Practice Questions

You are not required to submit solutions/screenshots of practice questions. You have to submit the solution and screenshot for only the homework question given after the practice questions.

[**Practice Question 1.**] For a given message and a key, write a program to repeat the characters of a key in the form of the message. **Assume that the length of the key is less than or equal to the message and all the letter in the key are in lowercase.**

Program Inputs

- **Enter the message:**
  - *The user will always enter a string!*
- **Enter the key:**
  - *The user will always enter a string!*

Program Outputs

- **The new string is: XXX**
  - *Replace XXX with the output!*

Test Case 1:

```
Enter the message: helloWORLD
Enter the key: matlab
The new string is: matlaBMATL
```

Test Case 2:

```
Enter the message: strings are vectors
Enter the key: woot
The new string is: wootwoo two otwootw
```

Test Case 3:

```
Enter the message: Kbsm urm lhrrfdr uzwcxb!
Enter the key: rusty
The new string is: Rust yru styrust yrusty!
```

Test Case 4:

```
Enter the message: iohfre ihfrewl IUHFRE
Enter the key: qqqttp
The new string is: qqqttp qqqttpq QQTTPQ
```

Test Case 5:

```
Enter the message: kjfe.. kejf;
Enter the key: time
The new string is: time.. time;
```

[**Practice Question 2.**] For a given encrypted single letter and a decryption letter, write a program to decrypt the single letter by moving it forward by the distance of the decryption letter from 'a'. For example, if the encrypted letter is 'b' and the decryption letter is 'd' , the encrypted letter 'b' will become 'e' (because 'd' is 3 letters away from 'a'). **Assume that the all the letters are in lowercase.**

Program Inputs

- **Enter the encrypted letter:**
  - *The user will always enter a lowercase letter!*
- **Enter the decryption letter:**
  - *The user will always enter a lowercase letter!*

Program Outputs

- **The decrypted letter is: XXX**
  - *Replace XXX with the decrypted letter!*

Test Case 1:

```
Enter the encrypted letter: d
Enter the decryption letter: b
The decrypted letter is: e
```

Test Case 2:

```
Enter the encrypted letter: i
Enter the decryption letter: c
The decrypted letter is: k
```

Test Case 3:

```
Enter the encrypted letter: k
Enter the decryption letter: n
The decrypted letter is: x
```

Test Case 4:

```
Enter the encrypted letter: g
Enter the decryption letter: w
The decrypted letter is: c
```

Test Case 5:

```
Enter the encrypted letter: z
Enter the decryption letter: c
The decrypted letter is: b
```

Test Case 6:

```
Enter the encrypted letter: a
Enter the decryption letter: s
The decrypted letter is: s
```

Homework: Modified Vigenere Cipher

Implement a decryption cipher to decode messages using a secret key. You are required to submit the solution and screenshots for this question.

Key programming concepts: if statements, loops, strings
Approximate lines of code: 27 (does not include comments or white space)
Commands you can't use: None...

Program Inputs

- **Enter message to decrypt:**
- **Enter secret key:**
  - The user will always enter text for all prompts, no error checking needed. The secret key will always be lower case to start.

Program Outputs

- **Updated key: XXX**
  - Replace XXX with the adjusted secret key
- **Decrypted message: YYY**
  - Replace YYY with the deciphered message

Assignment Details:

This assignment will give you a brief introduction into cryptography using a modified Vigenere Cipher! Cryptography allows us to encode and decode messages that are difficult to decipher without knowledge of a secret key/table/rules. Cryptography is a rich subject in its own right, and we will not have time to cover it in detail. Please check out the numerous online resources if you want more information: `http://www.braingle.com/brainteasers/codes/index.php`

This particular cipher depends upon a secret key (a single word) selected by the user that only contains letters which is paired with a phrase. For example, given the phrase:

Attack Now!

the user could choose the secret key:

woot

The first step to encryption is to repeat the letters in secret key until it has the same amount of letters as the message, skipping any spaces or punctuation! So with **woot** as the key, repeat the letters **w**, **o**, **o**, **t** for each letter in **Attack Now!**. Note that you must also change the letters in the key to upper case if the letters in phrase are upper case.

A	t	t	a	c	k		N	o	w	!
W	o	o	t	w	o		O	t	w	!

Now each letter in the secret message determines how far to shift the corresponding letter in the updated key. Essentially, take the position in the alphabet (starting from 0) of the letters in message and then shift key by that amount (like a Caesar Cipher). Also, treat upper case and lower case letters as two different alphabets. Here is a detailed breakdown:

Letter in message	Alphabet position	Letter in key	Decrypted letter
A	0	W	W
t	19	o	h
t	19	o	h
a	0	t	t
c	2	w	y
k	10	o	y
N	13	O	B
o	14	t	h
w	22	w	s
!			!

Following this table, **Attack Now!** becomes **Whhtyy Bhs!**. **To decode this message for the homework, do the reverse of this process!**

Sample Output

The following test cases do not cover all possible scenarios (**develop your own!**) but should indicate if your code is on the right track.

Test Case 1:

```
Enter message to decrypt: Whhtyy Bhs!
Enter secret key: woot
Updated key: Wootwo Otw!
Decrypted msg: Attack Now!
```

Test Case 2:

```
Enter message to decrypt: Rr pathf!
Enter secret key: edna
Updated key: Ed naedn!
Decrypted msg: No capes!
```

Test Case 3:

```
Enter message to decrypt: Qmh frisll kr pfbapgehleu!
Enter secret key: syndrome
Updated key: Syn dromes yn dromesyndro!
Decrypted msg: You caught me monologuing!
```

Test Case 4:

```
Enter message to decrypt: Kbsm urm lhrrfdr uzwcxb!
Enter secret key: rusty
Updated key: Rust yru styrust yrusty!
Decrypted msg: That was totally wicked!
```

Test Case 5:

```
Enter message to decrypt: Hbgzy'k xs ucjwc mwqn?
Enter secret key: lucius
Updated key: Luciu's lu ciusl uciu?
Decrypted msg: Where's my super suit?
```