1. Write a C program that reads a message, then checks whether it is a palindrome (the letters in the message are the same from left to right as from right to left):

Enter a message: He lived as a devil, eh?

Palindrome

Enter a message: Madam, I am Adam.

Not a palindrome

In your program, ignore all characters that are not letters. Use dynamic memory allocation (malloc/free)

1. Implement your code using an array to store the message. Use integer index to keep track of positions in the array.
2. Revise the program to use pointers instead of integers to keep track of positions in the array.

2. Write a C program for multiplying two matrices stored using 2-dimensional arrays. Ask the user to enter the number of rows and columns in the matrix. Then, the elements of the matrices can be entered by the user. Print out the output matrix.

3. Solve the following by induction: Let P(n) be the statement that 12 +22 +...+n2 = n(n+1)(2n+1)/6 for the positive integer n

(a) What is the statement P(1)?

(b) Show that P(1) is true, completing the basis step of the proof.

(c) What is the inductive hypothesis?

(d) What do you need to prove in the inductive step?

(e) Complete the inductive step.