Microcode enables programmability of (micro) architectural structures
to enhance functionality and to apply patches to an existing design. As more features get added to a CPU core, the area and power costs associated with microcode increase. One solution to address the
microcode size issue is to store the microcode in a compressed form and decompress it during execution. Furthermore, the reuse of a single
hardware building block layout to implement different dictionaries in
the two-level microcode compression reduces the cost and the design time of the decompression engine. However, the reuse of the hardware building block imposes structural constraints to the compression algorithm, and existing algorithms may yield poor compression. In this
paper, we develop the SC2 algorithm that considers the structural constraint in its objective function and reduces the area expansion when reusing hardware building blocks to implement different dictionaries. Our experimental results show that the SC2 algorithm is
able to produce similar sized dictionaries and achieves the similar compression ratio to the non-constrained algorithm.