



## Week 4: Good Programming

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# Introduction

In this problem set, you'll implement *two* versions of a wordgame!

Don't be intimidated by the length of this problem set. There is a lot of reading, but it can be done with a reasonable amount of thinking and coding. It'll be helpful if you start this problem set a few days before it is due!

Let's begin by describing the 6.00 wordgame: This game is a lot like Scrabble or Words With Friends, if you've played those. Letters are dealt to players, who then construct one or more words out of their letters. Each **valid** word receives a score, based on the length of the word and the letters in that word.

The rules of the game are as follows:

## Dealing

- A player is dealt a hand of  $n$  letters chosen at random (assume  $n=7$  for now).
- The player arranges the hand into as many words as they want out of the letters, using each letter at most once.
- Some letters may remain unused (these won't be scored).

## Scoring

- The score for the hand is the sum of the scores for each word formed.
- The score for a word is the sum of the points for letters in the word, multiplied by the length of the word, plus 50 points if all  $n$  letters are used on the first word created.



- Letters are scored as in Scrabble; A is worth 1, B is worth 3, C is worth 3, D is worth 2, E is worth 1, and so on. We have defined the dictionary `SCRABBLE_LETTER_VALUES` that maps each lowercase letter to its Scrabble letter value.
- For example, 'weed' would be worth 32 points  $((4+1+1+2)$  for the four letters, then multiply by `len( 'weed' )` to get  $(4+1+1+2)*4 = 32$ ). Be sure to check that the hand actually has 1 'w', 2 'e's, and 1 'd' before scoring the word!
- As another example, if  $n=7$  and you make the word 'waybill' on the first try, it would be worth 155 points (the base score for 'waybill' is  $(4+1+4+3+1+1+1)*7=105$ , plus an additional 50 point bonus for using all  $n$  letters).

## Sample Output

Here is how the game output will look!



Loading word list from file...

83667 words loaded.

Enter n to deal a new hand, r to replay the last hand, or e to end game: n

Current Hand: p z u t t t o

Enter word, or a "." to indicate that you are finished: tot

"tot" earned 9 points. Total: 9 points

Current Hand: p z u t

Enter word, or a "." to indicate that you are finished: .

Total score: 9 points.

Enter n to deal a new hand, r to replay the last hand, or e to end game: r

Current Hand: p z u t t t o

Enter word, or a "." to indicate that you are finished: top

"top" earned 15 points. Total: 15 points

Current Hand: z u t t

Enter word, or a "." to indicate that you are finished: tu

Invalid word, please try again.

Current Hand: z u t t

Enter word, or a "." to indicate that you are finished: .

Total score: 15 points.

Enter n to deal a new hand, r to replay the last hand, or e to end game: n

Current Hand: a q w f f i p

Enter word, or a "." to indicate that you are finished: paw

"paw" earned 24 points. Total: 24 points

Current Hand: q f f i

Enter word, or a "." to indicate that you are finished: qi

"qi" earned 22 points. Total: 46 points

Current Hand: f f

Enter word, or a "." to indicate that you are finished: .

Total score: 46 points.

Enter n to deal a new hand, r to replay the last hand, or e to end game: n

Current Hand: a r e t i i n

Enter word, or a "." to indicate that you are finished: inertia

"inertia" earned 99 points. Total: 99 points



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Run out of letters. Total score: 99 points.

Enter n to deal a new hand, r to replay the last hand, or e to
end game: e
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Introduction

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