



高级编程技术实验报告

实验二：Hangman

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一、问题描述及求解思路

实现一个挂小人(Hangman)的游戏。

1. 三个Helper函数

- **is_word_guessed:** 判断单词是否被猜中
实施方法：采用for...in...方法遍历secret_word数组，对于每一个字母c，若c不在（用not...in...方法）letters_guessed中，则说明有字母未被猜中，返回False；若全部字母都在letters_guessed中，则全部字母被猜中，返回True
- **get_guessed_word:** 返回带有下划线的猜测单词
实施方法：创建新的空字符串res，同样遍历secret_word的每一个字母c，若c在letters_guessed中，则将该字母添加到res中；否则用下划线代替
- **get_available_letters:** 返回可用字母
实施方法：对于letters_guessed中的每一个字母c，采用Python内置字符串方法find寻找c在ascii_lowercase字符串中的位置，然后将该位置上的字母剔除，这里采用了列表解析的方法，即

```
res = res[:index] + res[index+1:]
```

2. 核心游戏

游戏规则在problem_set描述中已经非常详细，这里不再赘述。

实施方法如下：

- 初始化计数器cnt用来记录用户剩余的“生命”，初始值为6
- 如果cnt的值大于0，则进入while循环
- 输出用户提示信息
- 根据用户输入的字母进行条件判断：若输入非字母，而是其他字符，则对用户进行提醒(warning)，若提醒次数使用完则声明减1
- 将字母转换为小写
- 判断该字母是否已经猜过，提醒警告规则与4相同，但提示信息不同
- 将该字母添加入guessed中

- 判断是否猜中单词中的字母，若猜中则再判断是否猜完单词，若猜完则游戏结束，输出分数；否则猜元音生命减2，猜辅音生命减1

3. 带提示的游戏

两个辅助函数

- `match_with_gaps`: 判断是否匹配带下划线的单词，其中下划线为通配符(wildcard)
实施方法: 用`strip`函数预处理，去除`my_word`首尾多余空格，先判断字符串长度是否相等，不相等肯定不匹配；然后遍历每一个字符，如果对于每一个字符`my_word`和`other_word`对应位置都相同，或`my_word`采用了通配符，则匹配成功，否则匹配失败
- `show_possible_matches`: 将所有可能的匹配输出
实施方法: 用`for...in...`方法遍历`wordlist`中每一个单词`word`，调用`match_with_gaps`函数判断`my_word`和`word`是否匹配，如果匹配则输出

完整游戏实施只需在上一题的基础上，在输入字符后判断是否为`*`，如果是则调用`show_possible_matches`函数，将所有可能匹配输出，作为提示。

二、 代码

代码实施及注释请见附件`hangman.py`。

三、 运行截图

实验运行结果如下面几幅图片所示，注意图中将游戏规则中的各种情况都进行了测试，也包括自定义的极端样例，且结果正确。

```
chhzh123@DESKTOP-PV2UBJL: /mnt/d/Assignments/AdvancedComputerProgramming/ps2
chhzh123@DESKTOP-PV2UBJL: /mnt/d/Assignments/AdvancedComputerProgramming/ps2$ python3 hangman.py
Loading word list from file...
  55900 words loaded.
Welcome to the game Hangman!
I am thinking of a word that is 10 letters long.
You have 3 warnings left.
-----
You have 6 guesses left.
Available Letters: abcdefghijklmnopqrstuvwxyz
Please guess a letter: a
Oops! That letter is not in my word: _____
-----
You have 4 guesses left.
Available Letters: bdefghijklmnopqrstuvwxyz
Please guess a letter: e
Good guess: ____e____
-----
You have 4 guesses left.
Available Letters: bdefghijklmnopqrstuvwxyz
Please guess a letter: o
Oops! That letter is not in my word: ____e____
-----
You have 2 guesses left.
Available Letters: bdefghijklmnopqrstuvwxyz
Please guess a letter: i
Good guess: __i__e_i__
-----
You have 2 guesses left.
Available Letters: bdefghijklmnopqrstuvwxyz
Please guess a letter: p
Good guess: p_i__e_i__
-----
You have 2 guesses left.
Available Letters: bdefghijklmnopqrstuvwxyz
Please guess a letter: n
Good guess: p_in_e_in_
-----
You have 2 guesses left.
Available Letters: bdefghijklmnopqrstuvwxyz
Please guess a letter: r
Good guess: prin_e_in_
-----
You have 2 guesses left.
Available Letters: bdefghijklmnopqrstuvwxyz
Please guess a letter: g
Good guess: prin_e_ing
-----
You have 2 guesses left.
Available Letters: bdefghijklmnopqrstuvwxyz
Please guess a letter: c
Good guess: prince_ing
-----
You have 2 guesses left.
Available Letters: bdefghijklmnopqrstuvwxyz
Please guess a letter: l
Good guess: princeling
-----
Congratulations, you won!
Your total score for this game is: 32
chhzh123@DESKTOP-PV2UBJL: /mnt/d/Assignments/AdvancedComputerProgramming/ps2$
```

图 1: 无提示, 游戏胜利

```
chhzh123@DESKTOP-PV2UBJL: /mnt/d/Assignments/AdvancedComputerProgramming/ps2
chhzh123@DESKTOP-PV2UBJL: /mnt/d/Assignments/AdvancedComputerProgramming/ps2$ python3 hangman.py
Loading word list from file...
  55900 words loaded.
Welcome to the game Hangman!
I am thinking of a word that is 5 letters long.
You have 3 warnings left.
-----
You have 6 guesses left.
Available Letters: abcdefghijklmnopqrstuvwxyz
Please guess a letter: a
Good guess: __a_
-----
You have 6 guesses left.
Available Letters: bcd efghijklmnopqrstuvwxyz
Please guess a letter: e
Oops! That letter is not in my word: __a_
-----
You have 4 guesses left.
Available Letters: bcd fghijklmnopqrstuvwxyz
Please guess a letter: p
Oops! That letter is not in my word: __a_
-----
You have 3 guesses left.
Available Letters: bcd fghijklmnopqrstuvwxyz
Please guess a letter: a
Oops! You've already guessed that letter. You now have 2 warnings: __a_
-----
You have 3 guesses left.
Available Letters: bcd fghijklmnopqrstuvwxyz
Please guess a letter: a
Oops! You've already guessed that letter. You now have 1 warnings: __a_
-----
You have 3 guesses left.
Available Letters: bcd fghijklmnopqrstuvwxyz
Please guess a letter: a
Oops! You've already guessed that letter. You now have 0 warnings: __a_
-----
You have 3 guesses left.
Available Letters: bcd fghijklmnopqrstuvwxyz
Please guess a letter: a
Oops! You've already guessed that letter. You have no warnings left
so you lose one guess: __a_
-----
You have 2 guesses left.
Available Letters: bcd fghijklmnopqrstuvwxyz
Please guess a letter: s
Good guess: s__a_
-----
You have 2 guesses left.
Available Letters: bcd fghijklmnopqrstuvwxyz
Please guess a letter: z
Oops! That letter is not in my word: s__a_
-----
You have 1 guesses left.
Available Letters: bcd fghijklmnopqrstuvwxyz
Please guess a letter: w
Oops! That letter is not in my word: s__a_
-----
Sorry, you ran out of guesses. The word was squad.
chhzh123@DESKTOP-PV2UBJL: /mnt/d/Assignments/AdvancedComputerProgramming/ps2$
```

图 2: 无提示, 游戏失败

```
chhzh123@DESKTOP-PV2UBJL: /mnt/d/Assignments/AdvancedComputerProgramming/ps2
chhzh123@DESKTOP-PV2UBJL: /mnt/d/Assignments/AdvancedComputerProgramming/ps2$ python3 hangman.py
Loading word list from file...
  55900 words loaded.
Welcome to the game Hangman!
I am thinking of a word that is 7 letters long.
You have 3 warnings left.
-----
You have 6 guesses left.
Available Letters: abcdefghijklmnopqrstuvwxyz
Please guess a letter: a
Good guess: _a_____
-----
You have 6 guesses left.
Available Letters: bcddefghijklmnopqrstuvwxyz
Please guess a letter: e
Oops! That letter is not in my word: _a_____
-----
You have 4 guesses left.
Available Letters: bcddefghijklmnopqrstuvwxyz
Please guess a letter: p
Oops! That letter is not in my word: _a_____
-----
You have 3 guesses left.
Available Letters: bcddefghijklmnopqrstuvwxyz
Please guess a letter: i
Good guess: _ia_i_
-----
You have 3 guesses left.
Available Letters: bcddefghijklmnopqrstuvwxyz
Please guess a letter: o
Oops! That letter is not in my word: _ia_i_
-----
You have 1 guesses left.
Available Letters: bcddefghijklmnopqrstuvwxyz
Please guess a letter: *
Possible word matches are:
biasing biaxial dialing diaries diarist niacins pianist vialing viatica
-----
You have 1 guesses left.
Available Letters: bcddefghijklmnopqrstuvwxyz
Please guess a letter: g
Oops! That letter is not in my word: _ia_i_
-----
Sorry, you ran out of guesses. The word was niacins.
chhzh123@DESKTOP-PV2UBJL: /mnt/d/Assignments/AdvancedComputerProgramming/ps2$
```

图 3: 带提示的游戏