

## Definition (Kleisli category)

Let  $\langle M, \mu, \eta \rangle$  be a monad on a category  $\mathbf{C}$ . The *Kleisli category*  $\mathbf{C}_M$  of the monad  $M$  is specified by:

1. *Objects*:  $\mathbf{Ob}(\mathbf{C}_M) := \mathbf{Ob}(\mathbf{C})$ ;
2. *Morphisms*:  $\mathbf{Hom}_{\mathbf{C}_M}(X, Y) := \mathbf{Hom}_{\mathbf{C}}(X, M(Y))$ ;
3. *Identities*:  $\text{Id}_X := \eta_X$ ;
4. *Composition*: Kleisli composition.