Hints for Machine Assignment #5

Consider the desired list [X1, X2, …Xn]. It has to satisfy two constraints:

The first is:
X1 + X2 + X3 + … + Xn =2*N
expressing that the total number of occurrences of numbers in the list representing the X's is both X1 + X2 + X3 + … + Xn and 2*N

The second is:
0*X1+1*X2+ ... +(N-1)*Xn = N*(N+1)/2,
expressing that the sum of numbers which appear in the list of X's is both 1*X1+2*X2+...+N*Xn and (X1+... +Xn) + (1+...+N)

Notice that N is known, i.e., the length of the list of X's. Therefore the two above constraints are linear and can be handled by CLP(R). Furthermore, the solution offered by CLP(R) has to satisfy the condition that all the X's have to be integers (within a certain accuracy –check the specs for CLP(R)).

Further hint:

Keep two lists LX and LY where LX = [X1, X2, …Xn] and LY is initially a list containing N ones, i.e., LY = [1,1, …1]; write a short program that keeps adding one to an element of LY whenever it finds an X in the list LX. You may use *append's* for that purpose.

Some results of the program, where X is the desired list

{*X* = <3,1,3,1>},
{*X* = <2,3,2,1>},
{*X* = <3,2,3,1,1>},
{*X* = <4,3,2,2,1,1,1>},

Good Luck!