EXERCISES ON REGULAR EXPRESSIONS AND FINITE AUTOMATA

Give regular expressions representing the following languages on {a, b} or {0, 1}:

1. all strings

2. strings which begin and end with the same letter

3. strings which begin and end with a different letter

4. strings with at least two occurrences of ab

5. strings with exactly two occurrences of ab

6. strings with at most two occurrences of ab

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

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

9. $L = \{a^n \mid n \text{ is even } \}$

10. $L = \{a^n \mid n \text{ is odd } \}$

11. L = { strings on {a, b} of odd length }.

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

13. strings that contain ab

14. strings that do not contain ab

15. strings that start with ab

16. strings that finish with ab

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

Now for each language give an automata which accepts that language