The strictification theorem

$(\mathcal{C}, \otimes, a, \lambda, \rho)$ monoidal category

construct $\mathcal{S}$ with objects: lists of objects in $\mathcal{C}$ of finite length.

have a map $f : ob(\mathcal{S}) \longrightarrow ob(\mathcal{C})$

$$[V_1, V_2, \dots V_n] \mapsto V_1 \otimes (V_2 \otimes (V_3 \otimes \dots \otimes V_n)\dots)$$
$$[\,] \mapsto 1$$

morphisms of $\mathcal{S}$

$$hom_{\mathcal{S}}(A, B) = hom_{\mathcal{C}}(f(A), f(B))$$

monoidale structure on $\mathcal{S}$: concatenation of objects (denoted $\cdot$)

note that there is a unique isomorphism rebracketing $f(A \cdot B)$ to $f(A) \otimes f(B)$ due to the coherence thm.

so given $g : A \to C$, $h : B \longrightarrow D$ we set

$$g \otimes h : f(A \cdot B) \xrightarrow[\text{rebracketing}]{} f(A) \otimes f(B) \longrightarrow f(C) \otimes f(D) \xrightarrow[\text{rebracketing}]{} f(C \cdot D)$$

$\to$ ~~mono~~ $\to$ strict monoidal category $\mathcal{S}$.

functor $F : \mathcal{S} \to \mathcal{C}$ is given by, $F(A) = f(A)$ identity on morphisms

$F_{(A,B)} : F(A \cdot B) \longrightarrow F(A) \otimes F(B)$ is rebracketing

$F_* = id$ on $F([\,]) = 1$