EEP-702 Software Lab
Assignment1-Writing a Code to solve two problems

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PROBLEM STATEMENT

Write a program in C/C++/Java to solve following two problems:

1. To print matrix (M) elements in reverse spiral order i.e., starting from the centre element, print all the elements in spiral order until the first element M[0][0] is reached. Matrix M is of order n where n is odd.
2. To match two strings containing wildcard characters '?' and '*' . '?' denotes no or exactly one character and '*' denotes no or many characters.

ABSTRACT

The code has been entirely structured on C language. For the first preliminary code has been taken against the test cases for a 3*3 matrix, however further it was taken into a generalised form for the sake of robustness. Error handling has been tried so as the code works in case of a odd number ordered sqaure matrix, where the matrix is traversed right from the center element to the final elememt that is the first ofcourse. Second Code has been done through pointers and is well explained undr below.

INTRODUCTION

Right from the starting when programming languages were developed, it was rather in the decade of 80s C language emerged which was much engraved with a powerful logic and soundness towards the logic and understanding. Throughout my code has been entirely written on C. Matrix Operations are some of the most common logic applications in a C code. Furthermore the other code signifies using a Automata set to check for the matching of two strings, where one of them contains a wild character.

SPECIFICATIONS AND ASSUMPTIONS

Specifications

1. gcc Compiler has been used to compile the code.
2. gdb debugger may be used if some error is encountered.
3. Some places inspite of printf command puts has been used to display a string
4. If '*' is encountered it is treated as any number of characters or null.
5. If '?' is encountered it is treated as one character or null.

Assumptions

1. User will be only allowed to put * and ? as special characters nothing else except alphabets.
2. The matrix would be an square Matrix
3. User will be providing a odd number ordered Matrix

METHODOLOGY

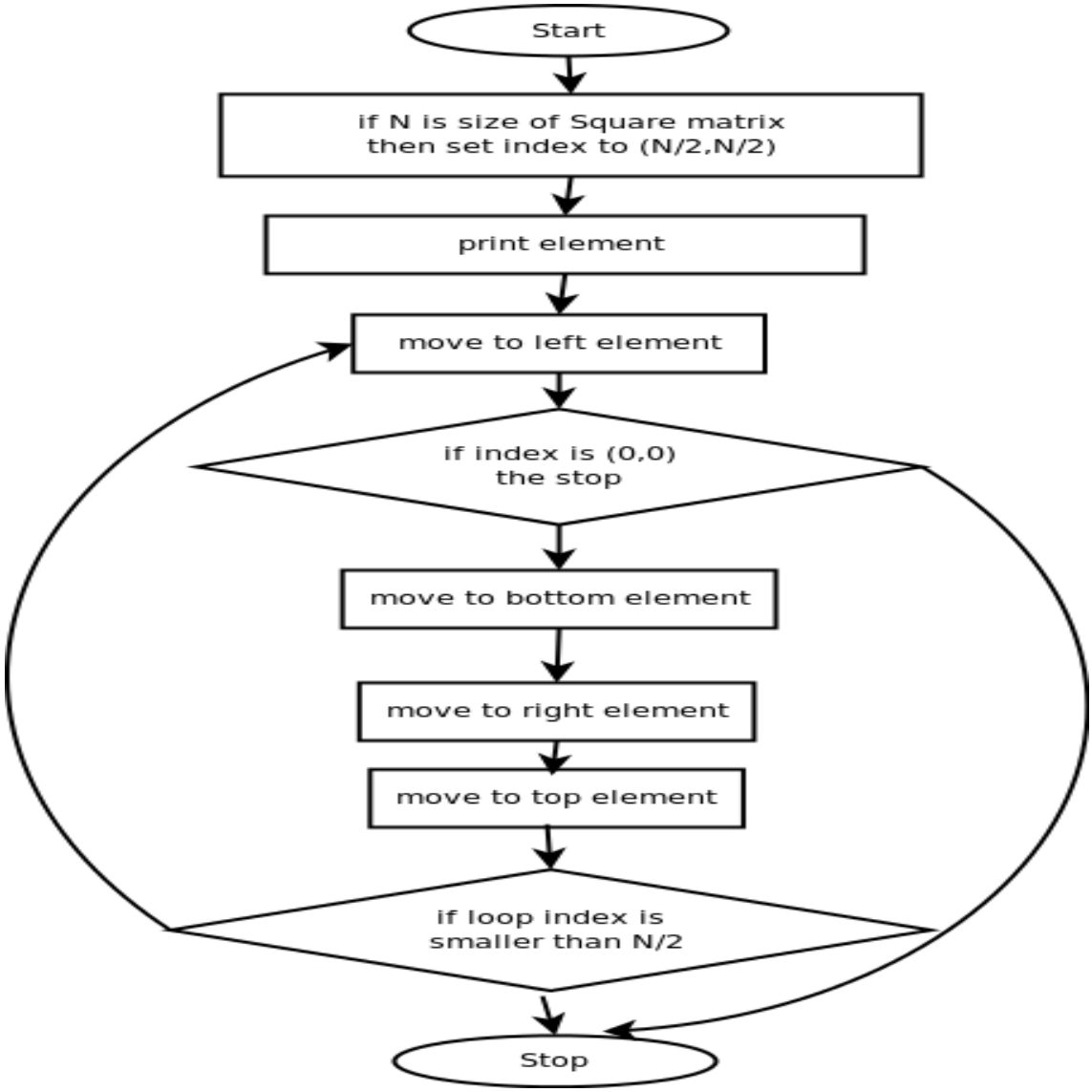
The methodology that is used for developing this project work is defined below:

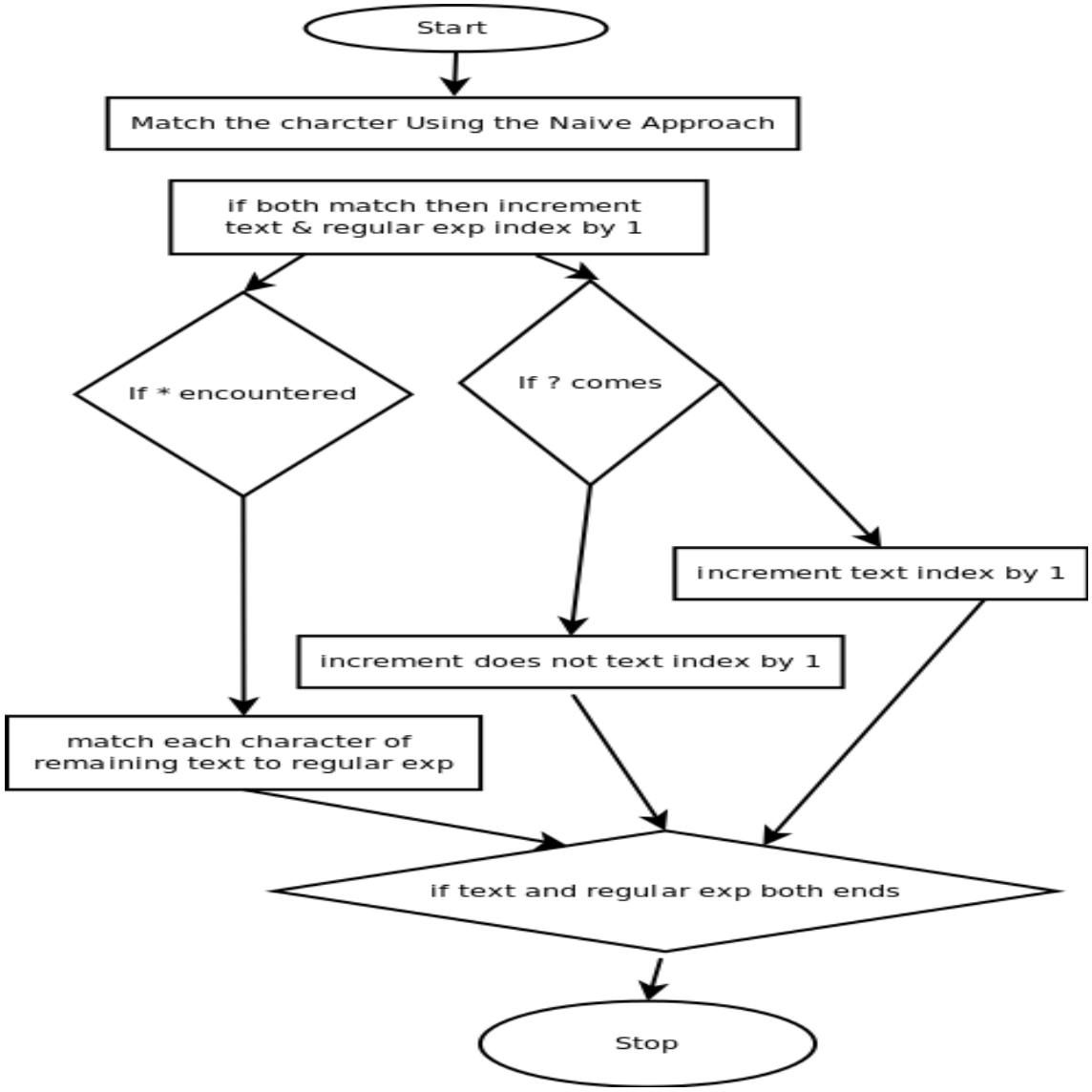
1. For the MATRIX TRAVERSAL CODE the idea was to go in an reverse spiral order.
2. Basically 4 'for' loops have been used which works as , the first loop prints the character towards the left from the center.
3. The second loop moves from left to right traversing the characters till upto the next column from the middle element so as to form a spiral.
4. The third and the fourth loop traverses for the remaining columns and rows respectively.
5. This is how we finally reach the end of the Traversal so as to reach the final element of the Matrix

Second Problem

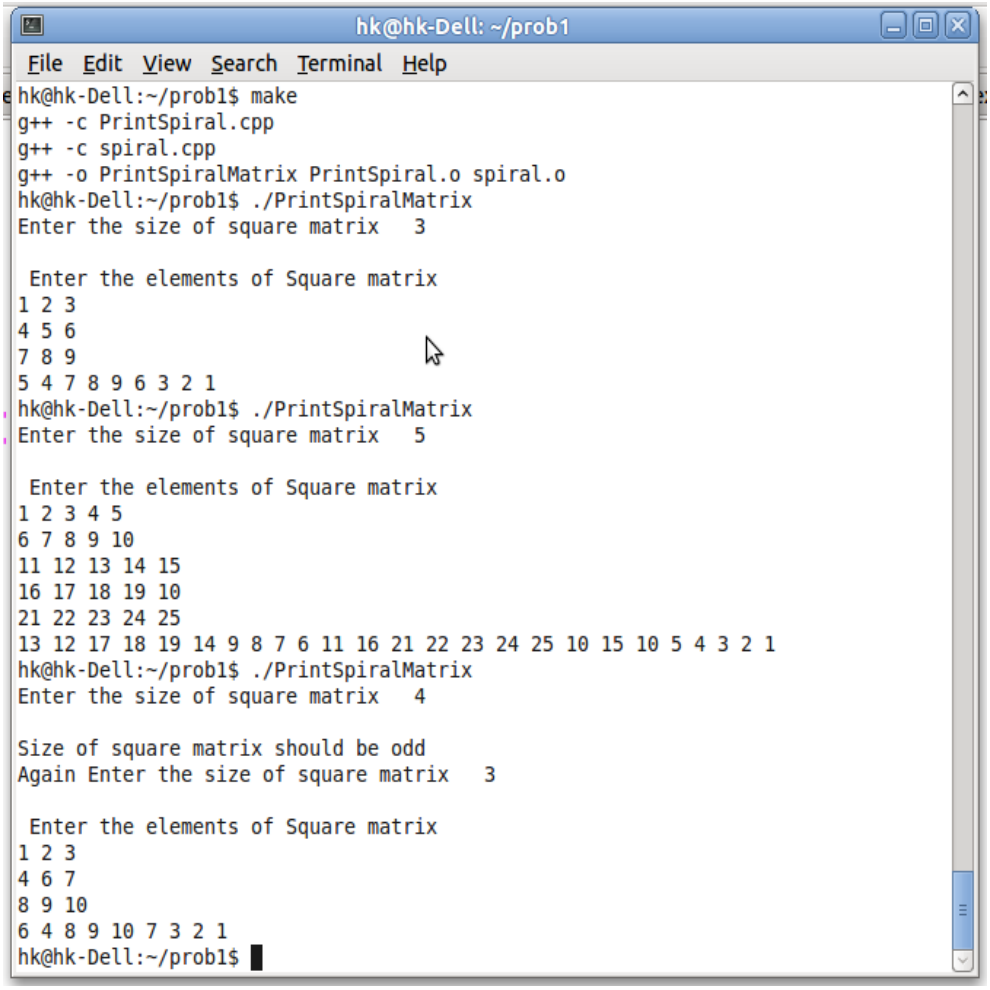
1. In the Second Code for the String matching has to be done.
2. As one of the Strings contain Wild Characters we have to implement the logic as per the specification.
3. User will be providing a odd number ordered Matrix
4. Now the logic is that string is first of all matched as if through a naive approach, however when a * is countered the fuction is recursively called to match to the second character value.

FLOWCHART

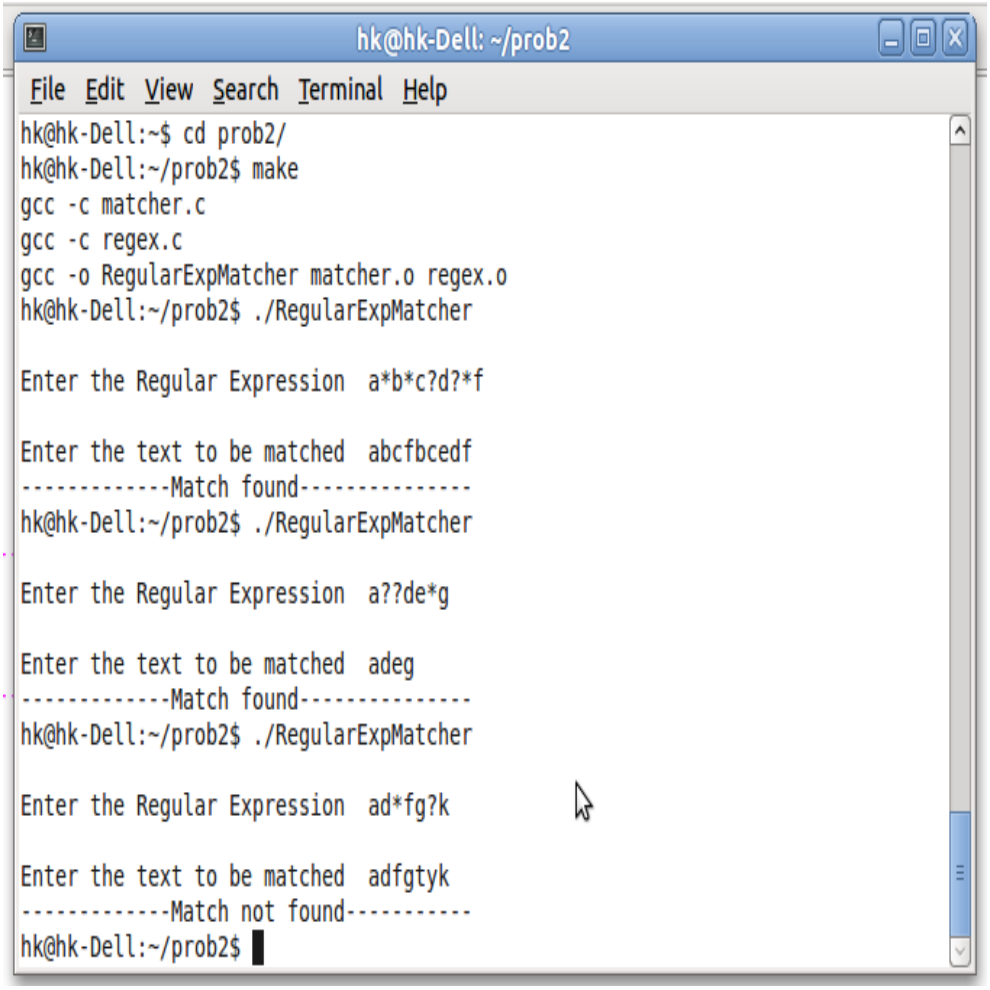

Start
if N is size of Square matrix
then set index to (N/2,N/2)
print element
move to left element
if index is (0,0)
the stop
move to bottom element
move to right element
move to top element
if loop index is
smaller than N/2
Stop


Start
Match the charcter Using the Naive Approach
if both match then increment
text & regular exp index by 1
If * encountered
If ? comes
increment text index by 1
increment does not text index by 1
match each character of
remaining text to regular exp
if text and regular exp both ends
Stop

OUTPUT



Output of Problem 1



Output of problem 2

RESULTS AND CONCLUSIONS

In both the cases the value output of the C and c++code is displayed on the user screen using the printf or cout command for the strings. In both the cases the output comes out to be as expected and is verified for all the conditions.