Models and Languages for Bioinformatics, AA 2018-19
Available time: 2 hours.

17/04/2019
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First name and family name:

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Exercise 1) Write a Prolog program ‘ascendingorder(L,N,M,LO)’ that given a list
of integers L, ordered in ascending order with possible repetitions
of values, and two integer numbers N, M,
returns an ordered list LO containing all elements in L plus N and M,
without repetitions.
So, for instance ascendingorder([-5,-3,0,1,1,4,7],7,2,[-5,-3,0,1,2,4,7]) is true.

Exercise 2) Write a Prolog program ‘eliminate2consecutivevalues(L,X,Y,LO)’ which
takes one input list of integers L, and two integer values X and Y, and returns
the list LO. LO is obtained by eliminating from L the first occurrence of
the ‘sequence’ X followed by Y. L is returned unchanged in case there is no occurrence
of X followed by Y.
So, eliminate2consecutivevalues([3,2,-1,3,5,7,-20,3,5],3,5,[3,2,-1,7,-20,3,5])
is true, and eliminate2consecutivevalues([3,2,-1,3,7,-20],3,8,[3,2,-1,3,7,-20]) is true.

Exercise 3) Consider a binary search tree of integers represented by the notation
we have seen in class. Namely, the constant nil represents an empty tree,
while a non empty tree is represented by the term t(N,Tree1,Tree2),
where ’t’ is a ternary function, N is the root (an integer value),
and Tree1 and Tree2 represents (inductively) the left and right subtrees.
Write a Prolog program intersectionTrees(T,T1,L), which given two binary search trees
T
and T1 returns the list L of the values which belong to the intersection
of the values in T1 and T2.
So, for instance
intersectionTrees(t(3,t(-1,nil,nil),t(4,nil,t(8,nil,nil)), t(2,t(-1,nil,nil),t(8,nil,t(9,nil,nil)), [-1,8])
is true.