TD4, SI4 Parallel programming 2022-2023

Exercice 1

Application of the Prefix, or Scan, on segments. Usage for quick sort. Read carefully PDF of Blelloch' chapter, section 1.5

Apply the proposed quick sort algorithm, without trying to implement the various scan/prefix segmented primitives, on an array of 16 entries and sort them in increasing order.

Evaluate its complexity

Exercice 2

Now, try to devise how to understand scan/prefix on segments. For this, study carefully equation 1.5 of that same PDF.

The segmented scans satisfy the recurrence:

$$x_i = \begin{cases} a_0 & i = 0 \\ \begin{cases} a_i & f_i = 1 \\ (x_{i-1} \oplus a_i) & f_i = 0 \end{cases} & 0 < i < n \end{cases} \qquad (1.15)$$

Exercice 3

Propose an implementation for the SPLIT on segments, that for each segment split in three sub parts, on the left hand side, elements whose value is less than the pivot of that segment, in the middle, elements that are equal to the pivots, then, on the right, elements that are greater than the pivot