Abstract. We live in an era of data explosion that necessitates the discovery of novel out-of-core techniques. The I/O bottleneck has to be dealt with in developing out-of-core methods. The Parallel Disk Model (PDM) has been proposed to alleviate the I/O bottleneck. Sorting is an important problem that has ubiquitous applications. Several asymptotically optimal PDM sorting algorithms are known and now the focus has shifted to developing algorithms for problem sizes of practical interest. In this paper we present several novel algorithms for sorting on the PDM that take only a small number of passes through the data.