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**Joseph M DiMuro\*** (joseph.dimuro@biola.edu). *The Warden's Game - Greedy and Necklace Constructions of Universal Cycles*. Preliminary report.

Let  $\mathbf{T}(n, k)$  be the set of strings over  $\{1, 2, \dots, k\}$  of length  $n$ . The lexicographically minimal universal cycle for  $\mathbf{T}(n, k)$  (also known as a de Bruijn cycle) can be constructed via a greedy algorithm; at each step, the smallest possible symbol is appended to the cycle, while ensuring that no substring of length  $n$  is repeated. This universal cycle can also be constructed by taking all necklaces in  $\mathbf{T}(n, k)$  in lexicographic order, and appending their aperiodic prefixes.

Let  $S \subseteq \mathbf{T}(n, k)$  be a subset that is closed under rotations. Aaron Williams asked for necessary and sufficient conditions on  $S$  so that a universal cycle for  $S$  can be generated via the greedy algorithm or the necklace algorithm. With the help of a dice-turning game, we will answer both questions. (Received September 20, 2016)