

## CMPE 350 - Spring 2018

### PS 10 - 26.04.18

**2.25** For any language  $A$ , let  $\text{SUFFIX}(A) = \{v|uv \in A \text{ for some string } u\}$ . Show that the class of context-free languages is closed under the SUFFIX operation

- Prove or disprove: “The class of non-context-free languages is closed under complementation.”
- Let  $A = \{1^p \mid p \text{ is a prime number greater than } 2^{100}\}$  and  $B = \{1^k \mid 0 \leq k < 2^{100}\}$ . Is the language  $A \cup B$  context-free? Prove your answer.
- Consider the language  $R = \{w \mid w \text{ is a regular expression on the alphabet } \{0, 1\}\}$ . Is  $R$  context-free?
- Prove that there exists a Turing machine  $M$  whose language  $L$  is decidable, but  $M$  is not a decider. This shows that just because a Turing machine’s language is decidable, it’s not necessarily the case that the Turing machine itself must be a decider.

**3.18** Show that a language is decidable iff some enumerator enumerates the language in the standard string order