

Your word, 'wharm', is not a valid dictionary word. Try again.

2. Previous word is 'charm'. Goal word is 'whory'. Next word: char

Your word, 'char', is not a 5-letter word. Try again.

2. Previous word is 'charm'. Goal word is 'whory'. Next word: chorm

Your word, 'chorm', is not a valid dictionary word. Try again.

2. Previous word is 'charm'. Goal word is 'whory'. Next word: wharm

Your word, 'wharm', is not a valid dictionary word. Try again.

2. Previous word is 'charm'. Goal word is 'whory'. Next word: q

Enter: 1 to play again,

2 to change the number of letters in the words and then play again, or

3 to exit the program.

Your choice --> 2

How many letters do you want to have in the words? 6

Number of 6-letter words found: 29874.

Enter starting and ending words, or 'r' for either for a random word: r trials

Your starting word is: palier.

Your ending word is: trials.

On each move enter a word of the same length that is at most 1 character different and is also in the dictionary.

You may also type in 'q' to quit guessing.

1. Previous word is 'palier'. Goal word is 'trials'. Next word: palies

Your word, 'palies', is not a valid dictionary word. Try again.

1. Previous word is 'palier'. Goal word is 'trials'. Next word: talier

Your word, 'talier', is not a valid dictionary word. Try again.

1. Previous word is 'palier'. Goal word is 'trials'. Next word: paleer

Your word, 'paleer', is not a valid dictionary word. Try again.

1. Previous word is 'palier'. Goal word is 'trials'. Next word: q

Enter: 1 to play again,
2 to change the number of letters in the words and then play again, or
3 to exit the program.

Your choice --> 1

Enter starting and ending words, or 'r' for either for a random word: candle
trials

Your starting word is: candle.

Your ending word is: trials.

On each move enter a word of the same length that is at most 1 character
different and is also in the dictionary.

You may also type in 'q' to quit guessing.

1. Previous word is 'candle'. Goal word is 'trials'. Next word: canele

Your word, 'canele', is not a valid dictionary word. Try again.

1. Previous word is 'candle'. Goal word is 'trials'. Next word: q

Enter: 1 to play again,
2 to change the number of letters in the words and then play again, or
3 to exit the program.

Your choice --> 1

Enter starting and ending words, or 'r' for either for a random word: thought r

Your word, 'thought', is not a 6-letter word. Try again.

Enter starting and ending words, or 'r' for either for a random word: r
thoughts

Your word, 'thoughts', is not a 6-letter word. Try again.

Enter starting and ending words, or 'r' for either for a random word: candle
trialz

Your word, 'trialz', is not a valid dictionary word. Try again.

Enter starting and ending words, or 'r' for either for a random word: trialz
candle

Your word, 'trialz', is not a valid dictionary word. Try again.

Enter starting and ending words, or 'r' for either for a random word: r r

Your starting word is: guards.

Your ending word is: vocoid.

On each move enter a word of the same length that is at most 1 character
different and is also in the dictionary.

You may also type in 'q' to quit guessing.

1. Previous word is 'guards'. Goal word is 'vocoid'. Next word: vuards

Your word, 'vuards', is not a valid dictionary word. Try again.

1. Previous word is 'guards'. Goal word is 'vocoid'. Next word: trials

Your word, 'trials', is not exactly 1 character different. Try again.

1. Previous word is 'guards'. Goal word is 'vocoid'. Next word: guards
Your word, 'guards', is not exactly 1 character different. Try again.

1. Previous word is 'guards'. Goal word is 'vocoid'. Next word: guarddd
Your word, 'guarddd', is not a valid dictionary word. Try again.

1. Previous word is 'guards'. Goal word is 'vocoid'. Next word: q

Enter: 1 to play again,

2 to change the number of letters in the words and then play again, or

3 to exit the program.

Your choice --> 3

Thanks for playing!

Exiting...