

$$\Sigma = \{0, 1\} \quad 1^* \quad (1+0)^* \quad 0^* + 1^* \quad (0+1)^*$$

$$\mathcal{L}(1^*) = \mathcal{L}(1)^* = \{1\}^* = \{\epsilon, 1, 11, 111, \dots\}$$

$$= \{1^n \mid n \geq 0\}$$

$$\mathcal{L}((1+0)^*) = \mathcal{L}(0+1)^* = (\mathcal{L}(0) \cup \mathcal{L}(1))^* =$$

$$= (\{0\} \cup \{1\})^* = \{0, 1\}^*$$

$$= \{\epsilon, 0, 1, 00, 01, 10, 11, 000, 001, 010, 011, 100, 101, 110, 111, \dots\}$$

The diagram shows a tree structure for the expression (1+0)*. The root node is (1+0)*. It branches into 1 and 0. The 1 branch leads to 1*, which then leads to the set {1}. The 0 branch leads to 0*, which then leads to the set {0}. These two sets are unioned to form {0, 1}, which is then raised to the power of * to form {0, 1}*. Arrows indicate the flow from the root to the union step and then to the final set.

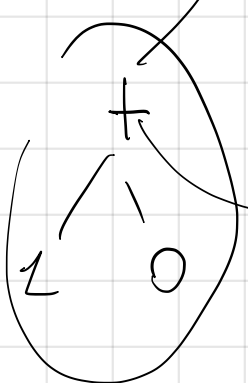
$$\mathcal{L}(0^* + 1^*) = \mathcal{L}(0^*) \cup \mathcal{L}(1^*) = \mathcal{L}(0)^* \cup \mathcal{L}(1)^*$$

$$= \{0\}^* \cup \{1\}^* =$$

$$= \{0^n \mid n \geq 0\} \cup \{1^n \mid n \geq 0\}$$

The diagram shows a tree structure for the expression 0^* + 1^*. The root node is 0^* + 1^*. It branches into 0^* and 1^*. The 0^* branch leads to the set {0}, which is then raised to the power of * to form {0}*. The 1^* branch leads to the set {1}, which is then raised to the power of * to form {1}*. These two sets are unioned to form {0}^* ∪ {1}^*. Arrows indicate the flow from the root to the union step and then to the final set.

$$\mathcal{L}((0+1)1) = \mathcal{L}(0+1) \odot \mathcal{L}(1) = (\mathcal{L}(0) \cup \mathcal{L}(1)) \odot \mathcal{L}(1)$$



$$= (\{0\} \cup \{1\}) \odot \{1\} = \{0,1\} \odot \{1\} = \{01, 11\}$$

$$(0+1)^* 1 (0+1)^* \stackrel{?}{=} (01+11)^* (0+1)^*$$

No because of ϵ

$$\mathcal{L}((0+1)^* 1 (0+1)^*) = \{0,1\}^+ \odot \{0,1\}^* = \{0,1\}^+$$

