

6.892: ALGORITHMIC LOWER BOUNDS, SPRING 2019  
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**Problem Set 5**

*Due: Tuesday, March 12, 2019 at noon*

**Problem 5.1 [Consecutive Sets].** Prove that the following problem is NP-complete.

CONSECUTIVE SETS: Given a collection of (unordered) subsets  $S_1, S_2, \dots, S_n$  of a finite alphabet  $\Sigma$ , and a positive integer  $k$ , is there a string  $w$  over the alphabet  $\Sigma$  with length at most  $k$  such that, for each  $S_i$ , the elements of  $S_i$  occur (in any order) as some consecutive characters  $w_j, w_{j+1}, \dots, w_{j+|S_i|-1}$  of  $w$ ?

**Hint:** Reduce from some version of Hamiltonicity.