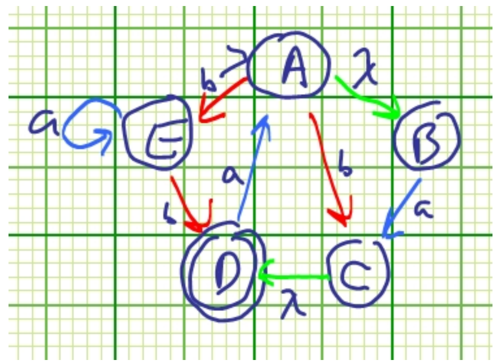
Foundations of C.S.

1. Consider the non-deterministic finite automaton with λ-rules:



a) Find the λ closure of each of the five states.

♣

A	$\{A, B\}$
B	$\{B\}$
C	$\{C, D\}$
D	$\{D\}$
E	$\{E\}$

♣

b) Use the λ-closure fill in the transition relation

	a	b
A		
B		
C		
D		
E		

♣ *For each state q, and for each letter $\sigma \in \Sigma$, we want to compute $\lambda(\sigma(\lambda(q)))$:*

	a	b
A	$\{C, D\}$	$\{C, D, E\}$
B	$\{C, D\}$	$\emptyset$
C	$\{A, B\}$	$\emptyset$
D	$\{A, B\}$	$\emptyset$
E	$\{E\}$	$\{D\}$

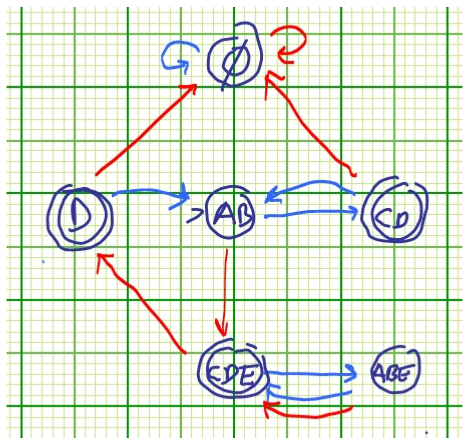
♣

c) Use parts a) and b) to construct an equivalent deterministic finite automaton. (The start state should be $\{A, B\}$). (You may specify your machine diagramatically or via a table, but the table must be in the correct format for a DFA).

♣ *The table can be constructed directly from the transition relation. There will be six states connected to the start state, $\{A, B\}$, so the resulting deterministic machine has six* *states, and three final states* $\{D\}$, $\{C, D\}$, *and* $\{C, D, E\}$. *For incomplete determinism you can leave of the state* $\emptyset$.

	a	b
$\{A, B\}$	$\{C, D\}$	$\{C, D, E\}$
$\{C, D\}$	$\{A, B\}$	$\emptyset$
$\{C, D, E\}$	$\{A, B, E\}$	$\{D\}$
$\{A, B, E\}$	$\{C, D, E\}$	$\{C, D, E\}$
$\{D\}$	$\{A, B\}$	$\emptyset$
$\emptyset$	$\emptyset$	$\emptyset$

A diagram is



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