Assignment 3

Exercise 1: 20+5 Points
Develop an algorithm that sorts \( N \) integer keys between 1 and \( K \) using \( O\left(\frac{N}{B} \log_{M/B} K\right) \) I/Os.

Assume that the parameter \( K \) is not known in advance in the previous exercise. Can you still sort \( N \) keys in \( O\left(\frac{N}{B} \log_{M/B} K\right) \) I/Os? If so, provide an algorithm.

Exercise 2: 5 Points
The radix sort can sort \( N \) integers between 1 and \( N \) in \( O(N) \) time. Provide an algorithm that can sort \( N \) integers between 1 and \( N \) I/O-efficiently using \( O(N/B) \) I/Os, or argue that it is impossible. Can you adapt the radix sort?