

Tell whether the statements below make sense (*not* whether they are true or false).

1. $\{a, b\}^*$ is of infinite length. **nonsense**
Sets have *size* or *cardinality*, not length. Strings have length.
2. $\{a, b\}\{a, b\}\{a, b\}$ contains 8 elements. **sense**
The expression $\{a, b\}\{a, b\}\{a, b\}$ denotes a set, namely the set $\{aaa, aab, aba, baa, abb, bab, bba, bbb\}$, which in fact has 8 elements.
3. The string *aabab* is an element of the automaton M . **nonsense**
A string cannot be an element of an automaton. It can be an element of the set of strings accepted by an automaton. It would make sense to say *aabab* is an element of $L(M)$, or that *aabab* is accepted by M .
4. M is a DFA with start state $\{q\}$. **sense**
The states of an automaton can be any finite set, including sets of states of another automaton. In fact, this happens in the subset construction (K, Lectures 5,6).
5. $L(M) = \emptyset$. **sense**
6. Any single string x is regular. **nonsense**
Strings cannot be regular. Sets of strings can be regular. It would be proper to say that any singleton set $\{x\}$ is regular.

Tell whether the given strings match the given regular expressions.

7. *aaba* $a^* + b^*$ **does not match**
8. *abbbb* $(\varepsilon + a)^*b^*$ **matches**
9. *abb* $b^* + (a + b)^*b$ **matches**
10. *babab* $b(ab)^*$ **matches**
11. *abb* $(a + b)(a + b)^*a(a + b)^*$ **does not match**