Homework 5

To hand in on October 25th at the beginning of the exercise session, or by mail (before 14:00) at `marie.fortin@lsv.fr`.

Answers can be written in french or in english.

Fix AP $= \{p, q\}$.

1. Give a deterministic synchronous Büchi transducer $\mathcal{A}_1$ with 2 states for the formula $\varphi_1 = \mathsf{Y}\, p$. Prove that the transducer is correct, i.e., that $[\![\mathcal{A}_1]\!] = [\![\mathsf{Y}\, p]\!]$.

2. Give a deterministic synchronous Büchi transducer $\mathcal{A}_2$ with 2 states for the formula $\varphi_2 = p\, \mathsf{S}\, q$. Prove that $[\![\mathcal{A}_2]\!] = [\![p\, \mathsf{S}\, q]\!]$.

3. Give an unambiguous synchronous Büchi transducer $\mathcal{A}_3$ with 3 states for the formula $\varphi_3 = \mathsf{G}\, p$. Prove that $\mathcal{A}_3$ is unambiguous, and that $[\![\mathcal{A}_3]\!] = [\![\mathsf{G}\, p]\!]$.

4. Give an unambiguous synchronous Büchi transducer $\mathcal{A}_3$ with 3 states for the formula $\varphi_4 = p\, \mathsf{R}\, q$. Prove that $\mathcal{A}_4$ is unambiguous, and that $[\![\mathcal{A}_4]\!] = [\![p\, \mathsf{R}\, q]\!]$.