Definition (Design problem with implementation). A *design problem with implementation* (DPI) is a tuple

$$\langle \mathbf{F}, \mathbf{R}, \mathbf{I}, \mathsf{prov}, \mathsf{req} \rangle$$

where:

- $\mathbf{F}$ is a poset, called *functionality space*;
- $\mathbf{R}$ is a poset, called *requirements space*;
- $\mathbf{I}$ is a set, called *implementation space*;
- the map $\mathsf{prov} : \mathbf{I} \to \mathbf{F}$ maps an implementation to the functionality it provides;
- the map $\mathsf{req} : \mathbf{I} \to \mathbf{R}$ maps an implementation to the resources it requires.