

# Equivalence Relation

## Reflexive



$$\partial(M \times [0,1]) = M \sqcup M$$



$$M \sim N \iff N \sim M$$



## Transitive



$$\begin{aligned} M \sim M' \& \ M' \sim M'' \\ \Rightarrow M \sim M'' \end{aligned}$$



# Ring Structure

addition: disjoint union

$$M \sim N \notin M' \sim N' \Rightarrow M \sqcup M' \sim N \sqcup N'$$

$$\Rightarrow [M] + [M'] = [M \sqcup M'] \text{ well defined!}$$

abelian!

$$[M] + [M] = 0$$

$\Rightarrow$  vector space over  $\mathbb{F}_2$

Graded by dimension:  $\Omega_n$

Multiplication: cartesian product



$$M \sqcup M' \sim N \sqcup N'$$



$$M \sqcup M$$



$\Omega^*$  cobordism ring!