

## CMPE 350 - Spring 2019

### PS 13 - 30.05.19

- Given an example of a language  $L$  such that  $L$  is co-Turing recognizable but its complement is not.
- Prove that the language  $\{ \langle M, w, q \rangle \mid M \text{ is a Turing machine which visits state } q \text{ during its execution when started with input string } w \}$  is undecidable.
- Prove or disprove: “Every infinite decidable language has an undecidable subset.”
- Prove or disprove: “For each  $k \geq 1$ ,  $L_k = \{ w \mid w \text{ is a } k\text{-symbol description of a Turing Machine} \}$  is regular.”
- Is the class of co-Turing recognizable languages closed under union? Prove your answer.
- Does every nonregular language have a proper subset that is itself a nonregular language? Prove your answer.