Reviewing Regular Expressions and Finite Automata - Selected Answers

2. strings which begin and end with the same letter

   a(a+b)*a + b(a+b)*b + a + b

5 strings with exactly two occurrences of ab

   b*a* ab b*a* ab b*a*

6. strings with at most two occurrences of ab

   b*a* (ab+λ) b*a* (ab+λ) b*a*

8. strings that contain exactly two pairs of consecutive 1's (111 represents two pairs - there may be isolated 1's)

   First consider the strings not containing the substring 11: (0+10)*(1+λ)

   An answer follows (there are also other answers):

   (0+10)* (11(0+01)*011 + 111) (0+01)*

12. L = $\{a^n b^m \mid n + m \text{ is odd}\}$

    (aa)* (b+a) (bb)*

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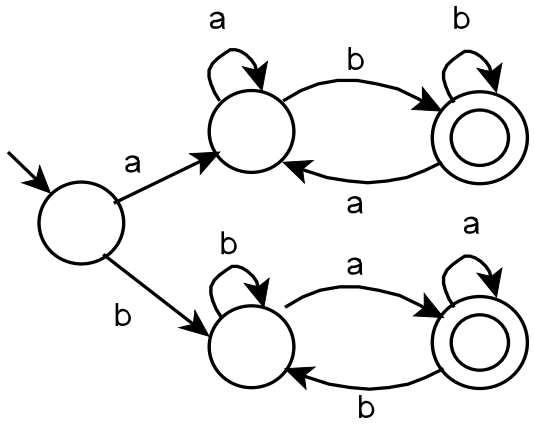
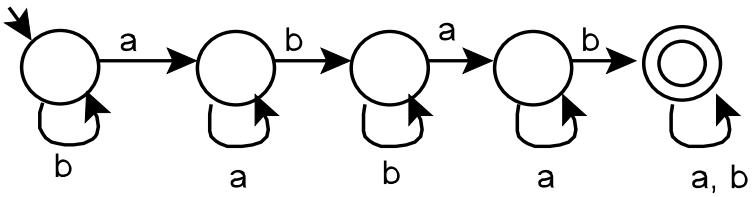
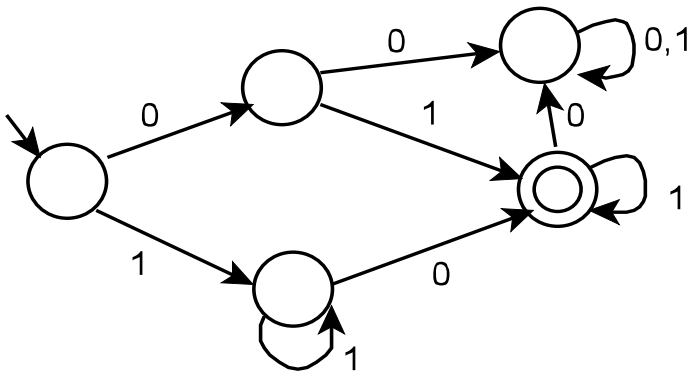
3. strings which begin and end with a different letter



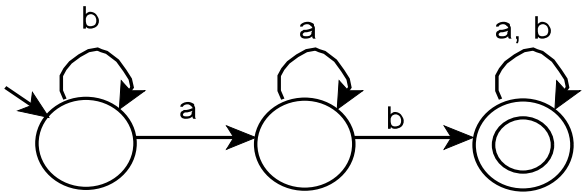
4. strings with at least two occurrences of ab.



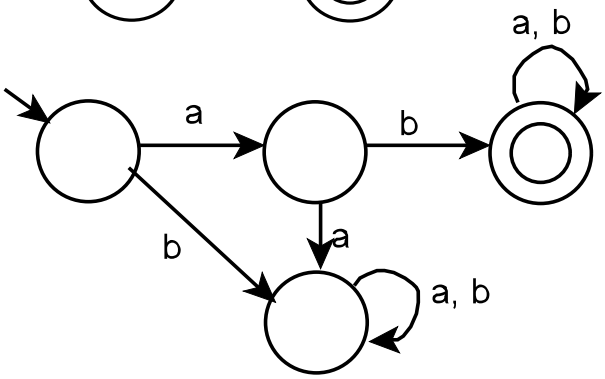
7. strings with exactly one 0 and at least one 1.



13. strings that contain ab



15. strings that start with ab



17. strings which contain a 1 in the third position from the end

the end of these strings is one of: 100, 101, 110, 111