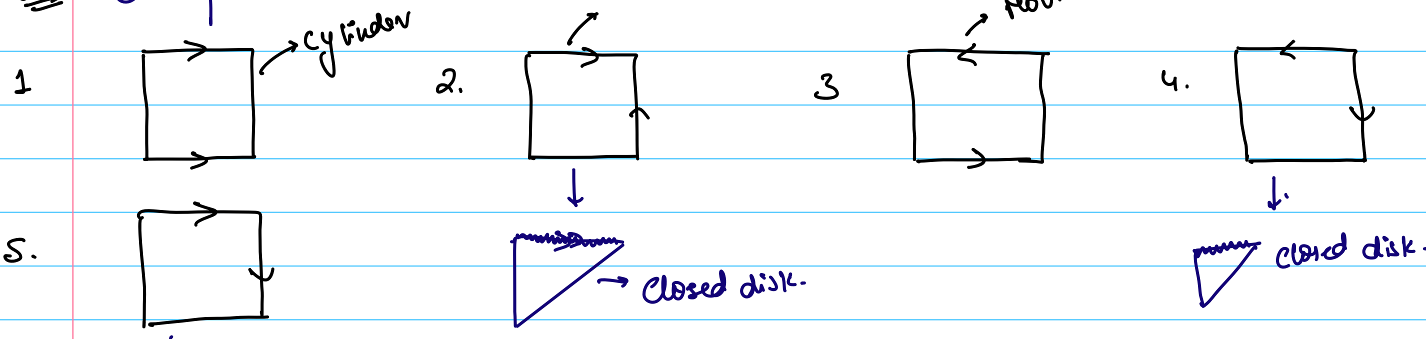
HOMEWORK -2

Qn1 One pair.

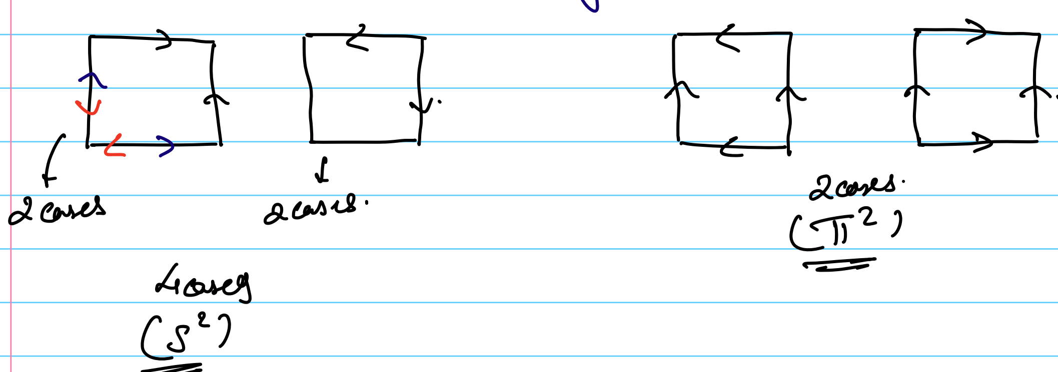


↳ not sure but online source says Möbius strip.

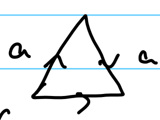
Two pair.

for all possibilities $\frac{{}^4C_2}{2} \times 2^4 \times \frac{1}{2} = 24$ possible.

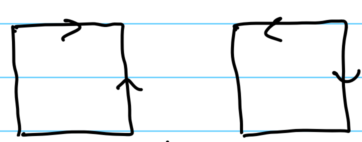
pairings, CW·ACW for each edge, repeated / rotated.



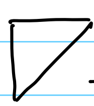
Both rotated ($\mathbb{R}P^2$)



↳ $\mathbb{R}P^2$ now we know.



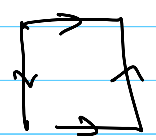
↓ produces two.



→ all of these +

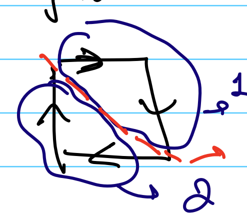
One rotated one not ($\mathbb{K}^2$)

So the parallel edges are easy case all

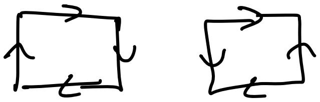


+ adjecent & möbius strip joined

⇒ all



along this boundary!!



Qn2] 1st one is not a triangulation of a $\mathbb{T}^2$ as visually you can see that the point S does not have enough directions

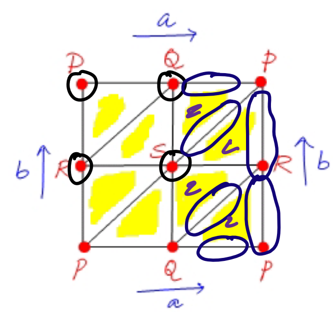
 → all these point are converging at the center making it flat 

as all edges are part of at max 2 triangles it is a manifold.

$$\chi = \underset{\text{points}}{4} - \underset{\text{edges}}{6} + \underset{\text{face}}{4} = 2$$

also we know $\chi(\mathbb{T}^2) = 0$

This is enough to prove not homeomorphic.



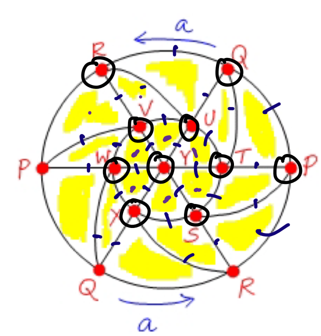
2nd.

$\chi = 10 - 27 + 18 = 1$

$\chi(\mathbb{RP}^2) = 1$

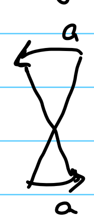
but this is not enough we need to check orientability.

$$\begin{array}{r} 12 \\ \times 3 \\ \hline \end{array} \qquad \begin{array}{r} \times 12 \\ \hline 2\cancel{7} \end{array} \qquad \begin{array}{r} 6 \\ + 12 \\ \hline 18 \end{array}$$



χ + orientability → Complete invariant

We need to find a möbius strip which can be seen in the marked

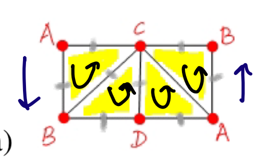


⇒ non oriantable

⇒ $\chi = 1$ + non oriantable ⇒ $\underline{\mathbb{RP}^2}$

★ Sanity check each edge 2 triangles.

Qn3]



(a)

$\chi = 4 - 6 + 3 = \underline{1}$

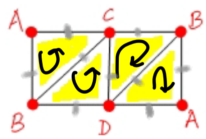
oriantable.

NOT POSSIBLE?

$\chi = 4 - 6 + 3 = 1.$

this is oriantable.

hence its a . ___ ?

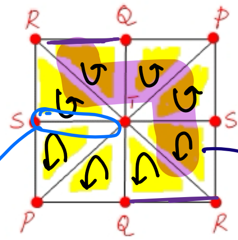


(b)

$\chi = 5 - 8 + 4 = 1.$

this is non oriantable

hence $\mathbb{R}P^2$



Non orantable

(c)

Möbius strip.??