External memory implicit searching

Given a static input array A of N keys in the EMM (external memory or cache-aware model), describe how to organize the keys inside A by suitably permuting them during a preprocessing step, so that any subsequent search of a key requires $O(log_B N)$ block transfers using just $O(1)$ memory words of auxiliary storage (besides those necessary to store A). Clearly, the CPU complexity should remain $O(logN)$. Discuss the I/O complexity of the above preprocessing, assuming that it can uses $O(N/B)$ blocks of auxiliary storage. (Note that the additional $O(N/B)$ blocks are employed only during the preprocessing; after that, they are discarded as the search is implicit and thus just O(1) words can be employed.)

SOLUTION