The Heap File (HF) Layer: System Report

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1. Environment

Ubuntu and Windows WSL

2. Compile method

make

- It uses libpf-Moon.a and libbf-Moon.a which might be different from test environment, so it must be changed
- Added -no-pie flag so that it will compile

3. File Structure

hf/hf.c – contains implementations of originally defined functions specified for this MiniRel assignment (i.e. insert/delete a record, open/close file scan)

h/hf.h – contains prototypes for functions that are used in hf.c

hf/hfinternal.c – contains definitions for a HF file table element, a HF scan table element, the HF file header structure, and bitmap management functions.

hf/hfinternal.h – prototypes for functions that are used in hfinternal.c

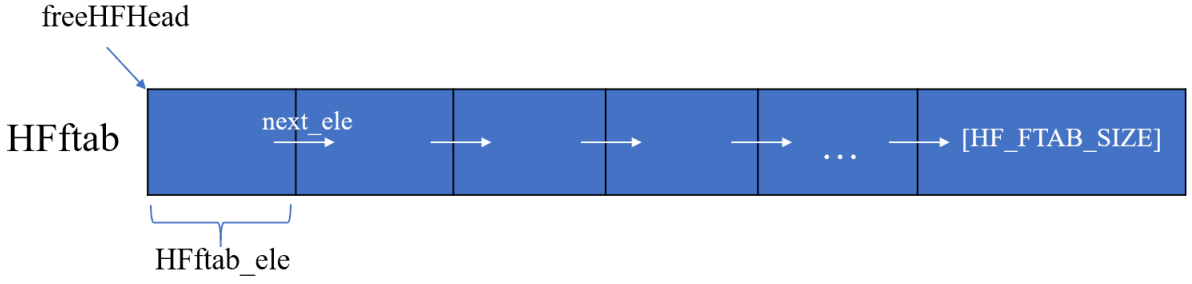
hf/hfhash.c – contains functions that manage the HF file table's hash table. This improves execution time of retrieving elements from the file table.

hf/hfhash.h - prototypes for functions that are used in hfhash.c

hf/hfScanHash.c – contains functions that manage the HF Scan table's hash table.

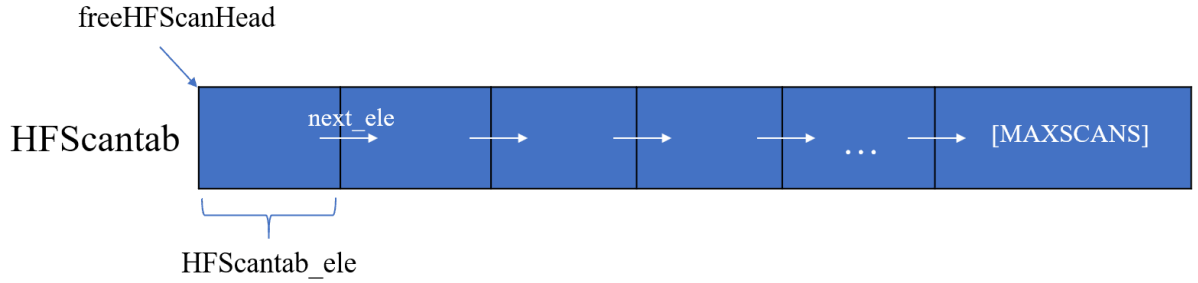
hf/hfScanHash.h - prototypes for functions that are used in hfScanHash.c

4. Data Structures



HFftab

The HF File table. It is a linked list that contains entries of type HFftab_ele. Each entry points to the next entry using **next_ele**. A pointer **freeHFHead** that points to the most recently freed entry of the table works to maintain a list of all empty file table elements.

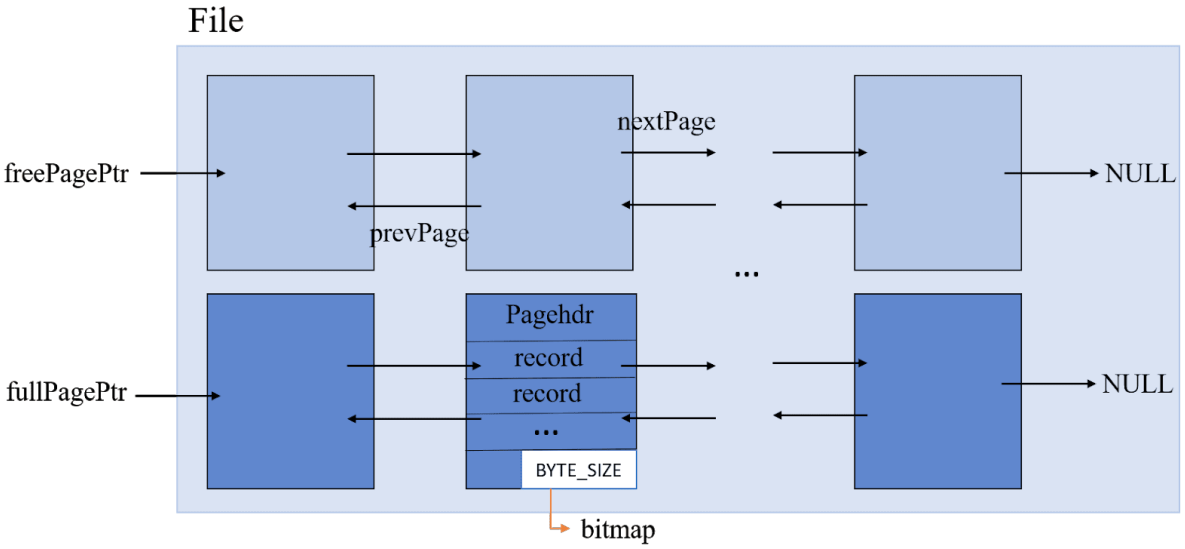


HFScantab

The HF Scan table. Maintains a list of all open file scans. Works similarly to the HF file table by using the pointer **next_ele** and the pointer **freeHFScanHead**.

HFHashT

The HF hash table. Consists of doubly linked list entries of type **HFhash_entry**. Is used to locate files currently in **HFftab** by filename.



File Structure

- Records are fixed length
- Records are unpacked

- Consists of two doubly-linked lists. One maintains a list of all free pages and the other maintains a list of all full pages
- Slot directory is a bitmap

Bitmap

- Initialized to size ceil(numRec/**BYTE_SIZE)**
- Value 0 indicates an empty slot, value 1 indicates an occupied slot.

4. Implementations

aminternal.c/HFgetEmtpySlot

- Get the first empty slot in the page

aminternal.c/HFnextFullSlot

- Finds the next full slot after index

aminternal.c/HFfindNextRecInner

- Scans in the order of pf file descriptor
- Find the next element satisfying the scan value