

Week 5

1. Closed under complementation hence L^c is regular.
2. Intersection and concatenation both closed under regularity.
3. The given definition satisfies for intersection rules.
4. All statements are true.
5. Concatenation is regular of regular languages. But definition of $L_1 \cdot L_2$ is wrong, it should be $\{a^n b^m | n, m \geq 0\}$
6. By definition it is true.
7. By definition option c is true.
8. $R_{i,j}^k$ is defined as set of strings that go from state q_i to q_j without going through any state q_l such that $l > k$.
9. Regular sets closed under concatenation and complementation.
10. By definition its option c as start state is q_1 and final states are q_3, q_5 .
11. By definition it is $r_{1,3}^3$.
12. By the formula it is $0 + 0(10)^*10$.
13. By formula, answer is option a. Can be verified by trying to find the $r \cdot e$ from state 1 to 3 without going to any state abovenumber 2 in between.
14. $L_1 = L_3$. And L_1 describes the given DFA. $L_1 \neq L_2$ as $0101 \in L_1$ but not in L_2 .
15. $L_1 \& L_3$ are regular as L_1 can be thought of as $a(a+b)^*a + b(a+b)^*b$, as $|x| > 0$.