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Aaron Williams* (haron@uvic.ca). *Greedy Constructions of de Bruijn Sequences and Gray Codes.*

In 1934, M. H. Martin gave the following greedy algorithm for constructing a binary de Bruijn sequence of order n : Start with 1^{n-1} , then repeatedly add the smallest bit (0 or 1) that does not create a duplicated substring of length n . For example, the result for $n = 4$ is 111 followed by 0000100110101111, which is the lexicographically smallest such de Bruijn sequence. The binary reflected Gray code has a similar construction: Start with 0^n , then repeatedly append a new string by complementing the rightmost possible bit of the previous string. For example, the result for $n = 3$ is $00\bar{0}, 0\bar{0}1, 01\bar{1}, \bar{0}10, 11\bar{0}, 1\bar{1}1, 10\bar{1}, 100$ with the complemented bits highlighted. Both algorithms generalize nicely from binary strings to k -ary strings.

Despite this strong foundation, greedy approaches to constructing generalizations of de Bruijn sequences and Gray codes have been largely overlooked. We reinterpret many classic results using simple greedy algorithms, and show that new results can also be obtained greedily. Preliminary results were presented at WADS 2013: A. Williams, *The Greedy Gray Code Algorithm*, LNCS 8037, 525–534, with an appendix appearing on the author’s webpage: www.math.mcgill.ca/haron. (Received September 17, 2013)