1145-VV-1824   **Masayoshi Kaneda*** (`mkaneda@uci.edu`), American University of Kuwait, P.O. Box 3323, 13034 Safat, Kuwait. *Structure and a duality of binary operations on monoids and groups.*

We introduce novel views of monoids and groups. More specifically, for a given set S, let $S^{S \times S}$ be the set of binary operations on S. We equip $S^{S \times S}$ with canonical binary operations induced by the elements of S. Let $S_{mn}^{S \times S}$ (respectively, $S_{gr}^{S \times S}$) be the set of binary operations that make S monoids (respectively, groups). Then we have the following "duality": for each $z \in S_{mn}^{S \times S}$ a certain subset of $S^{S \times S}$, denoted by S_z^*, is a monoid with a canonical binary operation and is isomorphic to (S, z). If $z \in S_{gr}^{S \times S}$, then $S_{gr}^{S \times S}$ can be partitioned into copies of S_z^*. We also give a new characterization of group binary operations which distinguishes them from the other binary operations. These results give us new insights into monoids and groups, and will provide new tools and directions in studying these objects. (Received September 26, 2018)