NFA to DFA
Solution of Reg Eqs
Practice NFAs

• Write NFAs for each of the following
  • \((111 + 000)^*\) -- I’ll do this one in detail
  • \((0+1)^* 101 (0+1)^*\)
  • \((1 (0+1)^* 0) + (0 (0+1)^* 1)\)
• Convert each NFA you just created to an equivalent DFA.
DFAs to REs

• For each of the DFAs you created for the previous page, use ripping of states and then regular equations to compute the associated regular expression. Note: You obviously ought to get expressions that are equivalent to the initial expressions.
NFA for \((111 + 000)^+\)

DFA for \((111 + 000)^+\)
State Ripping (A,H)
State Ripping (B,E)
State Ripping (CF)
State Ripping (D)

S

000+(111)*000 = (111)*000

(111)*

Z

G

000+(111)*000 = (111)*000
State
Ripping (G)

\[(111)^+ + ((111)*(000))^+(111)^* = (111 + 000)^+\]
Regular Equations

\[
A = \lambda \\
B = A_1 + D_1 + G_1 = 1 + D_1 + G_1 \\
C = B_1 \\
D = C_1 = B_{11} = 111 + D_{111} + G_{111} \\
E = A_0 + D_0 + G_0 = 0 + D_0 + G_0 \\
F = E_0 \\
G = F_0 = E_{00} = 000 + D_{000} + G_{000} \\
H = B_0 + C_0 + E_1 + F_1 = H(0+1) \\
D = (111 + G_{111}) (111)^* \\
G = 000 + (111 + G_{111}) (111)^* 000 + G_{000} \\
\quad = 000 + (111)^* 000 + G (111)^* 000 = (111)^* 000 ((111)^* 000)^* = ((111)^* 000)^* \\
D = 111 + ((111)^* 000)^* 111 + D_{111} = ((111)^* 000)^* (111)^* = ((000)^* 111)^* \\
L = D+G = ((111)^* 000)^* + ((000)^* 111)^* = (111 + 000)^* 
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