

Name: _____

Each question worth 5 points. Justify your answers where necessary.

1. Let $\Sigma_3 = T^2 \# T^2 \# T^2$ be the connected sum of three copies of the 2-torus.
 - (a) Draw a picture of Σ_3
 - (b) Compute the genus and the Euler characteristic of Σ_3

2. Compute the Jones polynomial of the Hopf link.

3. Compute the simplicial homology of the simplicial complex obtained from the 2-faces of the tetrahedron.

4. (a) What is the crossing number of a knot? Give a Python/Sage function that can compute it.
(b) Give the Union method of the Union-Find (or Disjoint-Set) datastructure?