Event B Exercises 8
Context specification of SUM, SEQSUM,BAGSUM for summing contents of a set, a sequence and a bag, respectively.

CONTEXT Sigma

CONSTANTS

SET

SEQ

BAG

SUM

SEQSUM

BAGSUM

AXIOMS

axm1 : $SET = \{s \cdot s \subseteq \mathbb{N} \land finite(s) | s\}$

SET is the set of all finite subsets of $\mathbb{N}$

axm2 : $SUM \in SET \to \mathbb{N}$

SUM sums all the numbers in a finite set of natural numbers

axm3 : $\forall s, i \cdot s \in SET \land i \in s$

$\Rightarrow$

$SUM(s) = i + SUM(s \setminus \{i\})$

axm4 : $\forall s \cdot s \in SET \land s = \varnothing$

$\Rightarrow$

$SUM(s) = 0$

axm5 : $SEQ = \{s \cdot s \in \mathbb{N} \pfun \mathbb{N} \land finite(s) \land dom(s) = 1 \upto card(s) | s\}$

axm6 : $SEQSUM \in SEQ \to \mathbb{N}$

SEQSUM sums all the numbers in the sequence; there may be repeated values

axm7 : $\forall s \cdot s \in SEQ \land s \neq \varnothing$

$\Rightarrow$

$SEQSUM(s) = s(card(s)) + SEQSUM(s \setminus \{card(s) \mapsto s(card(s))\})$

axm8 : $\forall s \cdot s \in SEQ \land s = \varnothing$

$\Rightarrow$

$SEQSUM(s) = 0$

axm9 : $BAG = \mathbb{N} \pfun \mathbb{N}$

axm10 : $BAGSUM \in BAG \to \mathbb{N}$

BAGSUM sums the product m*n for each mn in the bag

axm11 : $\forall b, x \cdot b \in BAG \land b \neq \varnothing \land x \in dom(b)$

$\Rightarrow$

$BAGSUM(b) = x * b(x) + BAGSUM(\{x\} \domsub b)$

END