## **Definition** (Adjunction, Version 2)

Let **C** and **D** be categories. An *adjunction* from **C** to **D** is given by the following data, satisfying the following conditions.

## Data:

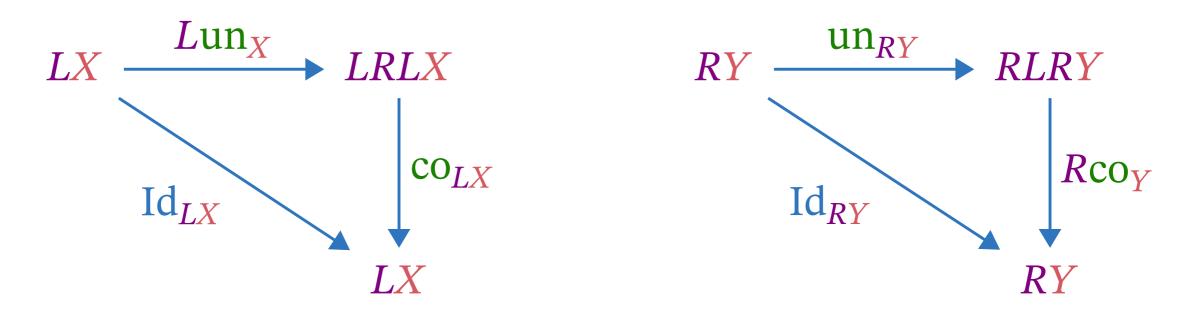
- 1. A functor  $L: \mathbb{C} \to \mathbb{D}$  (the *left adjoint*);
- 2. A functor  $R: \mathbf{D} \to \mathbf{C}$  (the right adjoint);
- 3. Natural transformations un :  $Id_{\mathbf{C}} \Rightarrow L \ ; R \text{ and co} : R \ ; L \Rightarrow Id_{\mathbf{D}}$

## **Conditions:**

1. For all objects *X* of **C**, it holds that

$$L\operatorname{un}_X \operatorname{s} \operatorname{co}_{LX} = \operatorname{Id}_{LX} \text{ and } \operatorname{un}_{RY} \operatorname{s} R\operatorname{co}_Y = \operatorname{Id}_{RY}$$

i.e. that the following diagrams commute:



The 2-morphisms un and co are called the *unit* and *counit* of the adjunction. An adjunction is called an *adjoint equivalence* if the unit and counit are natural isomorphisms.