Fixpoint Examples

Problem 1 Define the following sets / functions by fixpoints:

1. $\mathbb{N} = \{0, 1, 2, 3, \dots\}$:

$$\frac{}{0} \qquad \frac{n}{n+1}$$

2. The set of all integer lists:

$$\frac{}{\mathsf{nil}} \qquad \frac{l}{n \cdot l}\ n \in \mathbb{Z}$$

3. In a directed graph (N, E), where N is the set of nodes and $E \subseteq N \times N$ the set of edges, the set of nodes reachable from $I \subseteq N$:

4. The factorial function:

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fact(n) = if n == 0 then 1 else n * fact(n-1)
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