PES UNIVERSITY, Bangalore

(Established under Karnataka Act No. 16 of 2013)

Department of Computer Science & Engineering

Automata Formal Languages & Logic

Homework – Regular grammar

1) Construct derivations for the strings, if the language is given as

   S->AS| ε
   A->aa|ab|ba|bb

   Strings:

   a) aabbba
   b) baabab
   c) aaabbb

2) Construct a regular grammar over the alphabet Σ = {a, b, c, d} whose language is the set of strings that contain exactly two b's.

3) Construct right or left linear grammar for the regular language:
   Student grades in an examination are represented with the letters{A,B,C,D,E,F} .A string such as ABFCAD indicates the grades obtained by a student in six different subjects. The grammar must generate only those strings that have at most 3 D's and no F's.

4) Construct Regular Grammar for L = {x01y : x,y ∈ {0,1}∗} .

5) A run in a string is a sub-string made up of a single symbol. For example aabbbcd has a run of a's of length 2 and a run of b's of length 3.The grammar must derive all strings over the alphabet {a,b,c,d} with at least one run of a's of length 2 and a run of c's of length 3.

6) Construct right or left linear grammar for the regular language over the alphabet Σ = {0,1} L={w |w has length at least 3 and its third symbol is a 0}.

7) Construct regular grammar over the alphabet Σ ={0,1 },L={w | w contains at least three 1's}.

8) Construct regular grammar for the language consisting of all strings of zero or more 0's followed by one or more 1's, followed by two or more 2's For example 001122, 122 and 0111122 are in L; 012 (too few 2's) and 0112122 (a 2 precedes a a are not).

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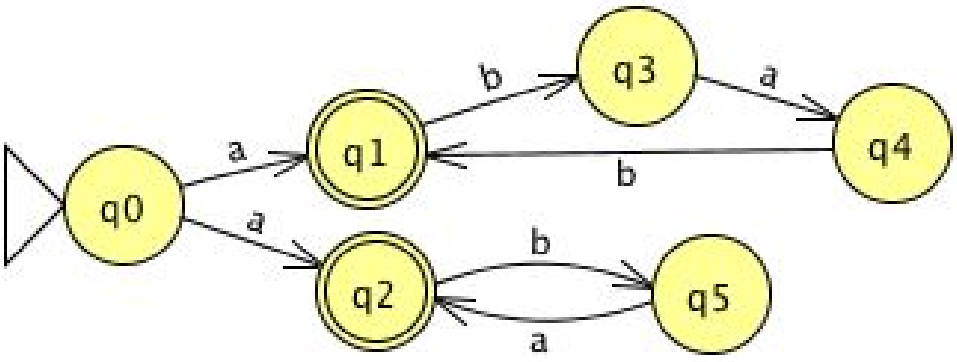
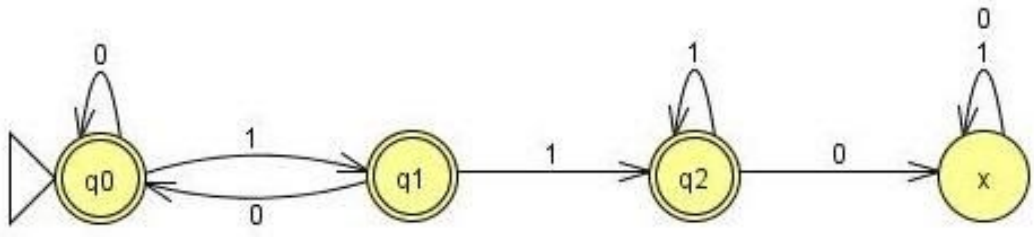
9) Construct regular grammar from the given finite automata.



10) Construct regular grammar from the given finite automata.



11) Construct regular grammar from the given finite automata.

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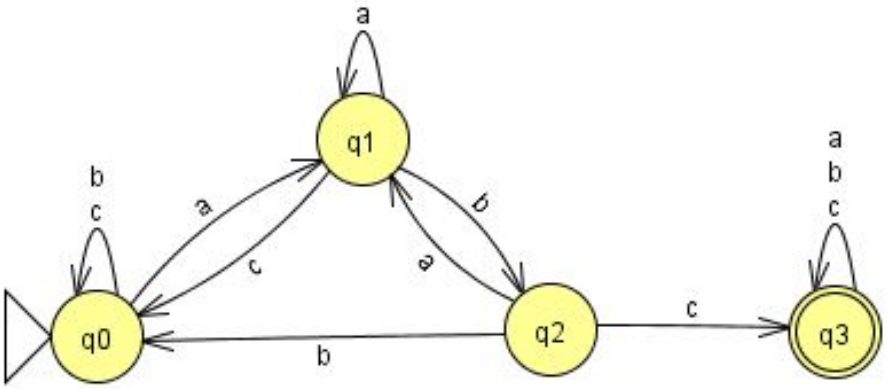

12) Construct Regular grammar for the given Finite Automata.(a+b)*ab*.

13) Construct Regular grammar for the given Finite Automata 0*11(0+1)*

14) For the regular expressions:
   a. (a +bc+ c)*
   b. (ab*ab*ab*)* + b*
      i. Construct a finite automaton.
      ii. Convert your finite automaton into an equivalent regular grammar

15) Consider the following regular grammar G:

   S → aB|a

   B → bS.

   (a) Build an NFA M that accepts L(G).

   (b) Construct a regular grammar G′ from M that generates L(M).

   What is the difference between G and G′?

16) Convert regular grammar to finite automata.

   S->aA |λ

   A->aA|bB|λ

B->bB|λ

17) Convert regular grammar to finite automata.
S->aA|bC
A->aC|bB
B->aB|bB|λ
C->aC|bC