

A monoid, which is also commutative and idempotent
is a **bounded semilattice**

```
class Semigroup a where  
  append :: a → a → a
```

```
class Semigroup m ≤ Monoid m where  
  mempty :: m
```

```
class Monoid m ≤ CommutativeMonoid m
```

```
class CommutativeMonoid m  
  ≤ BoundedSemilattice m
```

Semigroup



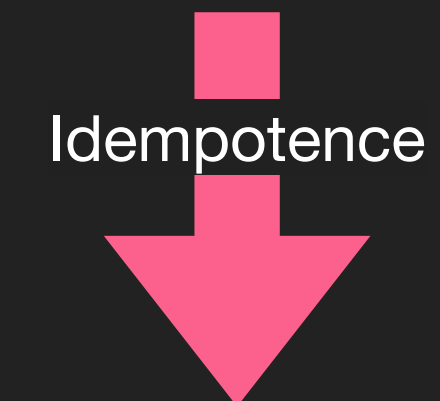
Identity

Monoid



Commutativity

Commutative or *abelian* monoid



Idempotence

Bounded semilattice

I'm a programmer, why do I care ?