CSE312
Operating Systems

Assignment #3
File System Design
Report

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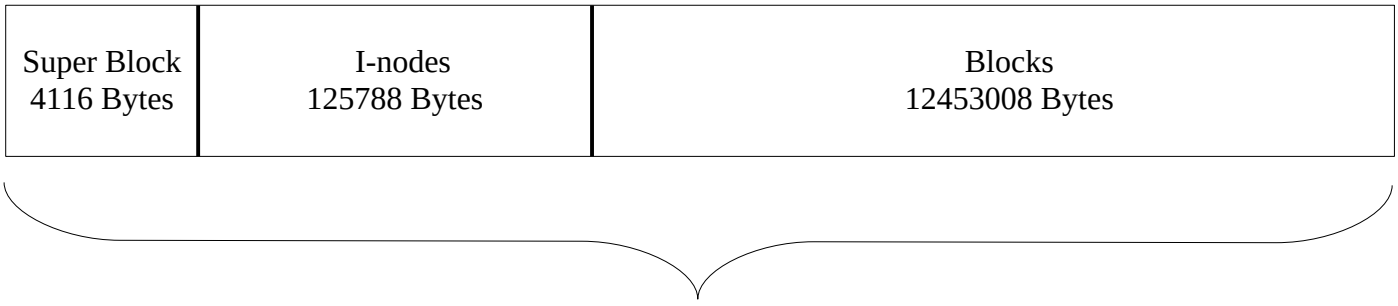
Part 1

File System



12 MB in total

Part 2

Super Block Structure

```
typedef struct{
    uint16_t block_size;
    uint16_t blocks_amt;
    uint32_t first_block_addr;
    uint8_t blocks_bitmap[4096];
    uint16_t inodes_amt;
    uint32_t first_inode_addr;
    uint16_t dirCount;
    uint16_t fileCount;
    uint16_t freeNodeCount;
}__attribute__ ((__packed__)) superblock;
```

All structures are packed since their size should be equal to sum of their variables sizes.

Part 3

File Structure

```
typedef struct{
    uint16_t inode_num;
    char name[24];
}__attribute__ ((__packed__)) file;
```

File structure only has a name field and the number of the inode. Inode number is multiplied by the size of the inode and added to first_inode_addr in order to access the node.

Part 4

I-Node Structure

```
typedef struct{
    uint32_t size;
    uint32_t creation_time;
    uint32_t last_access_time;
    uint16_t direct_blocks[13];
    uint16_t indirect1_block;
    uint16_t indirect2_block;
    uint16_t indirect3_block;
    uint8_t occupied;
    f_type type;


}__attribute__ ((__packed__)) inode;
```

Direct and indirect blocks are created on part 2 but never used since I didn’t implement write/read operations.

Implemented/Non-Implemented Parts

I fully implemented the Part 2.

On Part 3,

I implemented the following operations:

-Creating a file or a directory on the root directory (mkdir and write)

-Removing a file or a directory from the root directory (rmdir and del)

-Listing the files in the root directory (dir)

-Listing the system details (dumpe2fs)

I didn’t implement the following Operations:

-Doing file operations in a directory other than the root directory

-Writing/Reading from a file

(write only creates a file, doesn’t write anything on it.)

Function Definitions

```
void operationDir(uint8_t *fs,char* path);
```
Lists the contents of the directory. Only works on root directory.

```
void operationMkdir(uint8_t *fs,char* path);
```
Creates a directory with the given path. Only works on root directory (e.g mkdir /usr)

```
void operationRmdir(uint8_t *fs,char* path);
```
Removes the directory with the given path.

```
void operationDumpe2fs(uint8_t *fs);
```
Prints the system information

```
void operationWrite(uint8_t *fs,char* path,char* copyPath);
```
Creates a file with the given path. Only works on root directory (e.g write /info.txt dummyInput) second parameter is a dummy value since I didn't implement the write function.

```
void operationRead(uint8_t *fs,char* path,char* pastePath);
```
Not Implemented.

```
void operationDel(uint8_t *fs,char* path);
```
Removes the file with the given path.