

$$\begin{aligned}
(R_u, \ell) \triangleleft (R_v, m) &\stackrel{\text{def}}{=} \ell \in \mathcal{I} \wedge m \in \mathcal{I} \wedge \\
& \left(\bigvee_{i=0}^{d-1} (\ell_i < m_i \wedge \bigwedge_{j=0}^{i-1} \ell_j = m_j) \vee \right. \\
& \left. \bigwedge_{j=0}^{d-1} \ell_j = m_j \wedge u < v \right)
\end{aligned} \tag{2}$$