

**Definition** (Design problem with implementation)

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

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

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  $\text{prov} : \mathbf{I} \rightarrow \mathbf{F}$  maps an implementation to the functionality it provides;
- ▷ the map  $\text{req} : \mathbf{I} \rightarrow \mathbf{R}$  maps an implementation to the resources it requires.