Definition (Categorical Product). Let C be a category and let $X, Y \in Ob_C$ be objects. The *product* of X and Y is defined by the following consituent data, satisfying the following condition.

Data:

- 1. an object $Z \in Ob_{\mathbb{C}}$ (this is "the product" of X and Y);
 - 2. projection morphisms $\pi_1: \mathbb{Z} \to X$ and $\pi_2: \mathbb{Z} \to Y$,

Condition:

1. For any $T \in \operatorname{Ob}_{\mathbb{C}}$ and any morphisms $f: T \to X, g: T \to Y$, there exists a unique morphism $\phi_{f,g}: T \to Z$ such that $f = (\phi_{f,g}) \ \mathring{,} \ \pi_1$ and $g = (\phi_{f,g}) \ \mathring{,} \ \pi_2$.