Algorithm 1 Compute Achieved Landmarks From Observations.

Input: *$\mathcal{I}$ initial state, $\mathcal{G}$ set of candidate goals, O observations*, and *$\mathcal{L}_{\mathcal{G}}$ goals and their extracted landmarks.*
Output: *A map of goals to their achieved landmarks.*

function COMPUTEACHIEVEDLANDMARKS($\mathcal{I}, \mathcal{G}, O, \mathcal{L}_{\mathcal{G}}$)
    $\Lambda_{\mathcal{G}} \leftarrow \langle\rangle$ ▷ *Map goals $\mathcal{G}$ to their respective achieved landmarks.*
    for each goal G in $\mathcal{G}$ **do**
        $\mathcal{L}_G \leftarrow$ fact landmarks of G s.t $\langle G, \mathcal{L}_G \rangle$ in $\mathcal{L}_{\mathcal{G}}$
        $\mathcal{L}_{\mathcal{I}} \leftarrow$ all fact landmarks $L \in \mathcal{I}$
        for each observed action o in O **do**
            $\mathcal{L} \leftarrow$ all fact landmarks L in $\mathcal{L}_G$ such that $L \in \mathit{pre}(o) \cup \mathit{eff}(o)^+$ and $L \notin \mathcal{L}$
            $\mathcal{L}_{\prec} \leftarrow$ predecessors $L_{\prec}$ of all L in $\mathcal{L}$, such that $L_{\prec} \notin \mathcal{L}$
            $\mathcal{AL}_G \leftarrow \mathcal{AL}_G \cup \{\mathcal{L}_{\mathcal{I}} \cup \mathcal{L} \cup \mathcal{L}_{\prec}\}$
        end for
        $\Lambda_{\mathcal{G}}(G) \leftarrow \mathcal{AL}_G$ ▷ *Achieved landmarks of G.*
    end for
    return $\Lambda_{\mathcal{G}}$
end function