Exercise 2

Context: given a transactional dataset $\mathbb{T} \in 2^{\{ms:2^{\mathbb{X}} \to \mathbb{N}\}}$ on the universal set of items $\mathbb{X}$, and a two non-empty disjoint set of items $X, Y \subseteq \mathbb{X}$, a rule-quality function $q : 2^{\{ms:\mathbb{X} \to \mathbb{N}\}} \times 2^{\mathbb{X}} \times 2^{\mathbb{X}} \to \mathbb{R}$, let $rule : X \to Y$ let us define the $cpo_{rule,\mathbb{T},q}$ on the set X as $cpo_{rule,\mathbb{T},q}(X') = q(\mathbb{T}, X', Y)$ for any $X' \subseteq X$.

Assignment:
Implement and test a function:

rule-shapley :
$2^{\{ms:\mathbb{X} \to \mathbb{N}\}} \times \{q : 2^{\{ms:\mathbb{X} \to \mathbb{N}\}} \times 2^{\mathbb{X}} \times 2^{\mathbb{X}} \to \mathbb{R}\} \times 2^{\mathbb{X}} \times 2^{\mathbb{X}} \to \{f : \mathbb{X} \to \mathbb{R}\}$

Such that for any transactional dataset $\mathbb{T}$, any rule-quality function q, any rule $rule : X \to Y$ the value

$rule\text{-}shapley(\mathbb{T}, q, X, Y)(x) = s_{x,cpo_{rule,\mathbb{T},q}}$

for each $x \in X$