Problem Set 4
Weighted Automata 2020

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Problem 1. Given two probabilistic automata $\mathcal{A}_1$ and $\mathcal{A}_2$, construct automata $\mathcal{B}_1$, $\mathcal{B}_2$ and $\mathcal{B}_3$ such that

1. $||\mathcal{B}_1|| = 1 - ||\mathcal{A}_1||$,
2. $||\mathcal{B}_2|| = ||\mathcal{A}_1|| \cdot ||\mathcal{A}_2||$,
3. $||\mathcal{B}_3||(w) = \begin{cases} 0 & \text{if } w = \epsilon \\ \alpha||\mathcal{A}_1||(w) + \beta||\mathcal{A}_2||(w) & \text{otherwise} \end{cases}$, where $\alpha, \beta \in [0, 1]$ and $\alpha + \beta \leq 1$.