

COM 6854: Verification and Testing

Exercise Sheet 6

Exercise 1: Write Z-definitions for the sequence-functions *front* and *last*.

Exercise 2: Give an inductive definition of a function *incs* that increments each element in a sequence of numbers by one.

Exercise 3: Implement a stack and a first-in first-out queue (a FIFO queue) as a sequence.

- (a) For the stack, define the function
 - *push* that adds a value to the top of the stack,
 - *pop* that yields the stack after deleting its top value,
 - *top* that yields the value stored at the top of the stack.
- (b) For the FIFO queue, define the function
 - *enqueue* that adds a value to the end of the queue,
 - *dequeue* that yields the value at the beginning of the queue.
- (c) Are these implementations efficient?

Exercise 4: Give inductive proofs of the following statements:

- (a) $s \hat{\ } \langle \rangle = s$,
- (b) $rev(s \hat{\ } t) = (rev t) \hat{\ } (rev s)$,
- (c) $rev \circ rev = id$.