We initiate an algebraic approach to study DNA origami structures by associating an element from a monoid to each structure. We identify two types of basic building blocks and describe a DNA origami structure by their composition. These building blocks are taken as generators of a monoid, which we call the origami monoid. Motivated by the well studied Jones monoids, we identify a set of relations that characterize the origami monoid. With the aid of a GAP program, we prove the finiteness of the origami monoid, and propose a normal form of the elements. We study a connection between the Green’s classes of the origami monoid and the Green’s classes of a direct product of Jones monoids. (Received September 15, 2020)