The objective of this tutorial exercise is to develop some insight into the modelling of sequences and bags.

Sequences

We frequently use sequences for modelling both abstract and concrete levels of system development. At the abstract level they are used for the modelling of the concept of sorting. Clearly sorting presumes the concept of ordering.

What is a sequence?
A sequence is an aggregate—as is a set—in which members of the sequence are ordered, that is, they have a position in the sequence, unlike a member of a set.

In the following questions write descriptions that could be used in a context machine.

1. Write a specification of SEQ, the set of all sequences of max length maxseqlength. Notice that sequences need to be coherent, that is an ordering can have no gaps.

2. There are two types of sequences: injective and non-injective. Explain the implications of this

3. Write a function that determines whether a sequence is ordered.

4. Write a function that can be used for swapping the values at two positions in a sequence.

5. Write a constant function that can be used to shift the elements in a sequence by some parametric amount n. Is the result a sequence?

6. Discuss how you would delete an element from a sequence and maintain the result as a sequence. This can be discussed at both the event level in a machine or context machine level.

7. Discuss methods for joining (appending) two sequences to produce a new sequence.