Linked Lists

In mathematics, the Farey sequence of order n is the sequence of completely reduced fractions between 0 and 1 which, when in lowest terms, have denominator less than or equal to n, arranged in ascending orders. For this question, you need to print out the Farey sequence from order 1 to n, where n is the input from the user using linked list.

Here is the example of the Farey sequences of orders 1 to 6 are:
Order 1: $\{0/1,1/1\}$
Oder 2: $\{0/1,1/2,1/1\}$
Oder 3: $\{0/1,1/3,1/2,2/3,1/1\}$
Oder 4: $\{0/1,1/4,1/3,1/2,2/3,3/4,1/1\}$
Oder 5: $\{0/1,1/5,1/4,1/3,2/5,1/2,3/5,2/3,3/4,4/5,1/1\}$
Oder 6: $\{0/1,1/6,1/5,1/4,1/3,2/5,1/2,3/5,2/3,3/4,4/5,5/6,1/1\}$

The Farey sequence start with {0/1, 1/1}. After that, at each level, a new fraction (a+b)/(c+d) is inserted between two neighbor fractions a/c and b/d only if c + d <= n. You will need to use linked list to calculate the fare sequence. The definition of the linked list node can be found in farey_seq.h. The main and print_list, and delete_list functions are given to you. Your only need to implement the farey_seq function. Your code should not create any memory leak. Sample output is also given for you.

To compile and run your code:
g++ -Wall -g -o farey farey_seq.c
./farey
To run your code with valgrind:
valgirnd ./farey