1. The chain sorting problem is defined as follows: The input is a sequence $X$ of $n$ arbitrary elements and the output is the right neighbor of each element of $X$ in sorted order. For example, if $X = 5, 11, 4, 3, 23, 17, 8, 45, 14$, then, the output is $8, 14, 5, 4, 45, 23, 11, \infty, 17$. Show how to solve this problem in $\tilde{O}(1)$ time using $n^2$ arbitrary CRCW PRAM processors.

2. Input is a sequence $X$ of $n$ keys where each key is an integer in the range $[1, n^c]$, $c$ being any constant. Show how to sort $X$ in $O(\sqrt{n})$ time using $\sqrt{n}$ CREW PRAM processors.

3. Input are two sets $A$ and $B$ with $|A| = n$, $|B| = m$, and $m < n$. These two sets contain arbitrary real numbers and are not necessarily in sorted order. Present an $\tilde{O}(\log m)$ time algorithm to compute $A \cap B$. You can use up to $n$ arbitrary CRCW PRAM processors. As an example, if $A = \{8, 12, 3, 6, 11, 15, 4, 55, 32, 18\}$ and $B = \{11, 18, 5, 15, 7, 3\}$, then the elements $18, 11, 3$, and $15$ should be output (in any order) in successive cells of the common memory.