1. Show that the function $f(u, v) = uv$ is computable in $S_n$. Recall that $uv$ denotes the concatenation of the words $u$ and $v$.

2. Let $A = \{s_1, \ldots, s_n\}$ and let $P(x)$ be the predicate on $A^*$ that is TRUE just when $x$ has an even number of symbols. Show that $P(x)$ is computable in $S_n$.

3. Define $\text{HALT}_n(x, y)$ as the predicate that is TRUE if and only if the $S_n$ program $y$ eventually halts on input $x$. Show that $\text{HALT}_n(x, y)$ is not computable in $S_n$.

4. Construct a Post-Turing program that computes strictly the function $f(u, v) = uv$.

5. Construct a Turing machine that computes the function $f(x) = x^R$. 

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**Homework 5**

*Posted: April 11, 2022*

*Due: April 27, 2022*