CS 1301
Individual Homework 3 – Conditionals & Loops
Due: Friday, January 31st, before 11:55pm
Out of 100 points

Files to submit: 1. HW3.py

THIS IS AN INDIVIDUAL ASSIGNMENT!

You should work individually on this assignment. You may collaborate with other students in this class. Collaboration means talking through problems, assisting with debugging, explaining a concept, etc. Students may only collaborate with fellow students currently taking CS 1301, the TA's and the lecturer. You should not exchange code or write code for others. For individual assignments, each student must turn in a unique program. Your submission must not be substantially similar to another student's submission. Collaboration at a reasonable level will not result in substantially similar code.

For Help:
- TA Helpdesk – Schedule posted on class website.
- Email TA's or use T-Square Forums

Notes:
- **Don't forget to include the required comments and collaboration statement (as outlined on the course syllabus).**
- **Do not wait until the last minute** to do this assignment in case you run into problems.

Simple Functions:

You will write a few python functions for practice with the language. In your submission file, include a comment at the top with your names, section, GTID/Email, and your collaboration statement. Also include each of the following functions:

1. letterGrade
2. countLetter
3. eyeForI
4. wordMirror
5. encryption
6. guessPassword
7. countDown
8. numberBowTie
9. printTimes

Function Name: **letterGrade** (10pts)

Parameters:

grade – an integer/float representing the numerical grade

Return:

A string – ‘You made a(n) [letter grade].’

Test Cases:

letterGrade(92) **returns**: “You made a(n) A.”
letterGrade(72.5) **returns** “You made a(n) C.”
letterGrade(43) **returns** “You made a(n) F.”

Description:

Write a function, using conditionals, that determines the letter grade from the numerical grade, passed in as a parameter. The letter grade is determined by the following: [90, 100] - A, [80, 90) - B, [70, 80) - C, [60, 70) - D, [0, 60) - F (Assume the numerical grade argument is between 0 and 100.) After converting the numerical grade to a letter grader, **return** the exact string, ‘You made a(n) [letter grade].’

Function Name: **countLetter** (10pts)

Parameters:

aWord – a string representing a word
aLetter – a string representing the character to count in aWord

Return:

count – integer representing the number of times aLetter appears in aWord

Test Cases:

countLetter(“There are many cows in the field”, “e”) returns 5
countLetter(“Where is Waldo?”, “w”) returns 0
countLetter(“How much wood can a woodchuck chuck?”, “c”) returns 6

Description:

Write a function that takes in a word and letter as parameters. The function will then count the number of times that the letter appears in the word, using a loop. Remember that capital letters are DIFFERENT from lower case letters! **Return** the number of times that the letter appears in the word or sentence as an **integer**.

Function Name: **eyeForI** (10pts)

Parameters:

aString – any string

Return:

The modified string

Test Cases:

eyeForI(“William”) returns “Weyelleyeam”
eyeForI(“I do not like physics.”) returns “eye do not leyeke physeyecs.”
eyeForI(“This is so much fun!”) returns “Theyes eyes so much fun!”

Description:

Write a function that takes in a string as a parameter. Replace every “I” and “i” in the string with “eye” and **return** the resulting string. The function **MUST use a for-loop or while loop to build up the new string while processing the original string letter by letter, not take advantage of the built in str.replace function.**

Function Name: **wordMirror** (10pts)

Parameters:

aString – any string

Return:

The mirrored string (reversed)

Test Cases:

wordMirror(“CS 1301”) returns “CS 13011031 SC”
wordMirror(“Atlanta”) returns “AtlantaatnaltA”
wordMirror(“georgiatech”) returns “georgiatechhcetaigroeg”

Description:

Write a function that takes in a string as its only parameter. You will then **return** a new string that is the original string concatenated with the reflection of the original string (reverse the string). It may be helpful to use a for-loop to reflect (reverse) the string. Hint: Add each letter letter to the FRONT of the new string you are building up!

Function Name: **encryption** (10pts)

Parameters:

aString – a string that you want to encrypt

Return:

None

Test Cases:

encryption(“I love cs 1301”) **prints** “The encrypted code is: I 1o^() c$ 1301”
encryption(“Why is it freezing?”) **prints** “The encrypted code is: W#y i$ it f+()()zing ?”
encryption(“I play the saxophone”) **prints** “The encrypted code is: I p1@y t#() $@*op#on()”

Description:

Write a function that encrypts a message into a secret code. The encryption should reflect the following conversions:

1. a - @ (i.e. Change every instance of “a” to “@”)
2. e - ()
3. h - #
4. l - 1 (lowercase-L to number one)
5. r - + (plus sign)
6. s - $
7. v - ^
8. x - *

You may use a loop to complete the following function, or you may find the .replace method in the string module useful. After encrypting the message, **print** “The encrypted code is: [encrypted string]”.

Function Name: **guessPassword** (10pts)

Parameters:

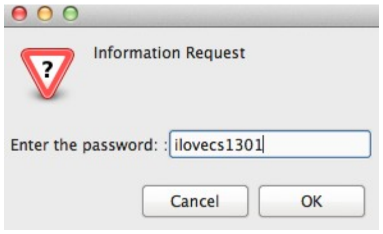
password – a string that represents the secret password to be guessed.

Return:

None

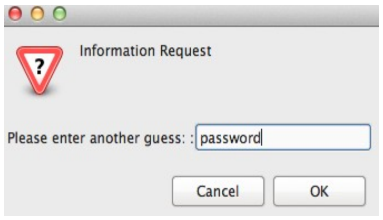
Test Case:

>>> guessPassword(“abc123”)



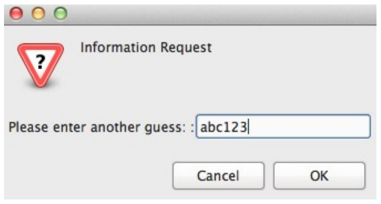
Enter the password: : ilovecs1301

>>> Incorrect Password!



Please enter another guess: : password

>>> Incorrect Password!



Please enter another guess: : abc123

>>> You entered the correct password!

Description:

Write a function that uses *input* to prompt the user to guess the password that is passed into the function as a parameter. The function will continuously prompt the user to guess the password until the correct password has been entered. The function should prompt the user for the password: “Please enter the password: “. If the user enters an incorrect password, **print** “Incorrect password!” and prompt the user again for the password. When the user correctly enters the password into the prompt, **print** “You entered the correct password!” You **MUST use a while-loop or recursion!**

Function Name: **countDown** (10pts)

Parameters:

startNum – an integer that is the starting number to count down from
countBy– an integer that is the number you count down by

Return:
None

Test Cases:
```
>>> countDown(10, 2)
        10
        8
        6
        4
        2
        Blast Off!

>>> countDown(23, 7)
        23
        16
        9
        2
        Blast Off!

>>> countDown(21, 4)
        21
        17
        13
        9
        5
        1
        Blast Off!
```

Description:
Write a function to count down from the first parameter (startNum) by the second parameter (countBy). The function should **print** the numbers from the given number to 1 (decreasing by the second parameter each time...if you go past 1, don't print it!) in descending order, with each number being printed on its own line. After printing the required numbers, on a separate line, print the string 'Blast off!'

Function Name: **numberBowTie** (10pts)

Parameters:
aNum – an integer (between 2 – 9) specifying ½ of the length of the longest row in the bow tie

Return:
None

Test Cases:
```
>>> numberBowTie(5)
1         1
```

```
22      22
333    333
4444  4444
5555555555
5555555555
4444  4444
333    333
22      22
1        1

>>> numberBowTie(9)
1                1
22              22
333            333
4444          4444
55555        55555
666666      666666
7777777    7777777
88888888  88888888
999999999999999999
999999999999999999
88888888  88888888
7777777    7777777
666666      666666
55555        55555
4444          4444
333            333
22              22
1                1
```

Description:

Write a function that takes in half the number of rows of the bow tie as a parameter. The function will then draw a number bow tie on screen using the **print** function. See screenshots above in the test cases for clarification. **DO NOT HARD CODE THE 8 different printouts**, you should have one set of code that will work for any number between 2 and 9. In order to correctly code this function, the spacing between elements in a row must be calculated mathematically.

Function Name: **printTimes** (20pts)

Parameters:

start – an integer that limits the LOWER bound of the times table (inclusive)
end – an integer that limits the UPPER bound of the times table (inclusive)
inc – a positive integer (less than the end value)

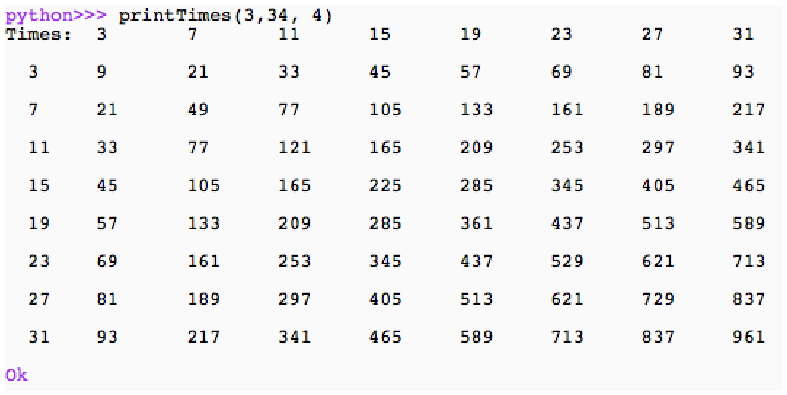
Return:

None

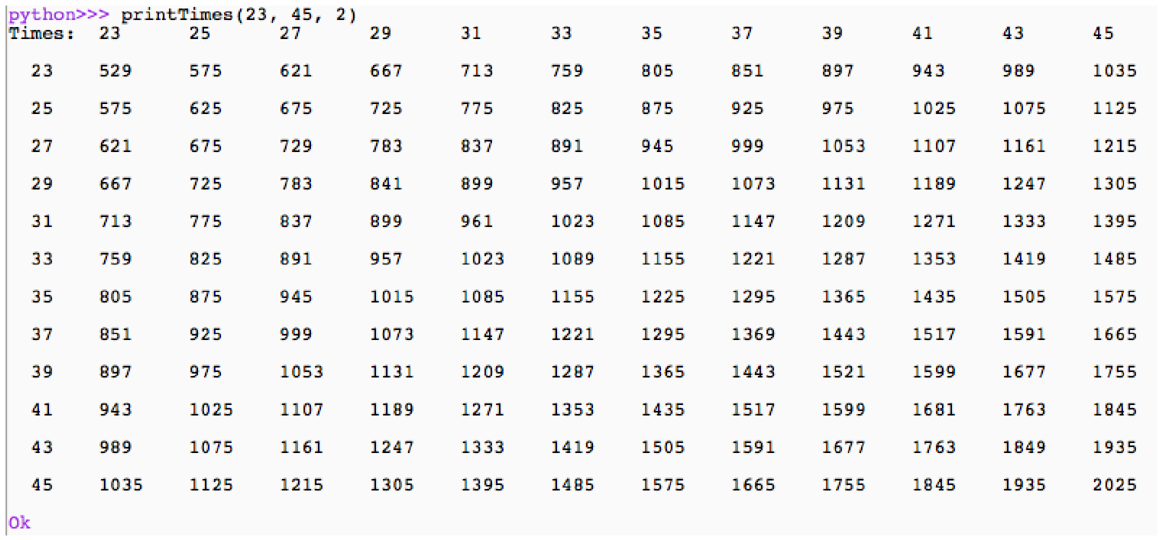
Description:

Write a printTimes(start, end, increment) function that will print a times table from ‘start’ up to ‘end’ by increments of ‘inc’, for any positive number. Note that your function must print a header (Times: start...end) and a first column number that goes from ‘start’…’end’, while the interior of the grid is the X * Y value. Hint: Using two loops (one inside of the other) is an easy (but not the only) way to accomplish this. You may want to use tab characters ("\t") to space your grid out correctly.

Test Cases:



```
python>>> printTimes(3,34, 4)
Times:  3       7       11      15      19      23      27      31

  3     9       21      33      45      57      69      81      93

  7     21      49      77      105     133     161     189     217

  11    33      77      121     165     209     253     297     341

  15    45      105     165     225     285     345     405     465

  19    57      133     209     285     361     437     513     589

  23    69      161     253     345     437     529     621     713

  27    81      189     297     405     513     621     729     837

  31    93      217     341     465     589     713     837     961

Ok
```



```
python>>> printTimes(23, 45, 2)
Times:  23      25      27      29      31      33      35      37      39      41      43      45

  23    529     575     621     667     713     759     805     851     897     943     989     1035

  25    575     625     675     725     775     825     875     925     975     1025    1075    1125

  27    621     675     729     783     837     891     945     999     1053    1107    1161    1215

  29    667     725     783     841     899     957     1015    1073    1131    1189    1247    1305

  31    713     775     837     899     961     1023    1085    1147    1209    1271    1333    1395

  33    759     825     891     957     1023    1089    1155    1221    1287    1353    1419    1485

  35    805     875     945     1015    1085    1155    1225    1295    1365    1435    1505    1575

  37    851     925     999     1073    1147    1221    1295    1369    1443    1517    1591    1665

  39    897     975     1053    1131    1209    1287    1365    1443    1521    1599    1677    1755

  41    943     1025    1107    1189    1271    1353    1435    1517    1599    1681    1763    1845

  43    989     1075    1161    1247    1333    1419    1505    1591    1677    1763    1849    1935

  45    1035    1125    1215    1305    1395    1485    1575    1665    1755    1845    1935    2025

Ok
```

Grading Rubric

letterGrade	**<u>10 pts</u>**
• Function name, parameters correct	2
• Correct use of conditionals (if…elif…else)	3
• Letter grade calculated correctly	3
• Return the string exactly as specified	2

countLetter	**<u>10 pts</u>**
• Function name, parameters correct	2
• Function examines each letter in the string	4
• Returns an integer	1
• Correctly counts the number of times the letter appears in the string	3

eyeForI	**<u>10 pts</u>**
• Function name, parameters correct	2
• Proper use of a for-loop or while-loop	3
• Correctly replaces all instances of “I” and “i” with “eye”	4
• Returns a string	1

wordMirror	**<u>10 pts</u>**
• Function name, parameters correct	2
• String is correctly mirrored	7
• Returns a string	1

encryption	**<u>10 pts</u>**
• Function name, parameters correct	2
• Correctly replaces each letter with the corresponding conversion	5
• Prints string, formatted exactly as instructed	3

guessPassword	**<u>10 pts</u>**
• Function header corect	2
• Uses a while-loop, or recursion	2
• Prompts user until correct password is entered	4
• Prints out correct statements when password is correct/incorrect	2

countDown	**<u>10 pts</u>**
• Function name, parameters correct	2
• A loop is used print one number per line	4
• Numbers are decremented correctly by the 2nd parameter	3
• “Blast Off!” is printed last	1

numberBowTie	**<u>10 pts</u>**
• Function name, parameters correct	2
• Use of a loop	2
• Correct spacing, length, and number of rows	4
• Prints correct shape	2

Note: Hardcoding all 8 possible printouts will result in 0 pts for this function.

printTimes	**<u>20 pts</u>**
• Function name, parameters correct	3
• Correctly prints times table with correct start, end, and incrementing numbers	10
• Table is nicely formatted	5
• Returns nothing	2