

Definition 1. *Functor*

A functor F between to categories C and D consists of two functions. One which maps objects from C to objects in D and one which maps morphisms from C to morphisms in D . Moreover, the following must hold:

$$(1) \text{ for } f \in \text{Hom}(A, B), F(f) \in \text{Hom}(F(A), F(B))$$

$$(2) F(\text{id}_A) = \text{id}_{F(A)}$$

$$(3) F(g \circ f) = F(g) \circ F(f)$$