

Declarative Programming

Workshop exercises set 4.

QUESTION 1

Write a Haskell version of the tree sort algorithm, which inserts all the to-be-sorted data items into a binary search tree, then performs an inorder traversal to extract the items in sorted order. Use simple structural induction where possible.

QUESTION 2

Write a Haskell function to "transpose" a list of lists. You may assume that all lists are non-empty, and that the inner lists are all the same length. If you are given a list of N lists, each of length M, the result should be a list of M lists, each of length N. For example,

```
transpose [[1,2],[4,4],[8,9]]
```

should return

```
[[1,4,8],[2,4,9]]
```

QUESTION 3

Write a Haskell function which takes a list of numbers and returns a triple containing the length, the sum of the numbers, and the sum of the squares of the numbers. Try coding this with (1) three separate traversals of the list and (2) a single traversal of the list.