Suppose $X, Y$ are topological spaces.

If $x_0 \in X$, a germ at $x_0$ is an equivalence class of pairs $[U, f]$, where $x_0 \in U^\text{open} \subseteq X$ and

$$f: U \rightarrow Y$$

where $[U, f] \sim [U', f']$

when $\exists \ V, \ x_0 \in V^\text{open} \subseteq U \cap U'$

$$f|_V \equiv f'|_V$$

One route: $F_{x_0} = \{ \text{all germs at } x_0 \}$

\[ \text{stalk, a.k.a. fibre} \]

Sheaf: \[ \bigcup_{x \in X} \overset{\text{F}_x}{} \]

Given a topological space $X$,

Consider the category $\mathcal{C}_X$ whose objects are the topology of $X$ and morphisms are inclusions.
Given a category $A$

An $A$-presheaf on $X$ is a contravariant functor $\mathcal{F}: \mathcal{T}_X \rightarrow A$

Given $U \subseteq V \in \mathcal{T}_X$

we get a restriction map $\rho: \mathcal{F}(V) \rightarrow \mathcal{F}(U)$

\[ \exp. \quad \mathcal{F}(U) = \{ f: U \rightarrow Y \}$, $U \subseteq V

\rho: \mathcal{F}(V) \rightarrow \mathcal{F}(U)

f \mapsto f | _U