SUM OR DISJOINT UNION

A special operation on sets forms a single set, like the operation union, but keeps the elements tagged with their origin set. We can use the sequence to do this by defining an operation $\Sigma$ on a sequence $\theta$:

$$\Sigma \theta \triangleq \{[i, x] \mid i \in \text{dom } \theta \text{ and } x \in (\theta i)\}.$$  

The sum is then defined by: $S + T \triangleq \Sigma \langle S, T \rangle$.

In general we can write:  

$$\sum_{i=1}^{n} S_i \triangleq S_1 + S_2 + \cdots S_n \triangleq \Sigma \langle S_1, S_2, \ldots S_n \rangle$$