

CS162 Discussion Session 5

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Homework 3

- **interval i j**: $\text{int} \rightarrow \text{int} \rightarrow \text{int list} = \langle \text{fun} \rangle$

Input: two integers i and j .

Output: a list containing the integers i through j inclusive.

Notice: if $i > j$, the output list is empty.

- **length list**: $'a \text{ list} \rightarrow \text{int} = \langle \text{fun} \rangle$

Input: a list of unknown type.

Output: the number of elements in the list.

Notice: use tail-recursion. All recursive calls are immediately followed by a return.

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- **compress list**: 'a list \rightarrow 'a list = < fun >

Input: a list of unknown type.

Output: a list of unknown type that eliminates consecutive duplicates of list elements.

- **goldbach n**: int \rightarrow int * int = < fun >

Input: a even number greater than 2.

Output: two prime numbers that sum up to the given even integer.

Homework 3

- **is_symmetric** t: 'a binary_tree \rightarrow bool =< fun >

Input: a binary tree of unknown type.

Output: whether the binary tree is symmetric or not (true / false).

Hint: only consider the structure; symmetric means right subtree is the “mirror” image of the left subtree.

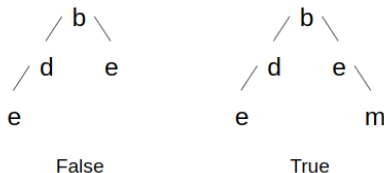


Figure 1: Examples of non-symmetric and symmetric trees

Homework 3

- `queens_positions` `n`: `int` \rightarrow `int list` `list` = `< fun >`

Input: the number of queens.

Output: all solutions of N-Queen problem so that no two queens are attacking each other. Check rows, columns and diagonals.

Q & A