Concept	1-Categorical construction	$\infty$ -Categorical construction	Intuition
F-Cartesian edge	$F: X \to S$ a functor, $f: x \to y$ a morphism in $X$ is $F$ -cartesian if the induced map $X_{/f} \to X_{/y} \times_{S_{/F(y)}} S_{/F(f)}$ is an isomorphism of categories. ([nLa25a], Prop 2.4)	$F: X \to S$ an inner fibration of simplicial sets, $f: x \to y$ an edge in $X$ is $F$ -cartesian if the induced map $ X_{/f} \to X_{/y} \times_{S_{/F(y)}} S_{/F(f)} $ is a trivial Kan fibration. ([Lur09], Def 2.4.1.1)	In the model structure on sSet, the fibrations are Kan fibrations and the weak equivalences are weak homotopy equivalences ([Lur09], A.2.7). A trivial fibration in a model category is a map which is both a fibration and a weak equivalence, which in sSet is equivalent to the definition given in this table. Thus, being related by a Kan fibration is a higher categorical notion of 'sameness'. Why not a categorical equivalence? [Lur09] Rem 1.2.5.5 implies this is stronger, which would match more with the fact that the 1-categorical version is defined in terms of an isomorphism (not equivalence) of categories.
Category	Collection of objects $C$ , set $\operatorname{Hom}(X,Y)$ for every $X,Y\in C$ , associative composition and identity morphisms	Simplicial set $C: \Delta^{\text{op}} \to \mathbf{Set}$ satisfying the inner horn filling condition. ([Lur09], Def 1.1.2.4)	Category with objects $C_0$ , morphisms $C_1$ , morphisms between morphisms $C_2$ , etc. Inner horn filling defines a non-unique composition.
F-Cocartesian edge	$F: X \to S$ a functor, $f: x \to y$ a morphism in $X$ is $F$ -cocartesian if the induced map $X_{f/} \to X_{x/} \times_{S_{F(y)/}} S_{F(f)/}$ is an isomorphism of categories. ([nLa25a], Prop 2.4)	$F: X \to S$ an inner fibration of simplicial sets, $f: x \to y$ an edge in $X$ is $F$ -cartesian if the induced map $X_{f/} \to X_{x/} \times_{S_{F(y)/}} S_{F(f)/}$ is a trivial Kan fibration. ([Lur09], Def 2.4.1.1 / Prop 2.4.1.8)	Note that the definitions of an inner fibration and a Kan fibration are invariant under taking opposites. For other intuition, see: F-cartesian edge.
Colimit	A colimit for $F: J \to \mathcal{C}$ is an initial cocone on $F$ .	A colimit for $F: X \to \mathcal{C}$ (X a simplicial set, $\mathcal{C}$ an $\infty$ -category) is an initial object of $\mathcal{C}_{F/}$ . ([Lur09], Def 1.2.13.4)	The obvious extension of the definition of the undercategory $\mathcal{C}_{C/}$ for $C: \{*\} \to \mathcal{C}$ to $\mathcal{C}_{/F}$ for an arbitrary functor $F: J \to \mathcal{C}$ ends up being exactly $\mathbf{Cocone}(F)$ .
Dual object	[todo]	[todo]	[todo]
Essentially surjective functor	$F: \mathcal{C} \to \mathcal{D}$ is essentially surjective if for every $D \in \mathcal{D}$ , there exists some $C \in \mathcal{C}$ with $FC \cong D$ .	$F: \mathcal{C} \to \mathcal{D}$ is essentially surjective if $hF: hC \to h\mathcal{D}$ is essentially surjective. ([Lur09], Def 1.2.10.1)	Essentially surjective up to homotopy.
Faithful functor	$F: \mathcal{C} \to \mathcal{D}$ is faithful if $\operatorname{Hom}(X,Y) \to \operatorname{Hom}(FX,FY)$ is injective for all $X,Y \in \mathcal{C}$ .	$F: \mathcal{C} \to \mathcal{D}$ is faithful if $hF: h\mathcal{C} \to h\mathcal{D}$ is faithful. ([Lur09], Def 1.2.10.1)	Faithful up to homotopy.
Final object	Object $C \in \mathcal{C}$ such that for any other object $C' \in \mathcal{C}$ , there exists a unique morphism $C' \to C$ .	Object $C \in \mathcal{C}$ such that $C$ is final in $h\mathcal{C}$ , regarded as an enriched category over $\mathcal{H}$ . ([Lur09], Def 1.2.12.1)	Object $C \in \mathcal{C}$ such that for any other object $C' \in \mathcal{C}$ , there exists a unique (up to homotopy) morphism $C' \to C$ .
Full functor	$F: \mathcal{C} \to \mathcal{D}$ is full if $\operatorname{Hom}(X,Y) \to \operatorname{Hom}(FX,FY)$ is surjective for all $X,Y \in \mathcal{C}$ .	$F: \mathcal{C} \to \mathcal{D}$ is full if $hF: h\mathcal{C} \to h\mathcal{D}$ is full. ([Lur09], Def 1.2.10.1)	Full up to homotopy.
Functor	Functor.	Natural transformation of simplicial sets. ([Lur09], 1.2.7)	-

Initial object  Object $C \in C$ such that for any other object $C' \in C$ , there exists a unique morphism $C \to C'$ .  Join $C \star D$ has objects ob $C \sqcup \text{ob} D$ , and Hom $_{C^*P}(X,Y)$ is given by: $C \star D$ has objects ob $C \sqcup \text{ob} D$ , and Hom $_{C^*P}(X,Y)$ is given by: $C \star D$ has objects ob $C \sqcup \text{ob} D$ , and Hom $_{C^*P}(X,Y)$ is given by: $C \star D$ has objects ob $C \sqcup \text{ob} D$ , and Hom $_{C^*P}(X,Y)$ is given by: $C \star D$ has objects ob $C \sqcup \text{ob} D$ , and Hom $_{C^*P}(X,Y)$ is given by: $C \star D$ has objects ob $C \sqcup \text{ob} D$ , and Hom $_{C^*P}(X,Y)$ is given by: $C \star D$ has being a signal of the two undary map $A : (C \star D)_{P-1}$ . The boundary map $A : (C \star D)_{P-1}$ is defined on $C_p$ and $C_p \to C'$ . $C \star D$ has objects ob $C \sqcup \text{ob} D$ , and $C \star D$ is a signal of $C \star D$ is a signal of $C \star D$ is a signal of $C \star D$ is a signal object of $C \star D$ is a signal object of $C \star D$ is a signal object of $C \star D$ is a terminal case	Crouncid	Catagony whose morphisms are	Van aamplay	Not only on you find (non
Initial object $\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Groupoid	Category whose morphisms are	Kan complex.	Not only can you find (non-
Initial object  Object $C \in C$ such that for any other object $C' \in C$ , there exists a unique morphism $C \to C'$ .  Join $C * D$ has objects ob $C \sqcap O D$ , and $I \operatorname{Im}(x, Y) \to X, Y \in C$ , $I \operatorname{Im}(x, Y) \to X, Y \to C$ , $I \operatorname{Im}(x, Y) \to X, Y \to C$ , $I \operatorname{Im}(x, Y) \to X, Y \to C$ , $I \operatorname{Im}(x, Y) \to X, Y \to C$ , $I \operatorname{Im}(x, Y) \to X, Y \to C$ , $I \operatorname{Im}(x, Y) \to X, Y \to C$ , $I \operatorname{Im}(x, Y) \to X, Y \to C$ , $I \operatorname{Im}(x, Y) \to X, Y \to C$ , $I \operatorname{Im}(x, Y) \to X, Y \to C$ , $I \operatorname{Im}(x, Y) \to X, Y \to C$ , $I \operatorname{Im}(x, Y) \to X, Y \to C$ , $I \operatorname{Im}(x, Y) \to X, Y \to C$ , $I \operatorname{Im}(x, Y) \to X, Y \to C$ , $I $		an invertible.		
Initial object  Object $C \in \mathcal{C}$ such that for any other object $C \in \mathcal{C}$ such that $C$ is initial in $K_C$ , regarded as an enriched actagory over $K_C$ ([Lun09], and $K_C$ ). The soliptest ob $C \cup ob D$ , and $K_C$ regarded as an enriched actagory over $K_C$ ([Lun09], and $K_C$ ). The soliptest ob $C \cup ob D$ , and $K_C$ regarded as an enriched actagory over $K_C$ ([Lun09], and $K_C$ ). The soliptest ob $K_C$ object $K_C$ of $K_C$ be an ensimplicies ( $C * D$ ) = and $K_C$ regarded as an enriched actagory over $K_C$ ([Lun09], and $K_C$ ). The soliptest $K_C$ of $K_C$ be an ensimplicies ( $C * D$ ) = object $K_C$ of $K_C$ be an ensimplicies ( $C * D$ ) = object $K_C$ of $K_C$ be an ensimplicies ( $C * D$ ) = object $K_C$ of $K_C$ be an ensimplicies ( $C * D$ ) = object $K_C$ of $K$				_
Initial object $C \in C$ such that for any other object $C \in C$ , there exists a unique morphism $C \to C'$ .  Join $C \star \mathcal{D}$ has objects ob $C \sqcup \phi D_{\gamma}$ and $\operatorname{Hom}_{c,\tau}(X,Y)$ is given by: $C \star \mathcal{D}$ has objects ob $C \sqcup \phi D_{\gamma}$ and $\operatorname{Hom}_{c,\tau}(X,Y)$ is given by: $C \star \mathcal{D}$ has objects ob $C \sqcup \phi D_{\gamma}$ and $\operatorname{Hom}_{c,\tau}(X,Y)$ is given by: $C \star \mathcal{D}$ has $C \star \mathcal{D}$ .  Homp $(X,Y) \times X \neq \mathcal{D}$ , $C \star \mathcal{D}$ has $C \star \mathcal{D}$ and $C \star \mathcal{D}$ is given by: $C \star \mathcal{D}$ has $C \star \mathcal{D}$ .  If $C \star \mathcal{D}$ has objects ob $C \sqcup \phi D_{\gamma}$ and $C \star \mathcal{D}$ has $C \star \mathcal{D}$ and $C \star \mathcal{D}$ has $C \star \mathcal{D}$ has $C \star \mathcal{D}$ . The interpolation of $C \star \mathcal{D}$ has $C \star \mathcal{D}$ has $C \star \mathcal{D}$ . The interpolation of $C \star \mathcal{D}$ has $C \star \mathcal{D}$ has $C \star \mathcal{D}$ . The interpolation of $C \star \mathcal{D}$ has $C \star \mathcal{D}$ has $C \star \mathcal{D}$ has $C \star \mathcal{D}$ . The interpolation of $C \star \mathcal{D}$ has $C \star \mathcal{D}$				$\begin{array}{cccccccccccccccccccccccccccccccccccc$
Initial object $C \in C$ such that for any other object $C \in C$ , there exists a unique morphism $C \to C'$ .  Join $C \star \mathcal{D}$ has objects ob $C \sqcup ob \mathcal{D}$ .  And $\operatorname{Hom}_{C \star \mathcal{D}}(X, Y)$ is given by: $(Blom_C(X, Y) \times X, Y \in \mathcal{D}, Hom_D(X, Y) \times X, Y \in \mathcal{D}, Ultimoply, 1.2.8)$ $(Blom_D(X, Y) \times X, Y \in \mathcal{D}, Hom_D(X, Y) \times X, Y \in \mathcal{D}, Hom_D(X, Y) \times X, Y \in \mathcal{D}, Ultimoply, 1.2.8)$ $(Blom_D(X, Y) \times X, Y \in \mathcal{D}, Hom_D(X, Y) \times X, Y \in \mathcal{D}, Ultimoply, 1.2.8)$ $(Blom_D(X, Y) \times X, Y \in \mathcal{D}, Hom_D(X, Y) \times X, Y \in \mathcal{D}, Ultimoply, Y, Y, Y \in \mathcal{D}, Hom_D(X, Y) \times X, Y \in \mathcal{D}, Ultimoply, Y, Y, Y, Y \in \mathcal{D}, Ultimoply, Y, Y,$				
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$				
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Initial object	Object $C \in \mathcal{C}$ such that for any	Object $C \in \mathcal{C}$ such that $C$ is ini-	Object $C \in \mathcal{C}$ such that for any
Join $C * \mathcal{D} \text{ has objects ob } \mathcal{C} \sqcup \text{ ob } \mathcal{D}, \\ \text{and } \text{Hom}_{\mathcal{C},\mathcal{D}}(X,Y) \text{ is given by} \\ \text{Hom}_{\mathcal{C}}(X,Y) \text{ is given by} \\ \text{Hom}_{\mathcal{C}}(X,Y) \text{ is given by} \\ \text{Hom}_{\mathcal{C}}(X,Y) \text{ is given by} \\ \text{Hom}_{\mathcal{D}}(X,Y) \text{ is given by} \\ \text{Hom}_{\mathcal{D}$	,			
$ \begin{bmatrix} C\star\mathcal{D} \text{ has objects o} \text{ obj } C \sqcup \text{ ob} \mathcal{D}, \\ \text{and } \text{Hom}_{\mathcal{C},N}(X,Y) \text{ is given by}. \\ \text{Hom}_{\mathcal{C}}(X,Y)  X,Y \in \mathcal{C}, \\ \text{Hom}_{\mathcal{D}}(X,Y)  X,Y \in \mathcal{C}, \\ \text{Hom}_{\mathcal{D}}(X,Y)  X,Y \in \mathcal{C}, \\ \text{Hom}_{\mathcal{D}}(X,Y)  X,Y \in \mathcal{D}, \\  & X\in\mathcal{D},Y\in\mathcal{C}, \\  & X\in\mathcal{D},Y\in\mathcal{C}, \\  & X\in\mathcal{C},Y\in\mathcal{D}. \\ \end{bmatrix} \\  & X\in\mathcal{D},Y\in\mathcal{C}, \\  & X\in\mathcal{C},Y\in\mathcal{D}. \\ \end{bmatrix} \\  & X\in\mathcal{D},Y\in\mathcal{C}, \\  & X\in\mathcal{C},Y\in\mathcal{D}. \\ \end{bmatrix} \\  & X\in\mathcal{C},Y\in\mathcal{D}. \\ \end{bmatrix} \\  & X\in\mathcal{D},Y\in\mathcal{C}, \\  & X\in\mathcal{C},Y\in\mathcal{D}. \\ \end{bmatrix} \\  & X\in\mathcal{C},Y\in\mathcal{D}. \\ \end{bmatrix} \\  & X\in\mathcal{D},Y\in\mathcal{C}, \\  & X\in\mathcal{C},Y\in\mathcal{D}. \\ \end{bmatrix} \\  & X\in\mathcal{C},X\in\mathcal{D}. \\ \end{bmatrix} \\  & X\in\mathcal{D},Y\in\mathcal{C}. \\  & X\in\mathcal{D}. \\ \end{bmatrix} \\  & X\in\mathcal{D},Y\in\mathcal{C}. \\  & X\in\mathcal{D}. \\ \end{bmatrix} \\  & X\in\mathcal{C},X\in\mathcal{D}. \\ \end{bmatrix} \\  & X\in\mathcal{D}. \\ \end{bmatrix} \\  & X\in\mathcal{D},Y\in\mathcal{D}. \\ \end{bmatrix} \\  & X\in\mathcal{D},Y\in\mathcal{D}. \\ \end{bmatrix} \\  & X\in\mathcal{D},Y\in\mathcal{D}.$		a unique morphism $C \to C'$ .	category over $\mathcal{H}$ . ([Lur09], Def	a unique (up to homotopy) mor-
			1.2.12.1)	
	Join	*		"
		and $\operatorname{Hom}_{\mathcal{C}\star\mathcal{D}}(X,Y)$ is given by:	$\mathcal{C}_n \cup \mathcal{D}_n \cup \bigcup_{i+j=n-1} \mathcal{C}_i \times \mathcal{D}_j$ . The	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		$ \int \operatorname{Hom}_{\mathcal{C}}(X,Y)  X,Y \in \mathcal{C}, $	ith boundary map $d_i: (\mathcal{C} \star \mathcal{D})_n \to$	
$ \begin{cases} \emptyset & X \in \mathcal{D}, Y \in \mathcal{C}, \\ X \in \mathcal{C}, Y \in \mathcal{D}. \end{cases} \\ ([Lur09], 1.2.8) \end{cases}                                   $		$\  \int \operatorname{Hom}_{\mathcal{D}}(X,Y)  X,Y \in \mathcal{D},$		-
		$X \in \mathcal{C}, Y \in \mathcal{D}$		
			$a_i(\sigma,\tau)$ is given by	
$ \text{If } j=0, \text{ then } d_0(\sigma,\tau)=\tau, \text{ and } \text{ if } k=0, \text{ then } d_0(\sigma,\tau)=\tau, \text{ and } \text{ if } k=0, \text{ then } d_n(\sigma,\tau)=\sigma. \\ ([\text{Lur09}], \text{ Def 1.2.8.1} / [\text{InLa25b}]) \\ C^{\lhd}:=[0] \star C. \\ C^{\circ}:=[0] \star C. \\ $		([24100], 1.2.0)	$(d,\sigma,\tau) \qquad i \leq i, i \neq 0$	
$ \text{If } j=0, \text{ then } d_0(\sigma,\tau)=\tau, \text{ and } \text{ if } k=0, \text{ then } d_0(\sigma,\tau)=\tau, \text{ and } \text{ if } k=0, \text{ then } d_0(\sigma,\tau)=\sigma. \\ ([\text{Lur09}], \text{ Def 1.2.8.1} / [\text{nLa25b}]) \\ C^3:=[0]\star C. $			$\begin{cases} (a_i b, T) & t \leq J, J \neq 0, \\ (-1, -1) & t \leq J, J \neq 0, \end{cases}$	
$ \text{Left cone} \qquad \begin{array}{c} \text{If } j=0, \text{ then } d_0(\sigma,\tau)=\tau, \text{ and } \\ \text{if } k=0, \text{ then } d_n(\sigma,\tau)=\sigma, \\ ([\text{Lur09}], \text{ Def } 1.2.8.1 / [\text{nLa25b}]) \\ \text{C}^{\lhd}:=[0]\star\mathcal{C}. \qquad \qquad \\ \mathcal{C}^{\lhd}:=[0]\star\mathcal{C}. \qquad \qquad \\ \mathcal{C}^{\lhd}:=\Delta^0\star\mathcal{C}. \qquad \\ \mathcal{C}^{\lhd}:=\Delta^0\star\mathcal{C}. \qquad \\ \mathcal{C}^{\lhd}:=\Delta^0\star\mathcal{C}. \qquad \\ \mathcal{C}^{\Box}:=\Delta^0\star\mathcal{C}. \qquad \\ \mathcal{C}^{\Box}:=\Delta^0\star\mathcal{C}.$			$(\sigma, a_{i-j-1}\tau)  i > j, \ \kappa \neq 0.$	
			If $i = 0$ , then $d_{\sigma}(\sigma, \tau) = \sigma$ and	
Left cone $C^{\lhd} := [0] \star C. \qquad ([Lur09], Def 1.2.8.1 / [nLa25b])$ $C^{\lhd} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4)$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4$ $C^{\circ} := \Delta^{0} \star C. \qquad ([Lur09], Not 1.2.8.4$ $C^{\circ} := \Delta$				
Left cone $ \begin{array}{ c c c c }\hline {\rm Left cone} & & & & & & & & & & & & & & & & & & &$				
Left Kan extension (along the inclusion of a full subcategory) $ \begin{array}{c} \text{Given a commutative diagram} \\ \text{Co} & \xrightarrow{F_0} \mathcal{D} \\ \text{C} & \text{C} & \text{D} \\ \text{C} & \text{C} & \text{D} \\ \text{C} & \text{C} & \text{C} & \text{C} \\ \text{C} & \text{C} & \text{C} \\ \text{C} & \text{C} & \text{C} \\ \text{C} & \text{C} & \text{C} \\ \text{C} & \text{C} & \text{C} \\ \text{C} & \text{C} \\ \text{C} & \text{C} & \text{C} \\ \text{C} \\ \text{C} & \text{C} \\ \text{C} & \text{C} \\ \text{C} \\ \text{C} & \text{C} \\ \text{C} \\ \text{C} & \text{C} \\ $	Left cone	$\mathcal{C}^{\triangleleft} := [0] \star \mathcal{C}.$	$\mathcal{C}^{\triangleleft} := \Delta^0 \star \mathcal{C}.$ ([Lur09]. Not	$\mathcal{C}$ with extra vertex (cone point)
Left Kan extension (along the inclusion of a full subcategory)  Given a commutative diagram (along the inclusion of a full subcategory) $C^0 \xrightarrow{F_0} \mathcal{D}$ $C^0 F$			\\L_{\text{2}}	` - /
Left Kan extension (along the inclusion of a full subcategory)  of a full subcategory  of a full subcategor			,	_
Left Kan extension (along the inclusion of a full subcategory) $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$				in $\mathcal{C}$ (plus obligatory degenerate
(along the inclusion of a full subcategory) $ \begin{array}{ccccccccccccccccccccccccccccccccccc$				simplicies).
tension of $F_0$ along $\iota$ if there is a natural transformation $\eta: F_0 \to F\iota$ such that for any other pair $(G: \mathcal{C} \to \mathcal{D}, \gamma: F_0 \to G\iota)$ , there exists a unique natural transformation $\alpha: F \to G$ such that $\gamma = (\alpha * \iota) \circ \eta$ . ([Rie16], Def 6.1.1)  A limit for $F: J \to \mathcal{C}$ is a terminal cone on $F$ .  A limit for $F: J \to \mathcal{C}$ is a terminal cone on $F$ .  A limit for $F: J \to \mathcal{C}$ is a terminal cone on $F$ .  Monoidal category  Monoidal category  The obvious extension of the definition of the overcategory $\mathcal{C}_{/\mathcal{C}}$ for $\mathcal{C}_{/\mathcal{F}}$ . ([Lur09], Def 1.2.13.4)  The obvious extension of the definition of the overcategory $\mathcal{C}_{/\mathcal{C}}$ for $\mathcal{C}: \{*\} \to \mathcal{C}$ to $\mathcal{C}_{/\mathcal{F}}$ for an arbitrary functor $F: J \to \mathcal{C}$ ends up being exactly $\mathcal{C}$ cone( $F$ ).  Monoidal category  Operad  Opposite category $\mathcal{C}_{/\mathcal{C}}^{\text{op}}$ has the same objects as $\mathcal{C}$ , and $\mathcal{C}_{/\mathcal{C}}^{\text{op}}$ and $\mathcal{C}_{/\mathcal{C}}^{\text{op}}$ where $\{0 < 1 < \}$ and $\mathcal{C}_{/\mathcal{C}}^{\text{op}}$ and $\mathcal{C}_{/\mathcal{C}}^{\text{op}}$ and $\mathcal{C}_{/\mathcal{C}}^{\text{op}}$ and $\mathcal{C}_{/\mathcal{C}}^{\text{op}}$ as $\mathcal{C}$ , and $\mathcal{C}_{/\mathcal{C}}^{\text{op}}$ as $\mathcal{C}$ , and $\mathcal{C}_{/\mathcal{C}}^{\text{op}}$ as $\mathcal{C}$ , and $\mathcal{C}_{/\mathcal{C}}^{\text{op}}$ and $\mathcal{C}_{/\mathcal{C}}^{\text{op}}$ where $\{0 < 1 < \}$ and $\mathcal{C}_{/\mathcal{C}}^{\text{op}}$ where $0 \to x$ and $1 \to y$ . In $\mathcal{C}_{/\mathcal{C}}^{\text{op}}$ and $1 \to y$ . In $$	Left Kan extension	Given a commutative diagram	Given a commutative diagram	[todo]
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$F\iota \text{ such that for any other pair } (G:\mathcal{C}\to\mathcal{D},\gamma:F_0\to G\iota), \text{ there exists a unique natural transformation }\alpha:F\to G \text{ such that }\gamma=(\alpha*\iota)\circ\eta. \text{ ([Rie16], Def 6.1.1)} $ exhibits $FC$ as exhi		1		
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			$C \in C$ , the induced diagram	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			$C_{/C}^{0} \xrightarrow{\longrightarrow} \mathcal{D}$	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$			$\int$ exhibits $FC$ as	
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Limit  A limit for $F: J \to \mathcal{C}$ is a terminal cone on $F$ .  A limit for $F: X \to \mathcal{C}$ ( $X$ a simplicial set, $\mathcal{C}$ an $\infty$ -category) is a final object of $\mathcal{C}_{/F}$ . ([Lur09], Definal object of $C$			a colimit of $F_C$ . ([Lur09], Def	
nal cone on $F$ .  plicial set, $C$ an $\infty$ -category) is a final object of $C_{/F}$ . ([Lur09], Def for $C: \{*\} \to C$ to $C_{/F}$ for an arbitrary functor $F: J \to C$ ends up being exactly $\mathbf{Cone}(F)$ .  Monoidal category  [todo]  Operad  Opposite category $C^{\mathrm{op}}$ has the same objects as $C$ , and $\mathrm{Hom}_{C^{\mathrm{op}}}(X,Y) = \mathrm{Hom}_{C}(Y,X)$ . $C^{\mathrm{op}}$ has the same objects as $C$ , and $C^{\mathrm{op}}$ has the same objects as $C$ , and $C^{\mathrm{op}}$ has the same objects as $C$ , and $C^{\mathrm{op}}$ has the same objects as $C^{\mathrm{op}}$ has the same objects of $C^{\mathrm{op}}$ has th			/	
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Operad	Manaidal asta	[todo]	[todo]	
Opposite category $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		l L J	t 3	£ 3
as $\mathcal{C}$ , and $\operatorname{Hom}_{\mathcal{C}^{\operatorname{op}}}(X,Y) = \left  \begin{array}{c} \ldots < n \right ^{\operatorname{op}} = \{0 > 1 > \ldots > n\}. \\ ([\operatorname{Lur09}], 1.2.1) \end{array} \right $ where $0 \mapsto x$ and $1 \mapsto y$ . In $\mathcal{C}^{\operatorname{op}}$ of $0$ and $1$ swap roles, so we instead	_			
$  \operatorname{Hom}_{\mathcal{C}}(Y,X). $ ([Lur09], 1.2.1) 0 and 1 swap roles, so we instead	Opposite category	l c mas one same objects		
			([-3255], 2.2.2)	get a map $y \to x$ .

Overcategory	For $C \in \mathcal{C}$ , the category $\mathcal{C}_{/C}$ satisfies the following universal property: for any category $\mathcal{D}$ , there is a bijection $\operatorname{Hom}(\mathcal{D},\mathcal{C}_{/C}) \simeq \operatorname{Hom}_C(\mathcal{D}\star[0],\mathcal{C}),$ where the subscript on the right indicates that we consider only those functors $\mathcal{D}\star[0]\to\mathcal{C}$ whose restriction to $[0]$ consides with $C$ . ([Lur09], 1.2.9)	For $f: S \to \mathcal{C}$ , $S$ a simplicial set and $\mathcal{C}$ an $\infty$ -category, the $\infty$ -category $\mathcal{C}_{/f}$ satisfies the following universal property: for any simplicial set $X$ , there is a bijection $\operatorname{Hom}(X, \mathcal{C}_{/f}) \simeq \operatorname{Hom}_f(X \star S, \mathcal{C}),$ where the subscript on the right indicates that we consider only those functors $X \star S \to \mathcal{C}$ whose restriction to $S$ consides with $f$ . Explicitly, $(\mathcal{C}_{/f})_n := \operatorname{Hom}_f(\Delta^n \star S, \mathcal{C}).$	If $S = \Delta^0$ , writing $C \in \mathcal{C}$ for the object picked out by $f$ , we have $(\mathcal{C}_{/C})_n = \operatorname{Hom}_C(\Delta^n \star \Delta^0, \mathcal{C}) \cong \operatorname{Hom}_C(\Delta^{n+1}, \mathcal{C})$ (where the subscript indicates that we only consider morphisms sending the $(n+1)$ st vertex to $C$ ). In other words, the objects are maps to $C$ , the morphisms are commuting triangles over $C$ , and so on; these are exactly the objects and morphisms in the 1-categorical case.
Presentable category	[todo]	([Lur09], Prop 1.2.9.2) [todo]	[todo]
Right cone	$\mathcal{C}^{\triangleright} := \mathcal{C} \star [0].$	$\mathcal{C}^{\triangleright} := \mathcal{C} \star \Delta^{0}.$ ([Lur09], Not 1.2.8.4)	$\mathcal{C}$ with extra vertex (cone point) added, as well as a map from every other vertex in $\mathcal{C}$ to that cone point (plus obligatory degenerate simplicies).
Subcategory	Subcategory $C' \subseteq C$ .	Subsimplicial set $\mathcal{C}' \subseteq \mathcal{C}$ arising as $\begin{array}{ccc} \mathcal{C}' & \longrightarrow \mathcal{C} \\ \text{a pullback} & \downarrow^{-1} & \downarrow \\ & N(\text{h}\mathcal{C})' & \longrightarrow N(\text{h}\mathcal{C}) \\ \text{where } (\text{h}\mathcal{C})' \subseteq \text{h}\mathcal{C} \text{ is a subcategory.} \\ ([\text{Lur09}], 1.2.11) \end{array}$	[todo]
Symmetric monoidal category	[todo]	[todo]	[todo]
Symmetric monoidal functor	[todo]	[todo]	[todo]
Topos	[todo]	[todo]	[todo]  If $S = \Lambda^0$ writing $C \in C$ for the
Undercategory	For $C \in \mathcal{C}$ , the category $\mathcal{C}_{C/}$ satisfies the following universal property: for any category $\mathcal{D}$ , there is a bijection $\operatorname{Hom}(\mathcal{D},\mathcal{C}_{C/}) \simeq \operatorname{Hom}_{C}([0] \star \mathcal{D},\mathcal{C}),$ where the subscript on the right indicates that we consider only those functors $[0] \star \mathcal{D} \to \mathcal{C}$ whose restriction to $[0]$ consides with $C$ . ([Lur09], 1.2.9)	For $f: S \to \mathcal{C}$ , $S$ a simplicial set and $\mathcal{C}$ an $\infty$ -category, the $\infty$ -category $\mathcal{C}_{f/}$ satisfies the following universal property: for any simplicial set $X$ , there is a bijection $\operatorname{Hom}(X,\mathcal{C}_{f/}) \simeq \operatorname{Hom}_f(S \star X,\mathcal{C}),$ where the subscript on the right indicates that we consider only those functors $S \star X \to \mathcal{C}$ whose restriction to $S$ consides with $f$ . Explicitly, $(\mathcal{C}_{f/})_n := \operatorname{Hom}_f(S \star \Delta^n, \mathcal{C}).$	If $S = \Delta^0$ , writing $C \in \mathcal{C}$ for the object picked out by $f$ , we have $(\mathcal{C}_{C/})_n = \operatorname{Hom}_C(\Delta^0 \star \Delta^n, \mathcal{C}) \cong \operatorname{Hom}_C(\Delta^{n+1}, \mathcal{C})$ (where the subscript indicates that we only consider morphisms sending the 0th vertex to $C$ ). In other words, the objects are maps from $C$ , the morphisms are commuting triangles under $C$ , and so on; these are exactly the objects and morphisms in the 1-categorical case.
		$(\mathcal{C}_{f/})_n := \operatorname{Hom}_f(S \star \Delta^n, \mathcal{C}).$ ([Lur09], Prop 1.2.9.2)	

Equivalences		
Name	Between	Definition
Strong equivalence	Topological categories $\mathcal{C}, \mathcal{D}$	$\mathcal{C} \to \mathcal{D}$ is an equivalnce in the sense of enriched
		category theory. ([Lur09], Def 1.1.3.1)
(Weak) equivalence	Topological categories $\mathcal{C}, \mathcal{D}$	The induced functor $h\mathcal{C} \to h\mathcal{D}$ is an equiva-
		lence of $\mathcal{H}$ -enriched categories. ([Lur09], Def
		1.1.3.6)
Categorical equivalence	Simplicial sets $X, S$	The induced functor $hX \to hS$ is an equiva-
		lence of $\mathcal{H}$ -enriched categories. ([Lur09], Def
		1.1.5.14)
Weak (homotopy) equivalence	Simplicial sets $X, S$	The induced map $ X  \rightarrow  S $ is a weak
		homotopy equivalence of topological spaces.
		([Lur09], 1.1.4)
Equivalence	Simplicial categories $\mathcal{C}, \mathcal{D}$	The induced functor $h\mathcal{C} \to h\mathcal{D}$ is an equiva-
		lence of $\mathcal{H}$ -enriched categories. ([Lur09], Def
		1.1.4.4)

Fibrations and anodyne morphisms		
Name	Describes	Definition
Acyclic Kan fibration	$f: X \to S$ map of simplicial sets	see: trivial Kan fibration. ([nLa23])
Anodyne	$f: X \to S$ map of simplicial sets	For every solid arrow diagram as below, with
		$p: Y \to T$ a Kan fibration,
		$X \longrightarrow Y$
		$ \begin{array}{ccc} f \downarrow & \downarrow p \\ S & \longrightarrow T \end{array} $
		$S \xrightarrow{\sim} T$
Cartesian fibration	$f: X \to S$ map of simplicial sets	there exists a dotted lift. ([Lur09], Ex 2.0.0.1)  f is an inner fibration such that for every edge
Cartesian infration	$J: X \to S$ map of simplicial sets	$g: x \to y$ of S and every vertex $\tilde{y}$ of X with
		$f(\tilde{y}) = y$ , there exists an f-cartesian edge $\tilde{g}$ :
		$\tilde{x} \to \tilde{y}$ with $f(\tilde{g}) = g$ . ([Lur09], Def 2.4.2.1)
Categorical fibration	$f: X \to S$ map of simplicial sets	For every solid arrow diagram as below, with
		$p: Y \to T$ both a cofibration and a categorical
		equivalence,
		$V \longrightarrow V$
		$Y \longrightarrow X$ $\downarrow f$ $T \longrightarrow S$
		$T \longrightarrow S$
		there exists a dotted lift. ([Lur09], p90)
Cocartesian fibration	$f: X \to S$ map of simplicial sets	f is an inner fibration such that for every edge
		$g: x \to y$ of S and every vertex $\tilde{x}$ of X with
		$f(\tilde{x}) = x$ , there exists an f-cocartesian edge
Cofibration	$f: X \to S$ map of simplicial sets	$\tilde{g}: \tilde{x} \to \tilde{y} \text{ with } f(\tilde{g}) = g. \text{ ([Lur09], Def 2.4.2.1)}$ $f \text{ is a monomorphism. ([Lur09], A.2.7)}$
Inner anodyne	$f: X \to S$ map of simplicial sets	For every solid arrow diagram as below, with
inner anoughe	y 111 / S map of simplicial sees	$p: Y \to T$ an inner fibration,
		,
		$X \longrightarrow Y$
		$f \downarrow p$
		$S \xrightarrow{\checkmark} T$
		there exists a dotted lift. ([Lur09], Def 2.0.0.3)

$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Inner fibration	$f: X \to S$ map of simplicial sets	For every solid arrow diagram as below, with $0 < i < n$ ,
$F: C \to \mathcal{D} \text{ map of } \infty\text{-categories} \qquad F \text{ is an inner fibration such that for all } C \in \mathcal{C}$ and every isomorphism $u: D \to FC$ in $\mathcal{D}$ (i.e. $[u]$ is an isomorphism $u: D \to FC$ in $\mathcal{D}$ (i.e. $[u]$ is an isomorphism $u: D \to C$ in $C$ such that $F(\overline{u}) = u$ . $[Luv25, De DiEN]$ (Kan) fibration $f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $0 \le i \le n$ , $A_i^n \longrightarrow X$ $\downarrow f$ $\downarrow f$ there exists a dotted lift. ([Luv0], A.2.7)  For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text$			
$F: C \to \mathcal{D} \text{ map of } \infty\text{-categories} \qquad F \text{ is an inner fibration such that for all } C \in \mathcal{C}$ and every isomorphism $u: D \to FC$ in $\mathcal{D}$ (i.e. $[u]$ is an isomorphism $u: D \to FC$ in $\mathcal{D}$ (i.e. $[u]$ is an isomorphism $u: D \to C$ in $C$ such that $F(\overline{u}) = u$ . $[Luv25, De DiEN]$ (Kan) fibration $f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $0 \le i \le n$ , $A_i^n \longrightarrow X$ $\downarrow f$ $\downarrow f$ there exists a dotted lift. ([Luv0], A.2.7)  For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text{ map of simplicial sets}$ For every solid arrow diagram as below, with $f$ $\downarrow f: X \to S \text$			there exists a dotted lift
$f: X \to S \text{ map of simplicial sets} \qquad \text{For every solid arrow diagram as below, with } 0 \le i \le n, \\ A_{i}^{p} \longrightarrow X \\ A_{i}^{p} \longrightarrow S \\ \text{there exists a dotted lift. ([Lur09], A.2.7)}$ Left anodyne $f: X \to S \text{ map of simplicial sets} \qquad \text{For every solid arrow diagram as below, with } p: Y \to T \text{ a left fibration}$ $f: X \to S \text{ map of simplicial sets} \qquad \text{For every solid arrow diagram as below, with } p: Y \to T \text{ a left fibration}$ For every solid arrow diagram as below, with $0 \le i < n, \qquad A_{i}^{n} \longrightarrow X \\ A_{i}^{n} \longrightarrow X \\ A_{i}^{n} \longrightarrow S \\ \text{there exists a dotted lift. ([Lur09], Def 2.0.0.3)}$ Right anodyne $f: X \to S \text{ map of simplicial sets} \qquad \text{for every solid arrow diagram as below, with } p: Y \to T \text{ a right fibration},$ $X \longrightarrow Y \\ f \downarrow \qquad A_{i}^{n} \longrightarrow S \\ \text{there exists a dotted lift. ([Lur09], Def 2.0.0.3)}$ Right fibration $f: X \to S \text{ map of simplicial sets} \qquad \text{for every solid arrow diagram as below, with } 0 < i \le n, \\ A_{i}^{n} \longrightarrow X \\ A_{i}^{n} \longrightarrow S$	Isofibration	$F:\mathcal{C}  o \mathcal{D}$ map of $\infty$ -categories	$F$ is an inner fibration such that for all $C \in \mathcal{C}$ and every isomorphism $u:D \to FC$ in $\mathcal{D}$ (i.e. $[u]$ is an isomorphism in $h\mathcal{D}$ ) there exists an isomorphism $\overline{u}:\overline{D}\to C$ in $\mathcal{C}$ such that
Left anodyne $f: X \to S \text{ map of simplicial sets} \qquad for every solid arrow diagram as below, with } p: Y \to T \text{ a left fibration}, \\ X \longrightarrow Y \\ \downarrow \downarrow \qquad \downarrow p \\ S \longrightarrow T \\ \text{there exists a dotted lift. ([Lur09], Def 2.0.0.3)} \\ \text{For every solid arrow diagram as below, with } 0 \le i < n, \\ A_i^n \longrightarrow X \\ \downarrow A^n \longrightarrow S \\ \text{there exists a dotted lift. ([Lur09], Def 2.0.0.3)} \\ \text{Right anodyne} \qquad f: X \to S \text{ map of simplicial sets} \qquad \text{for every solid arrow diagram as below, with } 0 \le i < n, \\ A_i^n \longrightarrow X \\ \downarrow A^n \longrightarrow S \\ \text{there exists a dotted lift. ([Lur09], Def 2.0.0.3)} \\ \text{For every solid arrow diagram as below, with } p: Y \to T \text{ a right fibration}, \\ X \longrightarrow Y \\ \downarrow \downarrow \qquad \downarrow p \\ S \longrightarrow T \\ \text{there exists a dotted lift. ([Lur09], Def 2.0.0.3)} \\ \text{For every solid arrow diagram as below, with } 0 < i \le n, \\ A_i^n \longrightarrow X \\ \downarrow \qquad \downarrow f \\ A^n \longrightarrow S \\ \text{here exists a dotted lift. ([Lur09], Def 2.0.0.3)} \\ \text{For every solid arrow diagram as below, with } 0 < i \le n, \\ A_i^n \longrightarrow X \\ \downarrow \qquad \downarrow f \\ A^n \longrightarrow S \\ \text{here exists a dotted lift. ([Lur09], Def 2.0.0.3)} \\ \text{For every solid arrow diagram as below, with } 0 < i \le n, \\ A_i^n \longrightarrow X \\ \downarrow \qquad \downarrow f \\ A^n \longrightarrow S \\ \text{here exists a dotted lift. ([Lur09], Def 2.0.0.3)} \\ \text{For every solid arrow diagram as below, with } 0 < i \le n, \\ A_i^n \longrightarrow X \\ \downarrow \qquad \downarrow f \\ A^n \longrightarrow S \\ \text{here exists a dotted lift. ([Lur09], Def 2.0.0.3)} \\ \text{For every solid arrow diagram as below, with } 0 < i \le n, \\ A_i^n \longrightarrow X \\ \downarrow \qquad \downarrow f \\ A^n \longrightarrow S \\ \text{here exists a dotted lift. ([Lur09], Def 2.0.0.3)} \\ \text{Here exists a dotted lift. ([Lur09], Def 2.0.0.3)} \\ \text{Here exists a dotted lift. ([Lur09], Def 2.0.0.3)} \\ \text{Here exists a dotted lift. ([Lur09], Def 2.0.0.3)} \\ \text{Here exists a dotted lift. ([Lur09], Def 2.0.0.3)} \\ \text{Here exists a dotted lift. ([Lur09], Def 2.0.0.3)} \\ \text{Here exists a dotted lift. ([Lur09], Def 2.0.0.3)} \\ \text{Here exists a dotted lift. ([Lur09], Def 2.0.0.3)} \\ \text{Here exists a dotted lift. ([Lur09], Def 2.0.0.3)} \\ \text{Here exists a dotted lift. ([Lur09], Def 2.0.0.3)} \\ \text{Here exists a dotted lift. ([Lur09], Def 2.0.0.3)} \\ Here exists a dotted lif$	(Kan) fibration	$f: X \to S$ map of simplicial sets	For every solid arrow diagram as below, with $0 \le i \le n$ ,
Left anodyne $f: X \to S \text{ map of simplicial sets} \qquad \text{For every solid arrow diagram as below, with } \\ p: Y \to T \text{ a left fibration}, \\ X \longrightarrow Y \\ \downarrow \downarrow \\ S \longrightarrow T \\ \text{there exists a dotted lift. ([Lur09], Def 2.0.0.3)} \\ \text{For every solid arrow diagram as below, with } \\ 0 \le i < n, \\ A_i^n \longrightarrow X \\ \downarrow \\ \Delta^n \longrightarrow S \\ \text{there exists a dotted lift. ([Lur09], Def 2.0.0.3)} \\ \text{For every solid arrow diagram as below, with } \\ p: Y \to T \text{ a right fibration}, \\ Y \to Y \text{ a right fibration}, \\ X \longrightarrow Y \\ \downarrow \\ S \longrightarrow T \\ \text{there exists a dotted lift. ([Lur09], Def 2.0.0.3)} \\ \text{Right fibration}$ $f: X \to S \text{ map of simplicial sets}$ $f: X \to S  map of simplicia$			$ \begin{array}{ccc} \Lambda_i^n & \longrightarrow X \\ \downarrow & & \downarrow f \\ \Delta^n & \longrightarrow S \end{array} $
Left anodyne $f: X \to S \text{ map of simplicial sets} \qquad \text{For every solid arrow diagram as below, with } \\ p: Y \to T \text{ a left fibration}, \\ X \longrightarrow Y \\ \downarrow \downarrow \\ S \longrightarrow T \\ \text{there exists a dotted lift. ([Lur09], Def 2.0.0.3)} \\ \text{For every solid arrow diagram as below, with } \\ 0 \le i < n, \\ A_i^n \longrightarrow X \\ \downarrow \\ \Delta^n \longrightarrow S \\ \text{there exists a dotted lift. ([Lur09], Def 2.0.0.3)} \\ \text{For every solid arrow diagram as below, with } \\ p: Y \to T \text{ a right fibration}, \\ Y \to Y \text{ a right fibration}, \\ X \longrightarrow Y \\ \downarrow \\ S \longrightarrow T \\ \text{there exists a dotted lift. ([Lur09], Def 2.0.0.3)} \\ \text{Right fibration}$ $f: X \to S \text{ map of simplicial sets}$ $f: X \to S  map of simplicia$			there exists a dotted lift. ([Lur09], A.2.7)
Left fibration $f: X \to S \text{ map of simplicial sets} \qquad \begin{array}{c} \text{there exists a dotted lift. ([Lur09], Def 2.0.0.3)} \\ For every solid arrow diagram as below, with \\ 0 \leq i < n, \\ & & & & & & \\ & & & & & \\ & & & & & $	Left anodyne	$f: X \to S$ map of simplicial sets	For every solid arrow diagram as below, with $p: Y \to T$ a left fibration,
Left fibration $f: X \to S \text{ map of simplicial sets} \qquad \text{For every solid arrow diagram as below, with } 0 \le i < n, \\ & & & & & & \\ & & & & & \\ & & & & & $			$X \longrightarrow Y$ $f \downarrow \qquad \qquad \downarrow p$ $S \longrightarrow T$
Left fibration $f: X \to S \text{ map of simplicial sets} \qquad \text{For every solid arrow diagram as below, with } 0 \le i < n, \\ & & & & & & \\ & & & & & \\ & & & & & $			there exists a dotted lift. ([Lur09], Def 2.0.0.3)
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Left fibration	$f: X \to S$ map of simplicial sets	$0 \le i < n,$
Right anodyne $f: X \to S \text{ map of simplicial sets} \qquad \text{For every solid arrow diagram as below, with} \\ p: Y \to T \text{ a right fibration,} \\ X \longrightarrow Y \\ f \downarrow \\ S \longrightarrow T \\ \text{there exists a dotted lift. ([Lur09], Def 2.0.0.3)} \\ \text{Right fibration} \qquad f: X \to S \text{ map of simplicial sets} \qquad \text{For every solid arrow diagram as below, with} \\ 0 < i \le n, \\ \Lambda_i^n \longrightarrow X \\ \downarrow \\ \Delta^n \longrightarrow S \\ \end{cases}$			$\begin{array}{ccc} & & \downarrow^f \\ \Delta^n & \longrightarrow & S \end{array}$
$X \longrightarrow Y \\ f \downarrow \qquad \downarrow p \\ S \longrightarrow T$ there exists a dotted lift. ([Lur09], Def 2.0.0.3)   Right fibration $f: X \to S \text{ map of simplicial sets} \qquad \text{For every solid arrow diagram as below, with } 0 < i \le n,$ $A_i^n \longrightarrow X \\ \downarrow \qquad \downarrow f \\ \Delta^n \longrightarrow S$	Right anodyne	$f: X \to S$ map of simplicial sets	For every solid arrow diagram as below, with
Right fibration $f: X \to S \text{ map of simplicial sets} \qquad \text{For every solid arrow diagram as below, with} \\ 0 < i \le n, \\ & & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ &$			$X \longrightarrow Y$
Right fibration $f: X \to S \text{ map of simplicial sets} \qquad \text{For every solid arrow diagram as below, with} \\ 0 < i \le n, \\ & & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ &$			there exists a dotted lift. ([Lur09], Def 2.0.0.3)
	Right fibration	$f: X \to S$ map of simplicial sets	For every solid arrow diagram as below, with $0 < i \le n$ ,
there exists a dotted lift. ([Lur09], Def 2.0.0.3)			$ \begin{array}{ccc} \Lambda_i^n & \longrightarrow X \\ \downarrow & & \downarrow f \\ \Delta^n & \longrightarrow S \end{array} $
			there exists a dotted lift. ([Lur09], Def 2.0.0.3)

Serre fibration	$f: Y \to Z$ map of topological	For every solid arrow diagram as below,
	spaces	
		$\{0\} \times  \Delta^n  \longrightarrow Y$
		$\{0\} \times  \Delta^n   Y$ $\downarrow \qquad \qquad \downarrow f$
		$[0,1] \times  \Delta^n  \longrightarrow Z$
		there exists a dotted lift. [Lur25, Def 021R]
Trivial (Kan) fibration	$f: X \to S$ map of simplicial sets	For every solid arrow diagram as below,
		$\partial \Delta^n \longrightarrow X$
		$ \begin{array}{ccc} 0\Delta^{n} & \longrightarrow & X \\ \downarrow & & \downarrow f \\ \Delta^{n} & \longrightarrow & S \end{array} $
		there exists a dotted lift. ([Lur25, Def 006W]/[Lur09], Def 2.0.0.2)

Nerves		
Name	Domain object	Definition
Nerve	Category $\mathcal{C}$	$(NC)_n = \{n\text{-composable strings of morphisms}\}$
		$\operatorname{in} \mathcal{C}$ .
Simplicial nerve	Simplicial category $\mathcal{C}$	$(N\mathcal{C})_n = \operatorname{Hom}_{\mathbf{Cat}_{\Delta}}(\mathfrak{C}[\Delta^n], \mathcal{C}), \text{ where } \mathfrak{C}[\Delta^n] \text{ is }$
		the category whose objects are the same as $[n]$ ,
		and $\operatorname{Hom}_{\mathfrak{C}[\Delta^n]}(i,j) = \emptyset$ for $i < j$ and $N(P_{ij})$
		for $i \geq j$ (where $P_{ij} = \{I \subseteq [n] : (i, j \in I) \land$
		$(\forall k \in I, i \le k \le j)\}).$
Topological nerve	Topological category $\mathcal{C}$	The simplicial nerve of Sing $\mathcal{C}$ .

Homotopy categories		
Domain object Definition		
$\infty$ -Category $\mathcal{C}$ The objects of $\mathcal{C}$ are the vertices of $\mathcal{C}$ , an		
	$\operatorname{Hom}_{\mathrm{h}\mathcal{C}}(X,Y)$ is the set of homotopy classes of edges	
	$X \to Y$ in $\mathcal{C}$ . ([Lur09], Prop 1.2.3.9)	
Simplicial category $\mathcal{C}$	h C . ([Lur09], 1.1.4)	
Topological category $\mathcal{C}$	$hC$ has the same objects as $C$ , and $Hom_{hC}(X,Y) =$	
	$[\operatorname{Hom}_{\mathcal{C}}(X,Y)]. \ ([\operatorname{Lur}09], \ 1.1.3)$	

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