

NFA to DFA

Solution of Reg Eqs

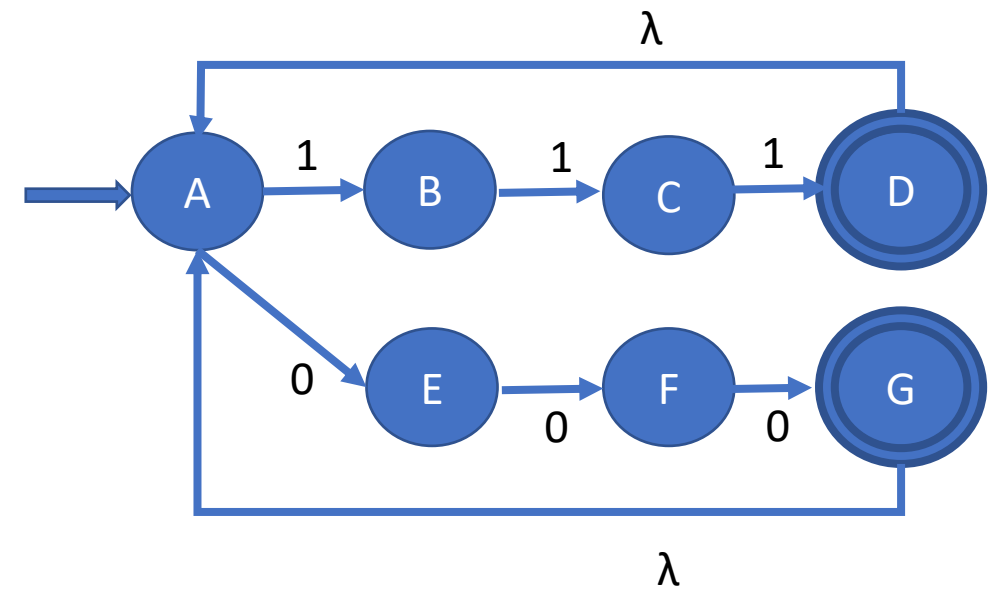
Practice NFAs

- 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.

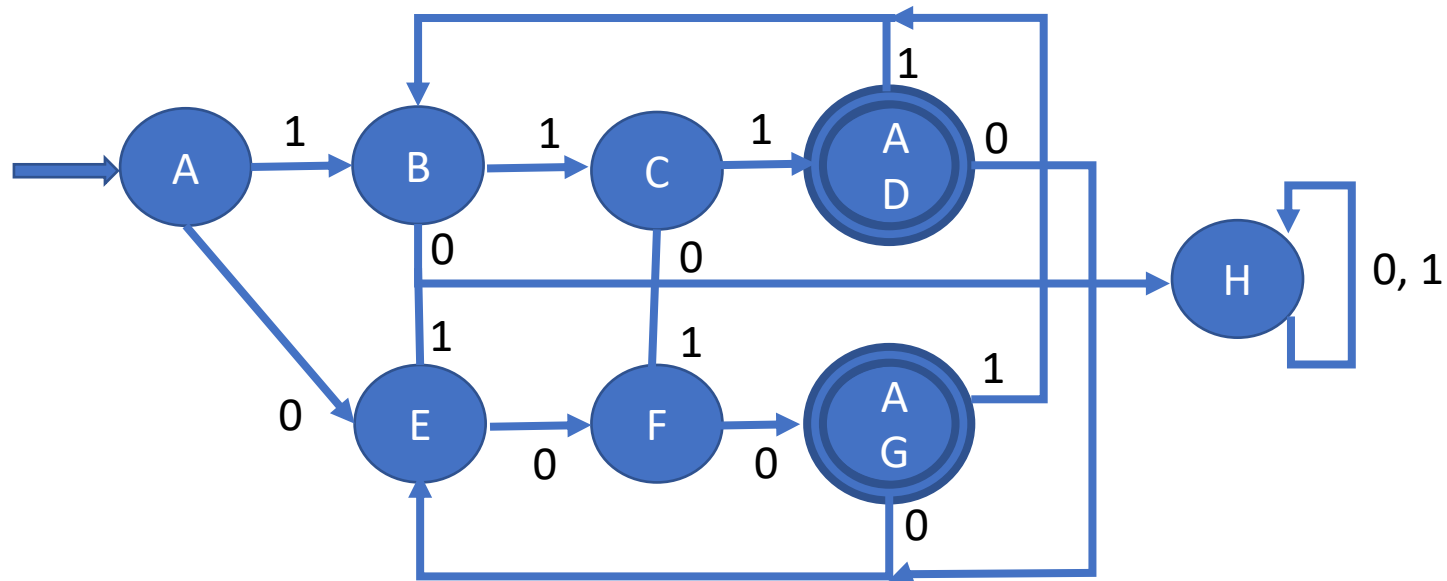
DFAs to REs

- 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.

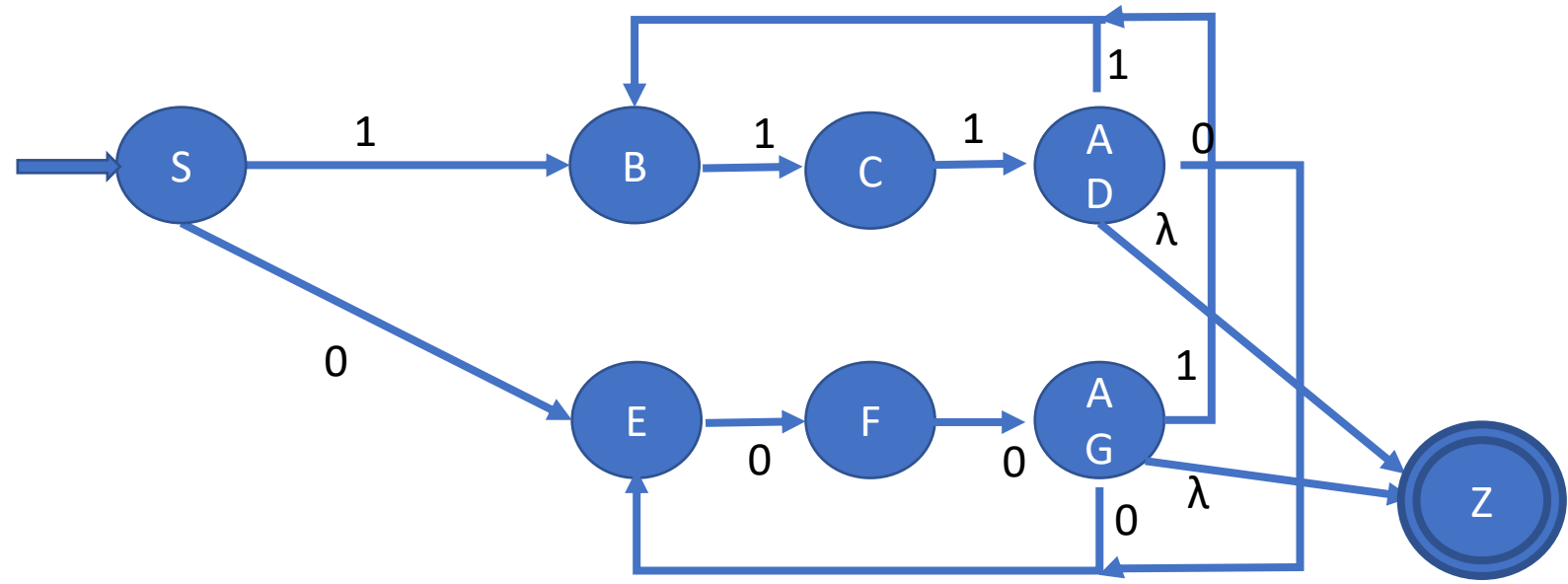
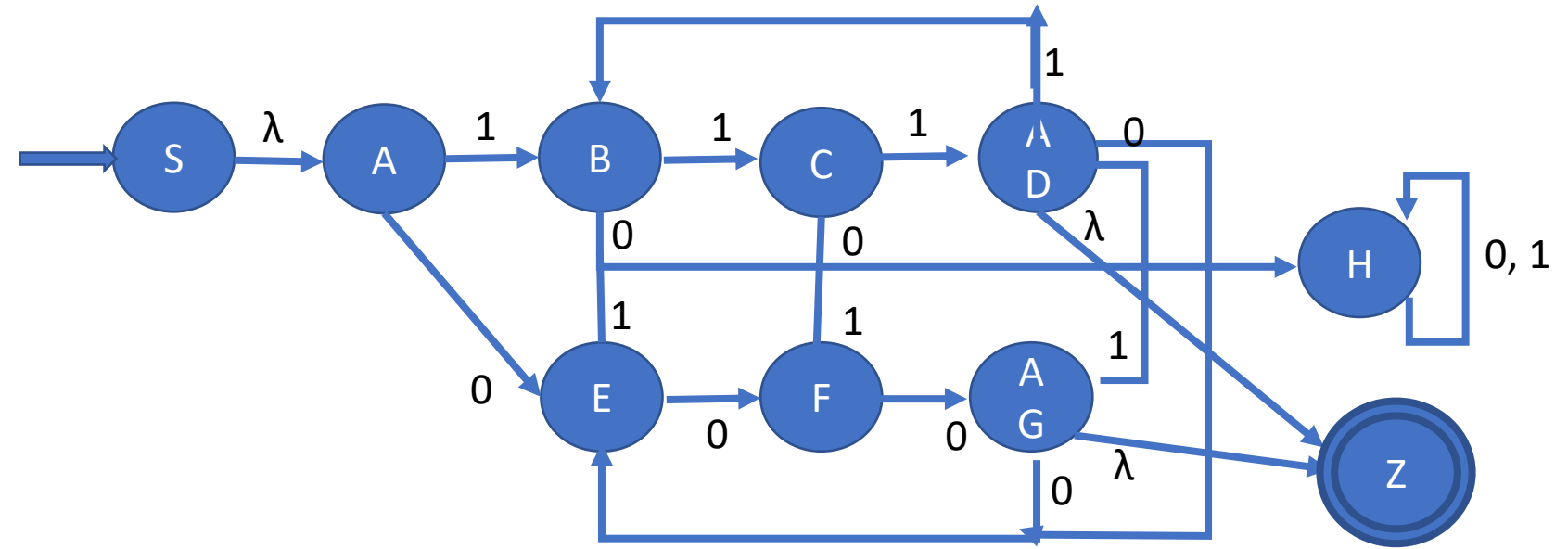
NFA for $(111 + 000)^+$



DFA for $(111 + 000)^+$

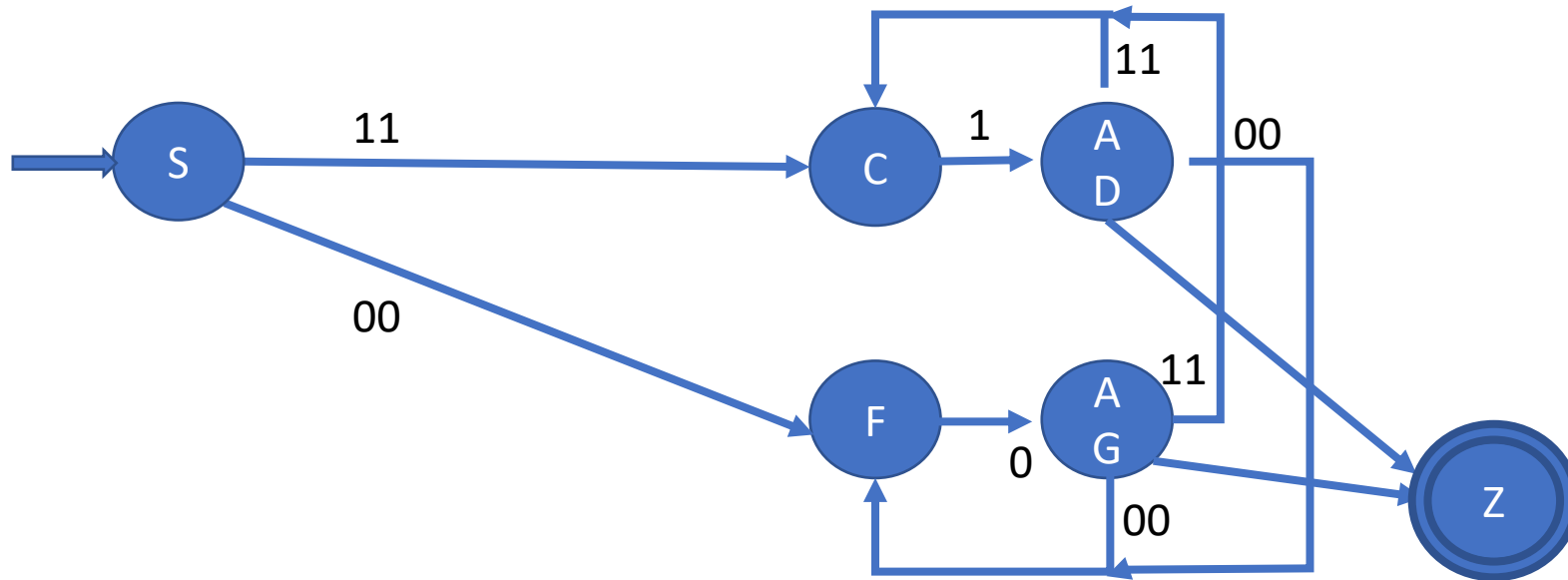


State Ripping (A,H)

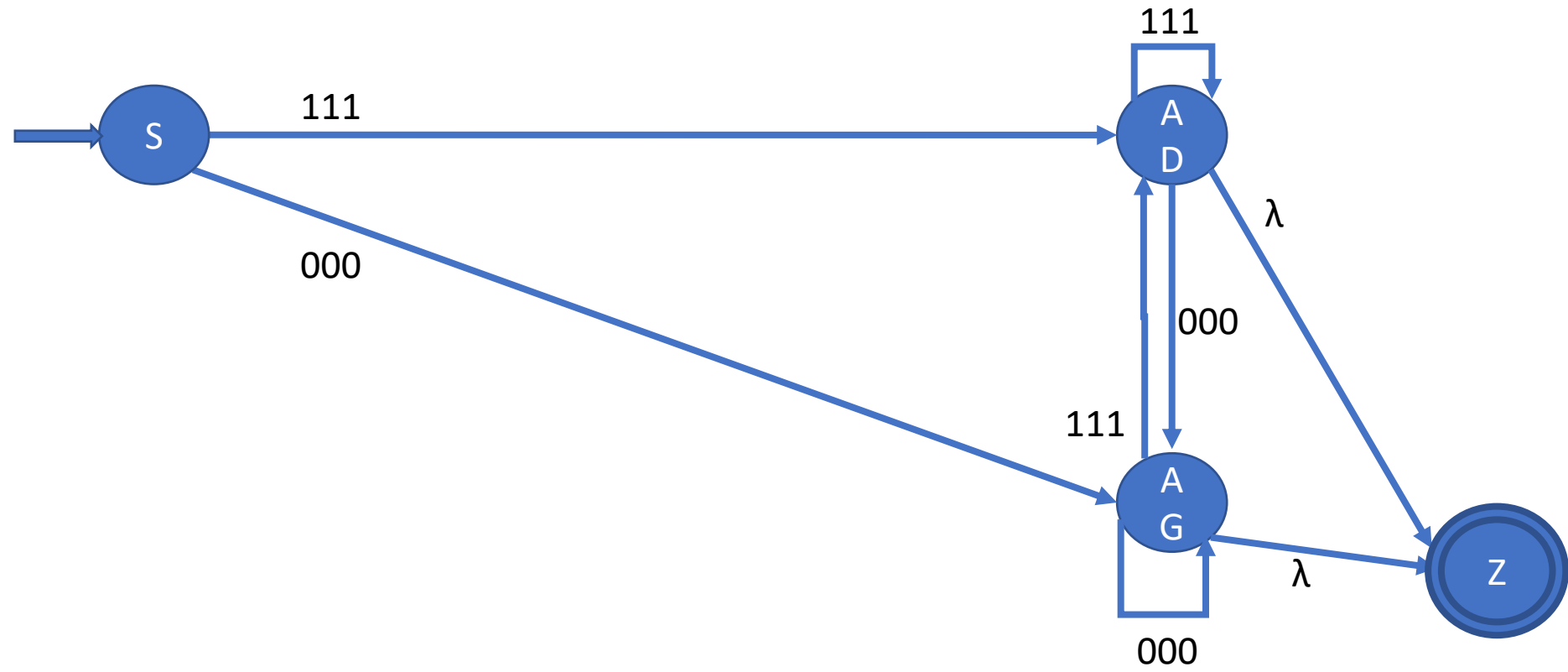


State Ripping (B,E)

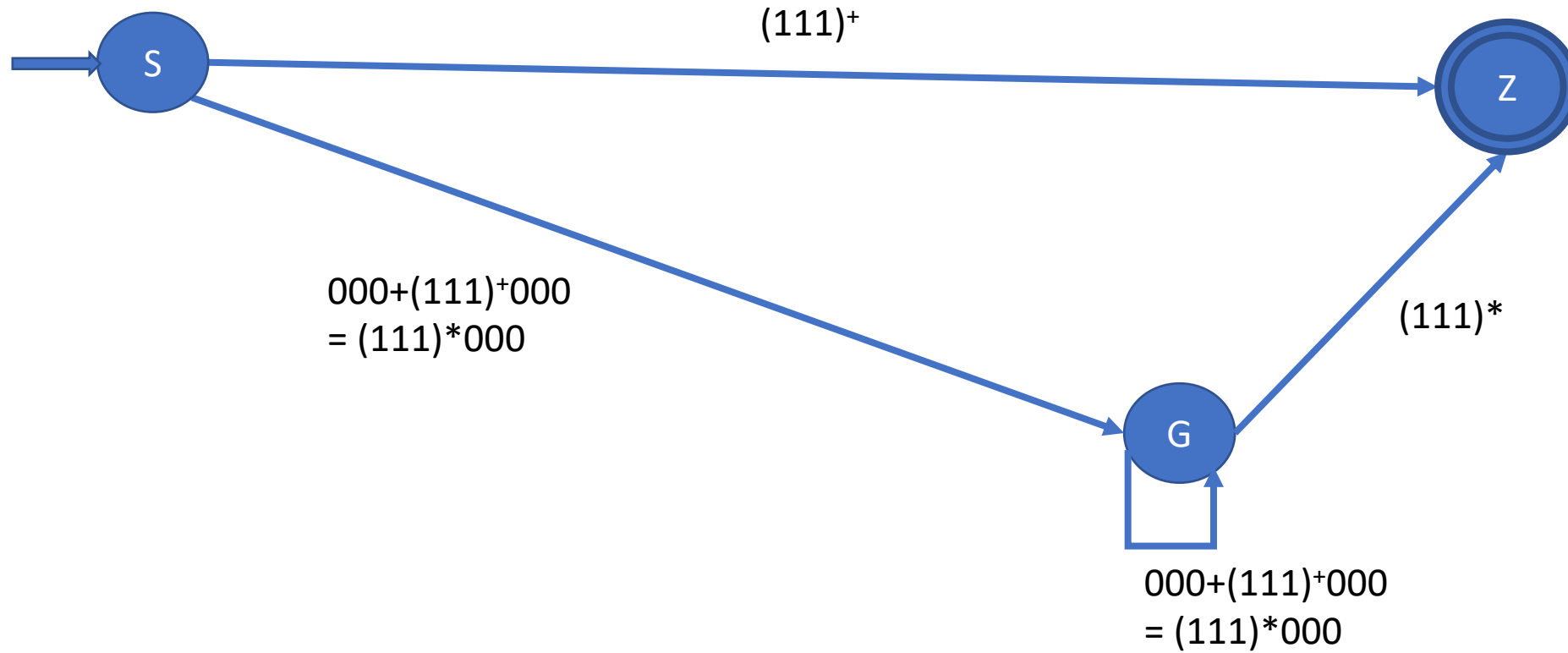
0, 1



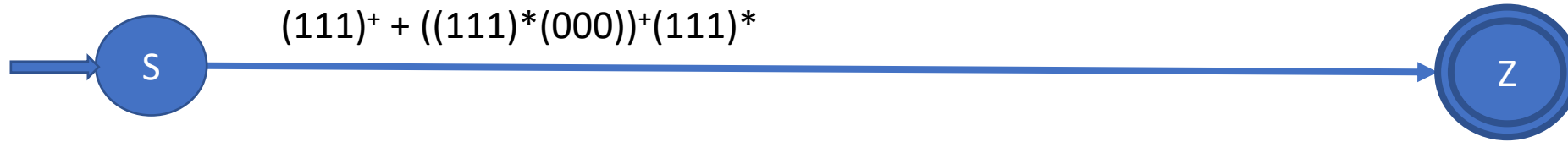
State Ripping (CF)



State Ripping (D)

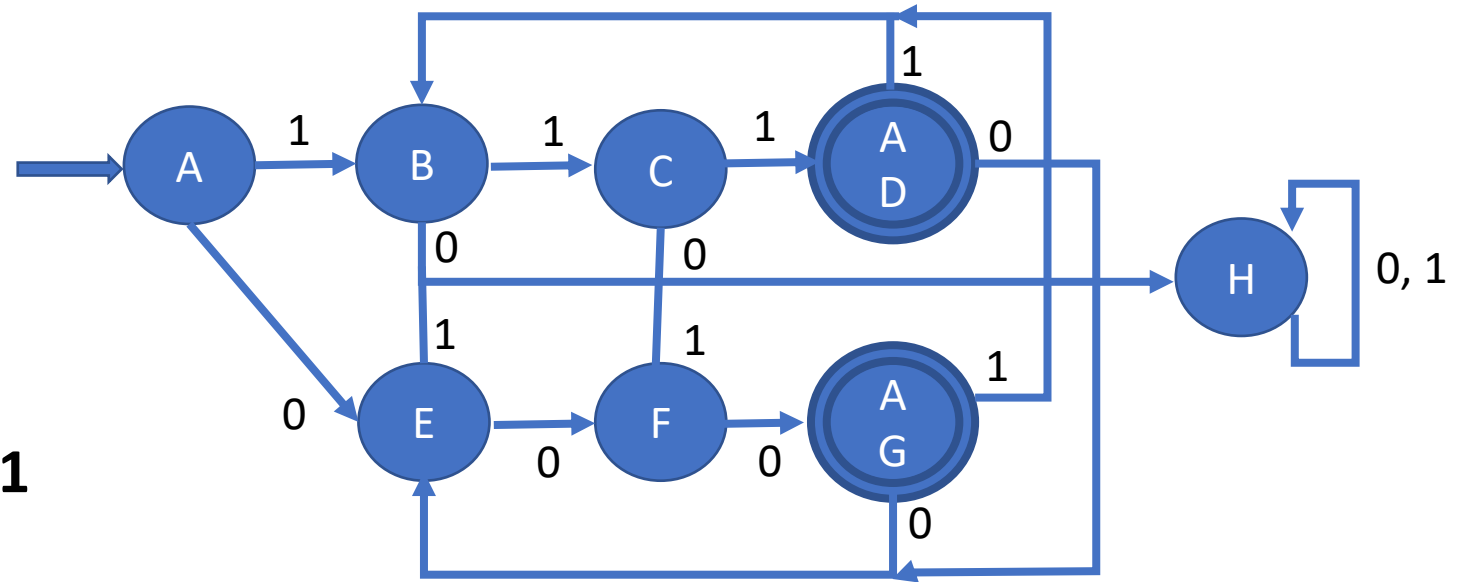


State Ripping (G)



$$(111)^+ + ((111)^*(000))^+(111)^* = (111 + 000)^+$$

Regular Equations



$$A = \lambda$$

$$B = A1 + D1 + G1 = 1 + D1 + G1$$

$$C = B1$$

$$D = C1 = B11 = 111 + D111 + G111$$

$$E = A0 + D0 + G0 = 0 + D0 + G0$$

$$F = E0$$

$$G = F0 = E00 = 000 + D000 + G000$$

$$H = B0 + C0 + E1 + F1 = H(0+1)$$

$$D = (111 + G111) (111)^*$$

$$G = 000 + (111 + G111) (111)^* 000 + G000$$

$$= 000 + (111)^+ 000 + G (111)^* 000 = (111)^* 000 ((111)^* 000)^* = ((111)^* 000)^+$$

$$D = 111 + ((111)^* 000)^+ 111 + D111 = ((111)^* 000)^* (111)^+ = ((000)^* 111)^+$$

$$L = D+G = ((111)^* 000)^+ + ((000)^* 111)^+ = (111 + 000)^+$$