1 Intro to Semigroups

1.1 Basic Definitions

A **semigroup** is a set S together with an associative binary operaiton on S.

1.2 Examples

1. Empty Set w/ the Empty Function as the binary operator.
2. Groups are semigroups.
3. Singleton w/ only possible function.
4. The Cyclic group C_3.
5. The flip-flop monoid { "set", "reset", "do nothing"}
6. The set $\{-1, 0, 1\}$ under integer multiplication.
7. The **symmetric semigroup** - For any set X the mappings (or transformation)of X into X are the elements of a semigroup; the operation is composition of mappings.
8. Partial Mapping Semigroup (see pg. 2)

1.2.1 Exercises - Demonstrate Examples

1. Verify that the above are examples of semigroups.
2. Given any sets I and Λ show that the operation $(i, \lambda)(j, \mu) = (i, \mu)$ on $I \times \Lambda$ is associative.