

# COS 522 Complexity — Homework 3.

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Total of 150 points

**Exercise 1** (20 points). Do Exercise 8.4 (alternative construction of pairwise ind. hashes)

**Exercise 2** (30 points). Do Exercise 8.5 (perfectly complete set lower bound protocol)

**Exercise 3** (20 points). Do Exercise 8.6 (parallel repetition of AM protocols)

**Exercise 4** (30 points). Do Exercise 8.7 ( $\mathbf{AM}[O(1)] \subseteq \mathbf{AM}[2]$ )

**Exercise 5** (30 points). Do Exercise 8.8 ( $\mathbf{IP} = \mathbf{PSPACE}$ )

**Exercise 6** (20 points). Do Exercise 8.9 (downward reducible languages are in  $\mathbf{PSPACE}$ )