# Ornamentation Lattices

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Partially ordered sets (posets) are objects of central study in combinatorics. A poset $L = (X, \preceq)$ is called a *lattice* if for all $a, b \in X$ there exists a unique greatest lower bound and unique least upper bound of $a$ and $b$.

The *Tamari lattice* $\mathrm{Tam}_n$ is a lattice defined on the set of bracketings of a word of length $n$, where we say that one bracketing is less than another if we can obtain the second from the first by rightward applications of the associativity rule $(xy)z \to x(yz)$. See Figure 1 for $T_5$.
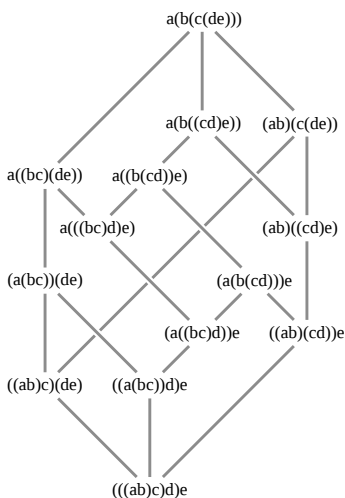


Figure 1: The Tamari lattice $T_5$.

*Ornamentation lattices* are a recent generalization of the Tamari lattice. The purpose of this project is to study ornamentation lattices and attempt to generalize known results about Tamari lattices to ornamentation lattices.

**Prerequisites:** No prerequisite is required. However, Math 465 and some coding experience would be helpful.