

ENEE/CMSC/MATH 456: Cryptography  
PRF Class Exercise 2/24/20

Let  $F$  be a length-preserving pseudorandom function. For the following constructions of a keyed function  $F': \{0,1\}^n \times \{0,1\}^{n-1} \rightarrow \{0,1\}^{2n}$ , state whether  $F'$  is a pseudorandom function. If yes, prove it; if not, show an attack.

1.  $F'_k(x) := F_k(0||x)||F_k(x||1)$ .

2.  $F'_k(x) := F_k(0||x)||F_k(1||x)$ .