Computer Programming A, B, E
FAST-NU, Lahore, Spring 2017

Homework 3

Farey Fractions with Linked Lists

Due on Tuesday February 28 11:55 P.M. Marked out of 50 points.

Farey fractions of level 1 are defined as sequence $\left(\frac{0}{1}, \frac{1}{1}\right)$.

This sequence is extended in level 2 to form a sequence $\left(\frac{0}{1}, \frac{1}{2}, \frac{1}{1}\right)$,

sequence $\left(\frac{0}{1}, \frac{1}{3}, \frac{1}{2}, \frac{2}{3}, \frac{1}{1}\right)$ at level 3, and

sequence $\left(\frac{0}{1}, \frac{1}{4}, \frac{1}{3}, \frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{1}{1}\right)$ at level 4 and so on.

The rule followed here to extend the sequence is the following:

Between every two neighboring fractions $\frac{a}{c}$ and $\frac{b}{d}$ at level $n-1$ add a new fraction $\frac{a+b}{c+d}$ in level n **only if** $c + d \leq n$.

In this assignment you will write a program uses a linked list to store Farey Fractions:

i) You will ask the user to enter a number **n**, and create a Farey fraction sequence of level n, with each fraction in the sequence stored in a separate node in a linked list.

ii) You will ask the user either increase or decrease the level of the fraction by 1, and **update the same list** by making appropriate changes to its structure.

iii) You will give the user the option to change the level to **m,** and update the same list by making appropriate changes to its structure.

iv) Always print the list again after each change.

(All options should be provided to the user on the console, as a numbered menu.)

Each node in the list will look the following:

```
struct node{
   //numerator and denominator
   int neu, dem;
   //pointer to next node
   node * next;
};
```

THE END