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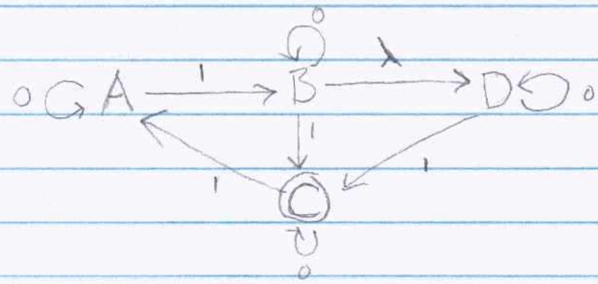
COSC 312
10/13/14
Vose

Homework 4

1 • Non-deterministic automata $\Sigma = \{0, 1\}$



Initial state: $\{A\}$

$A0 \rightarrow 0A$

$\{A\}0 \rightarrow \{A\}$

$A1 \rightarrow 1B$

$A1 \rightarrow 1B \rightarrow 1D$

$\{A\}1 \rightarrow \{B, D\}$

$B0 \rightarrow 0B$

$B0 \rightarrow D0 \rightarrow 0D$

$D0 \rightarrow 0D$

$\{B, D\}0 \rightarrow \{B, D\}$

$B1 \rightarrow D1 \rightarrow 1C$

$B1 \rightarrow 1C$

$D1 \rightarrow 1C$

$\{B, D\}1 \rightarrow \{C\}$

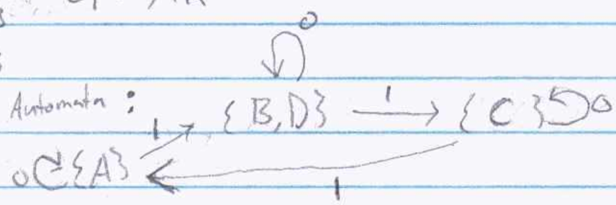
$C0 \rightarrow 0C$

$C1 \rightarrow 1A$

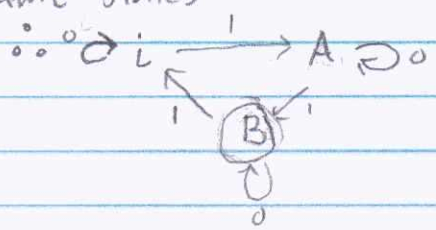
$\{C\}1 \rightarrow \{A\}$

$\{C\}0 \rightarrow \{C\}$

• Deterministic Automata :



if we rename states



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- Converting to a regular expression

$R_i = 1R_A + 0R_i$

$R_B = \lambda + 1R_A + 0R_B$

$R_A = 1R_B + 0R_A \Rightarrow R_A = 0^*1R_B$

$\therefore R_B = \lambda + 1R_B + 00^*1R_B \Rightarrow R_B = (1 + 00^*1)^*\lambda = (0^*1)^*$

$\therefore R_i = 10^*1(0^*1)^* + 0^* = (0^*1)(0^*1)^*$

- Converting to a DA.

$r = (0^*1)(0^*1)^*$

$D_\lambda r = r$

$D_0 r = (D_0 0^*1)(0^*1)^* + \delta(0^*1) D_0(0^*1)^*$

$= ((D_0 0^*)1 + \delta(0^*) D_0 1)(0^*1)^*$

$= ((D_0 0)0^*1)(0^*1)^*$

$= r$

$D_1 r = (D_1 0^*1)(0^*1)^* + \delta(0^*1) D_0(0^*1)^*$

$= ((D_1 0^*)1 + \delta(0^*) D_1 1)(0^*1)^*$

$= ((D_1 0)0^*1 + \lambda)(0^*1)^*$

$= (0^*1)^*$

$D_{11} r = D_1(D_1 r)$

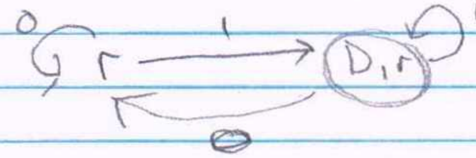
$= (D_1 0^*1)(0^*1)^*$

$= D_1 r$

$D_{10} r = D_0(D_1 r)$

$= (D_0 0^*1)(0^*1)^*$

$= r$



= Deterministic automata.