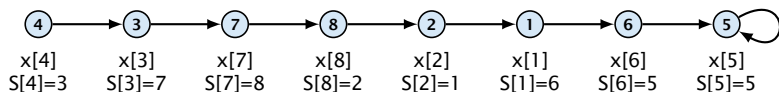# Parallel Prefix

Input: a linked list given by successor pointers; a value $x[i]$ for every list element; an operator $*$;

Output: for every list position ℓ the sum (w.r.t. $*$) of elements after ℓ in the list (including ℓ)

Parallel Prefix

Algorithm 7 ParallelPrefix

1: **for** $1 \leq i \leq n$ **pardo**
2:      $P[i] \leftarrow S[i]$
3:      **while** $S[i] \neq S[S[i]]$ **do**
4:          $x[i] \leftarrow x[i] * x[S[i]]$
5:          $S[i] \leftarrow S[S[i]]$
6:      **if** $P[i] \neq i$ **then** $x[i] \leftarrow x[i] * x[S(i)]$

The algorithm runs in time $\mathcal{O}(\log n)$.

It has work requirement $\mathcal{O}(n \log n)$. non-optimal

This technique is also known as pointer jumping