15-453: Formal Languages, Automata and Computability
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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.

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.

3

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