Assignment 1, Advanced Functional Programming

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1 Stack Permutations

1.1 Algorithm

To check if the given inputs are stack permutations we try to order the input to the output. If we succeed we know that the given inputs are stack permutations. The implementation keeps a stack that values can be pushed to from the input and poped from and put on the output queue. The main loop is constructed as follows. We check if the top of the stack is the next item that should be enqued to the output queue, if that is the case we pop the item from the stack and equeue it on the output queue. If that is not the case we dequeue a item from the input stack and push it to the stack and repeat the previous step. Hence all items in the input queue will need to pass trough the stack in order to get to the output queue.

1.2 Properties Tested

To test the algorithm we use the Knuths properties that 231 patterns are not stack-sortable and all sequences without 231 patterns are stack-sortable.

We check both that sequences with 231 patterns returns false and that patterns without 231 patterns returns true

We also check a couple of less strict properties, for example that the same input and output are always stack sortable.