15-453: Formal Languages, Automata and Computability
L.Blum, Andrew Smith, Aashish Jindia, Asa Frank

Homework # 4 **Due: February 18, 2014**

1

If A and B are languages, define the equal concatenation of A and B to be

$$\mathrm{EC}(A, B) = \{xy \mid x \in A, y \in B, |x| = |y|\}.$$

Show that if A and B are regular, then $\mathrm{EC}(A, B)$ is context-free.

the state will be a composition of PDA state and DFA state. for every input symbol read of A, X will be inserted in stack. from the final state of the first language, we may non-deterministically decide to start reading y. Thus, the PDA state will change, and the DFA state will change to that of start state of B.this will eject from stack and stimulate B as well. In the end, we should have stack empty and the state in DFA in the accept state of B, only then acceptance

2

For any language A over Σ, consider the language of strings obtained by deleting a single character from any string in A:

$$\textsc{Delete}(A) = \{xz \mid x, z \in \Sigma^* \text{ and } xyz \in A \text{ for some } y \in \Sigma\}$$

Show that if A is regular, then $\textsc{Delete}(A)$ is regular.

almost same DFA, just make the state composite QX{0,1}
when in 0 you can make an epsilon transition in lieu of some alphabet and transition to 1 and continue with life as was acceptance from state 1 only

3

Include a References section. Cite all sources and people, including yourself, that you collaborated with on this assignment.