Operations on Languages

- Let L, L_1, L_2 be subsets of Σ^*
- Concatenation: $L_1L_2 = \{xy \mid x \text{ is in } L_1 \text{ and } y \text{ is in } L_2\}$
- Concatenating a language with itself: $L^0 = \{\varepsilon\}$

  $L^i = LL^{i-1}$, for all $i >= 1$

$L^0 = \{\epsilon\}$ **No concatenation**

$L^0 = \{\varepsilon\}$ **Not a closure**

$L^i = LL^{i-1}$, for all $i >= 1$ **not null**

$aa = a^2$

$aaaa = a^4$

$L = \{a\}$

$LL = L^2 =$

$= \{aa\}$

$L^4 = L L^3$

$= aaaa$

$L^3 = \{aaa\} = LL^2 = \{aaa\} = L^3$

$L^5 = L L^4$