Definition (U endofunctor). The U endofunctor has the form U: Pos \rightarrow Pos and acts on objects and morphisms as follows:

- 1. On objects: Given a poset $P \in Ob_{Pos}$, U maps P to its upper set.
- 2. *On morphisms*: Given posets P, Q, and a monotone map $f: P \rightarrow Q$, the U endofunctor acts as:

$$U(f): \mathcal{U}P \to \mathcal{U}Q$$

$$P' \mapsto \uparrow \left(\bigcup_{p \in P'} \{f(p)\}\right).$$