

Part I : problems 1, 2 (100 pts) due: Feb 21, 2013 11:59pm
Part II : problem 3 (optional) (50 pts) due: Feb 21, 2013 11:59pm

Important Notes

- **This assignment is to be done on your own.** If you need help, see the instructor or TA.
- Please start the assignment as soon as possible and get your questions answered early.
- Read through this specification completely before you start.
- Some aspects of this specification are subject to change, in response to issues detected by students or the course staff.

1. Reverse a Sentence (pp 180, 8.14)

Write a program that reverses the words in a sentence:

Enter a sentence: you can cage a swallow can't you?
Reversal of sentence: you can't swallow a cage can you?

2. Caesar cipher(pp 180-181, 8.15)

One of the oldest known encryption techniques is the Caesar cipher, attributed to Julius Carsar. It involves replacing each letter in a message with another letter that is a fixed number of positions later in the alphabet. (If the replacement would go past the letter Z, the cipher “wraps around” to the beginning of the alphabet. For example, if each letter is replaced by the letter two position after it, then Y would be replazed by A, and Z would be replaced by B.) Write a program that encrypted a message using a Caesar cipher. The user will enter the message to be encrypted and the shift amount (the number of positions by which letters should be shifted):

Enter message to be encrypted: Go ahead, make my day.
Enter shift amount (1–25): 3
Encrypted message: Jr dkhdg, pdnh pb gdb.

Notice that the program can decrypt a message if the user enters 26 minus the original key:

Enter message to be encrypted: Jr dkhdg, pdnh pb gdb.
Enter shift amount (1–25): 23
Encrypted message: Go ahead, make my day.

You may assume that the message does not exceed 80 characters. Characters other than letters should be left unchanged. Lower-case letters remain lower-case when encrypted, and upper-case letters remain upper-case.

3. Extra Credit: Spiral Matrix

Given an integer n , generate a square matrix filled with elements from 1 to n^2 in spiral order. For example, given $n = 3$, you should return the following matrix:

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{ {1, 2, 3},  
  {8, 9, 4},  
  {7, 6, 5} }
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