

Definition (The category **Tup**)

The category **Tup** is defined as follows:

1. *Objects*: lists of sets.
2. *Morphisms*: A morphism from \mathbf{A} to \mathbf{B} is a list of n functions $f_i : \mathbf{A}_i \rightarrow \mathbf{B}_i$ such that $\mathbf{A} = \langle \mathbf{A}_1, \dots, \mathbf{A}_n \rangle$ and $\mathbf{B} = \langle \mathbf{B}_1, \dots, \mathbf{B}_n \rangle$.
3. *Composition of morphisms*: Composition is given by function composition.
4. *Identities*: The identity on an object $\langle \mathbf{A}_1, \dots, \mathbf{A}_n \rangle$ is given by $\langle \text{Id}_{\mathbf{A}_1}, \dots, \text{Id}_{\mathbf{A}_n} \rangle$.