# CS 1550

Week 13 – Project 4

Teaching Assistant

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# What You Need To Do
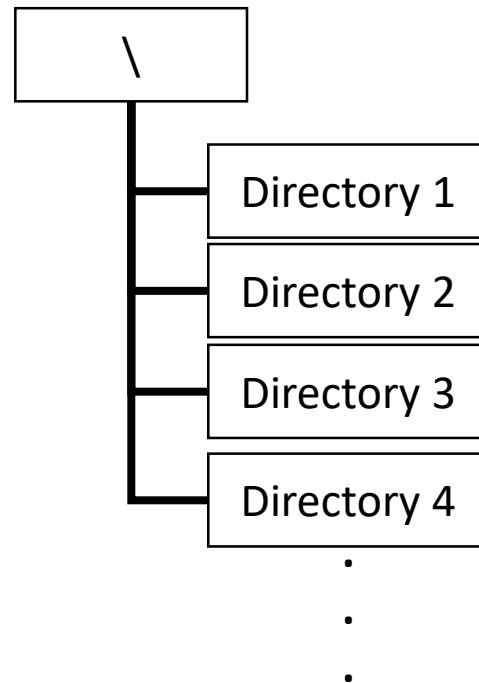
- Create the **cs1550 file system** as a **FUSE application**

- A code skeleton has been provided **under the FUSE zip examples** directory as cs1550.c

- **Automatically built** when make

- Implement **using a single file**, named **.disk  512-byte blocks**
  - **dd bs=1k count=5k if=/dev/zero of=.disk**
  - Only need to do this once, or every time your want to completely destroy the disk

# File System

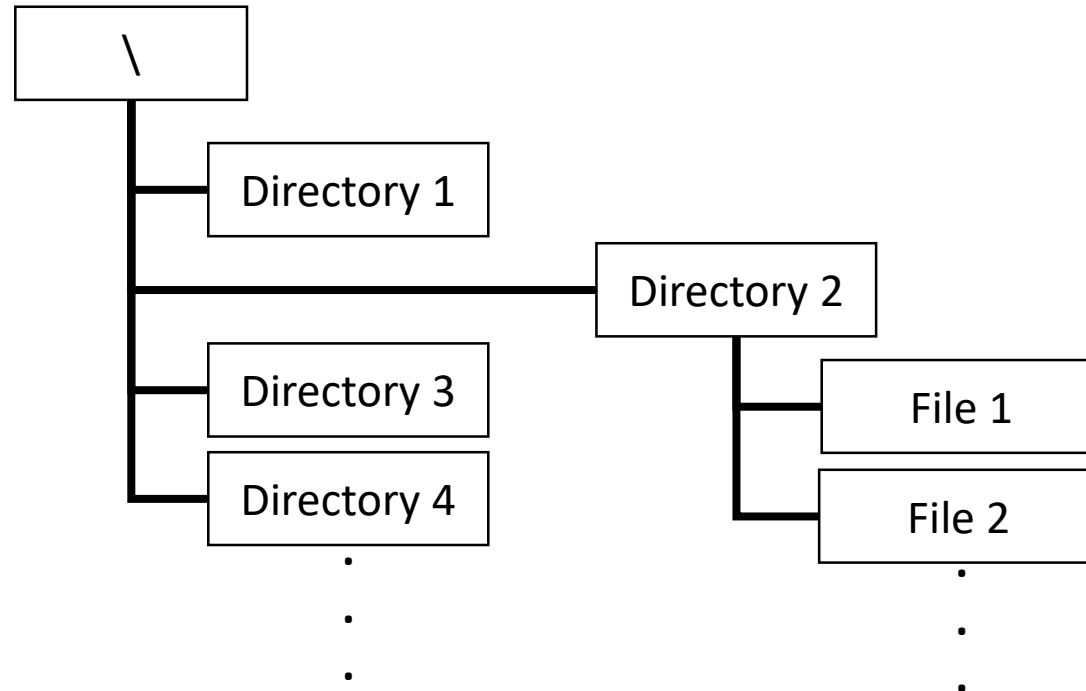- Two-level directory system
  - The root directory "\" **will only contain other subdirectories**, and no regular files.

# File System

- Two-level directory system
  - The root directory "\" will only contain other subdirectories, and no regular files.
  - The subdirectories **will only contain regular files**, and no subdirectories of their own.

```
┌──────────┐
│    \     │
└──────────┘
     │
     │     ┌──────────────┐
     ├─────│  Directory 1 │
     │     └──────────────┘
     │                        ┌──────────────┐
     ├────────────────────────│  Directory 2 │
     │                        └──────────────┘
     │     ┌──────────────┐          │      ┌──────────────┐
     ├─────│  Directory 3 │          ├──────│    File 1    │
     │     └──────────────┘          │      └──────────────┘
     │     ┌──────────────┐          │      ┌──────────────┐
     └─────│  Directory 4 │          └──────│    File 2    │
           └──────────────┘                 └──────────────┘
                  .                                 .
                  .                                 .
                  .                                 .
```

# File System

- Two-level directory system
    - The root directory "\" will **only contain other subdirectories**, and no regular files.
    - The subdirectories will **only contain regular files**, and no subdirectories of their own.
    - All files will **be full access** with permissions to be mainly ignored.
    - Many file attributes such as creation and modification times **will not be accurately stored**.
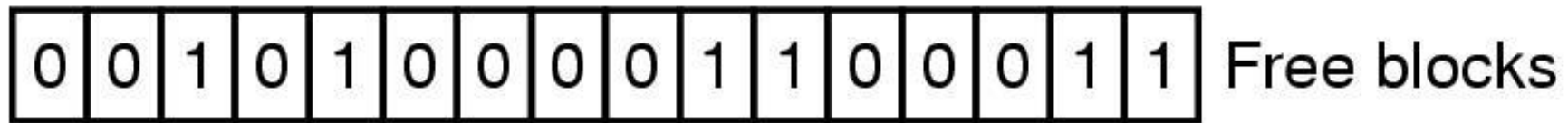    - **Files cannot be truncated**.

# Structure
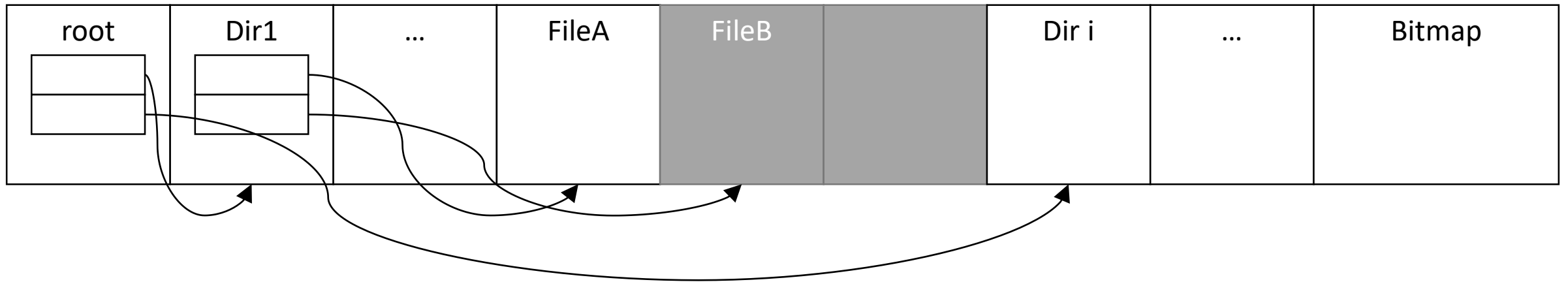
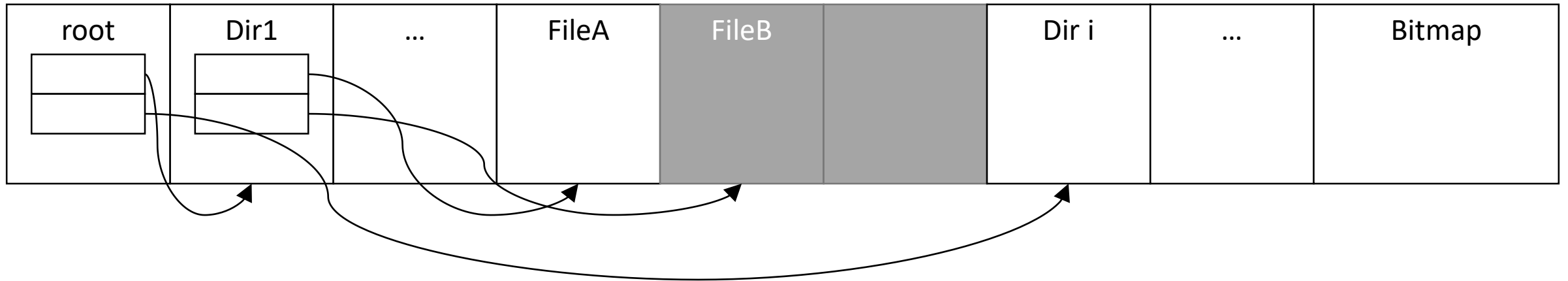# Disk Management

- Manage free (or empty) space using bitmap

| 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | Free blocks

(a)

- **Create** a 5MB disk image

    dd bs=1K count=5K if=/dev/zero of=.disk

# Disk Management

# Disk Management

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| | | | | | | | | Bitmap |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

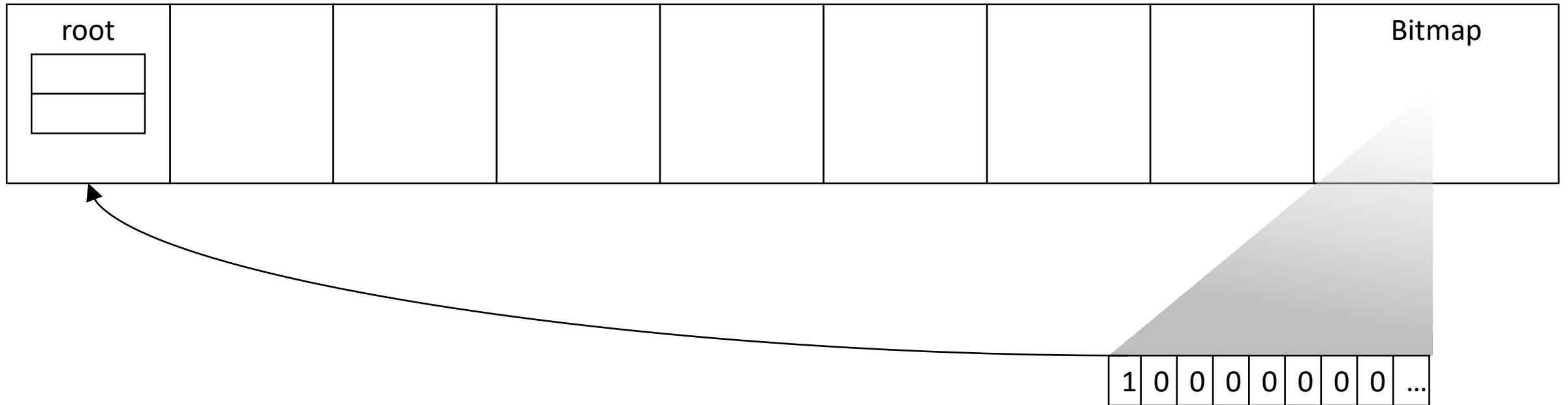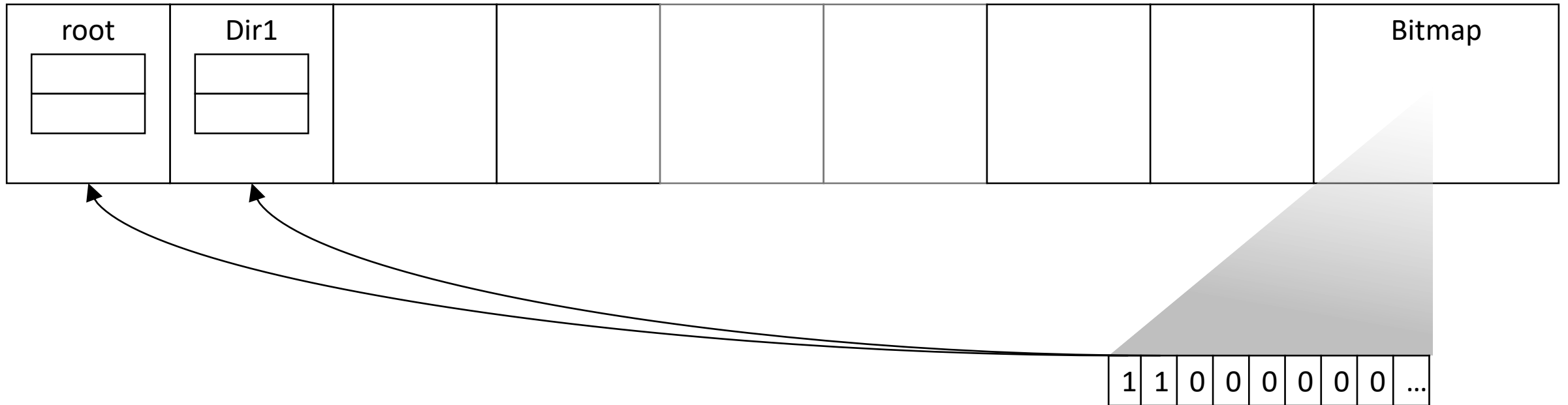| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | … |
|---|---|---|---|---|---|---|---|---|
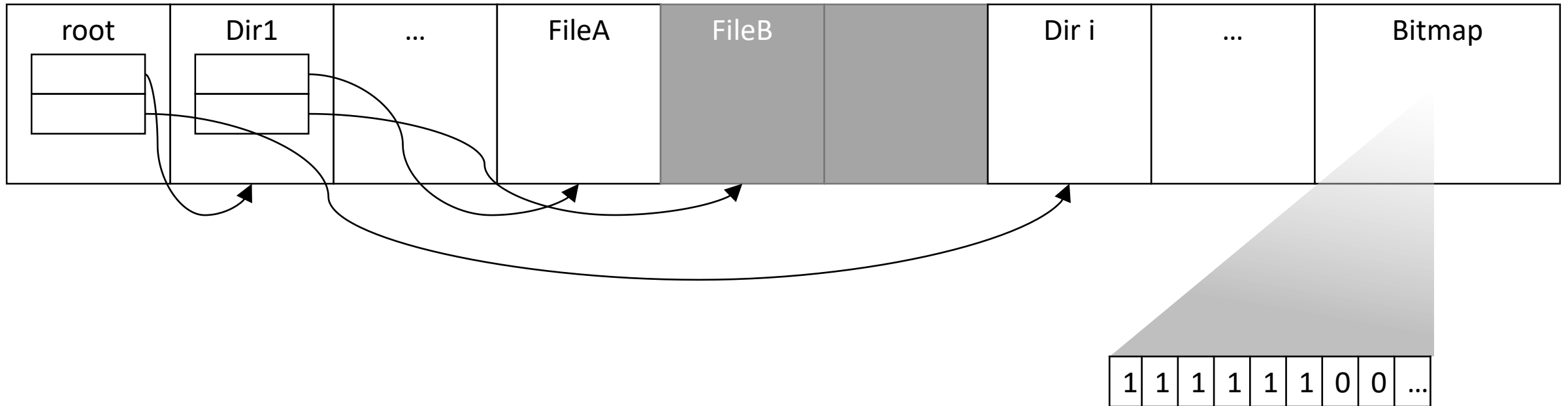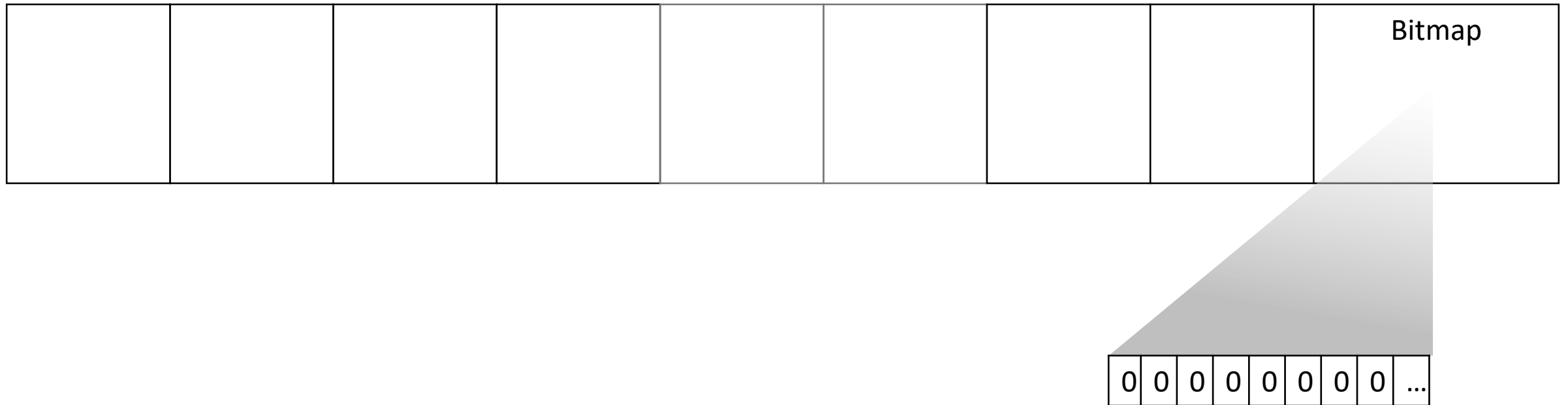
# Disk Management
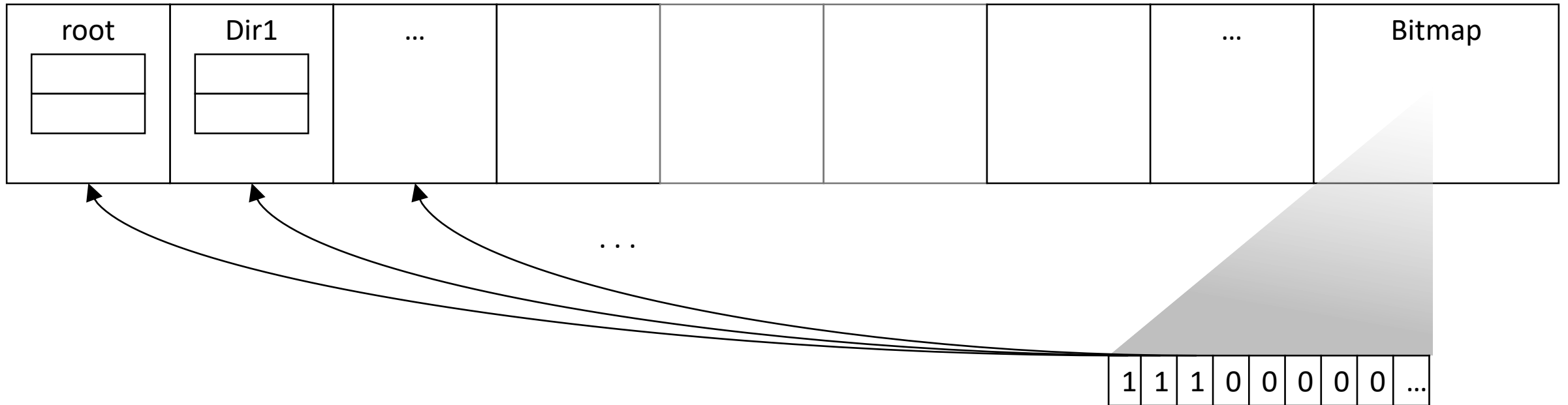
# Disk Management

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# Syscalls

- **cs1550_getattr**
- **cs1550_mkdir**
- **cs1550_readdir**
- cs1550_rmdir
- **cs1550_mknod**
- **cs1550_write**
- **cs1550_read**
- cs1550_unlink
- cs1550_truncate
- cs1550_open
- cs1550_flush

No delete calls need to be written so you don't need to solve fragmentation

When there is no space left, return an error

# Requirements and submission

- Well-commented cs1550.c

- Rubric

| Item | Grade |
|---|---|
| **cs1550_getattr** | 15% |
| **cs1550_mkdir** | 15% |
| **cs1550_readdir** | 15% |
| **cs1550_mknod** | 15% |
| **cs1550_write** | 15% |
| **cs1550_read** | 15% |
| **File System works correctly** | 10% |