TP SFSD 2025/2026

EN (TÔF data file – TOF index file)

Part 1

The index in RAM is a binary tree structure (T1) where each node contains the following information:
a pointer (R) to another tree of type T2, the smallest key is (v1), and the largest key is (v2) in R.
The nodes of the T2 tree contain the following information:
a key of the record in the data file, its block number and offset (i,j) linking the record to its address in the data file.
Searching for a key k is done as follows:
IF k >= v1 and k <= v2, continue the search in the tree R (standard search)
ELSE IF k < v1 go left and loop
ELSE (if k > v2) go right and loop
Insertion of a new key or deletion of an old one will always be done in a tree of type T2.
To do so, it is required to step through the following points:

- Provide declarations for this file structure
- Module for loading the index in RAM from the index file
- Module for saving the index to a file (TOF)
- Search for a record by key k
- Insertion module

Part 2

Suppose we replace the T1/T2 structure with a B-Tree of Order 5.
Provide the module for splitting a leaf node, which takes a full node and a new key and divides the data to two nodes identifying which keys get promoted to the parent.