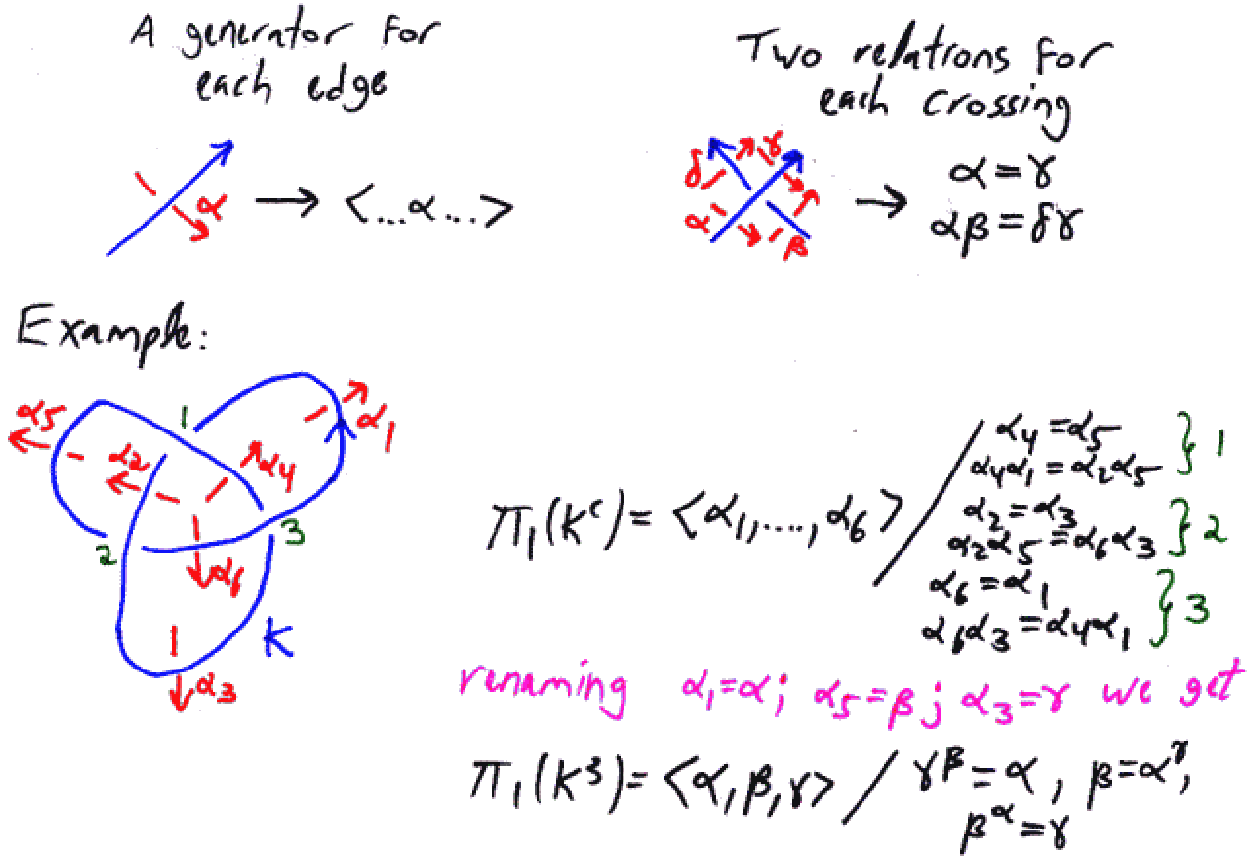
Problem 1 (40 points). Let K be a knot in $\mathbb{R}^3$ presented by a planar diagram D. With a massive use of van Kampen's theorem, show that the fundamental group of the complement of K has a presentation (the "Wirtinger presentation", as discussed in class) with one generator for each edge of D and two relations for each crossing of D, as indicated in the figure below.



Problem 2 (20 points). The trefoil knot above, whose fundamental group is $G_1=\langle \alpha,\beta,\gamma\colon \alpha=\gamma^\beta,\ \beta=\alpha^\gamma,\ \gamma=\beta^\alpha\rangle$ is in fact the torus knot $T_{3/2}$, whose fundamental group, as computed in class, is $G_2=\langle \lambda,\mu\colon \lambda^2=\mu^3\rangle$. Prevent the collapse of mathematics by showing that these two groups are isomorphic.