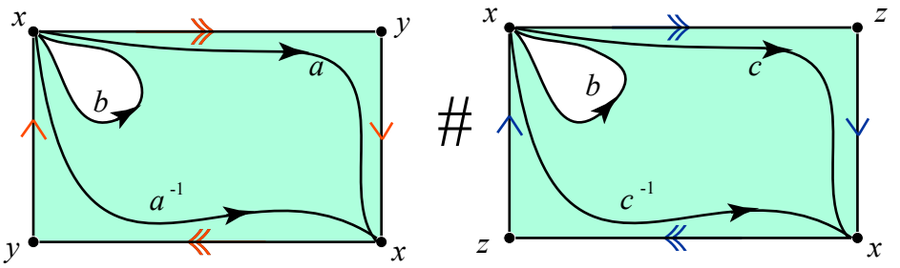
$P^2 \# P^2$



From this picture and those below we can find several fundamental groups.

If just P^2, we don't have b, so a is the only generator and the relation is $a = a^{-1}$. $\langle\ a \mid a = a^{-1}\ \rangle$

Thus the group is the integers mod 2, where 1+1 = 0.

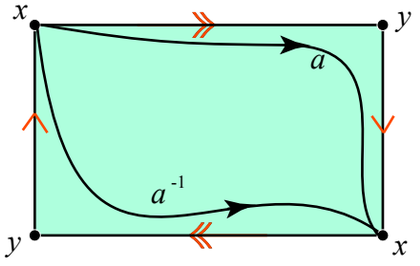
If $P^2 - D^2$, we have generators a, b, and relation $ba = a^{-1}$. $\langle\ a, b \mid ba = a^{-1}\rangle$

If $P^2 \# P^2$, we have generators a, b, c and relations $ba = a^{-1}$ and $bc = c^{-1}$.

$\langle a, b, c \mid ba = a^{-1},\ bc = c^{-1}\ \rangle$

Exercise: We know that $P^2 \# P^2 = K^2$ so find an isomorphism from this group to the one we found in class!

P^2



$P^2 - D^2$