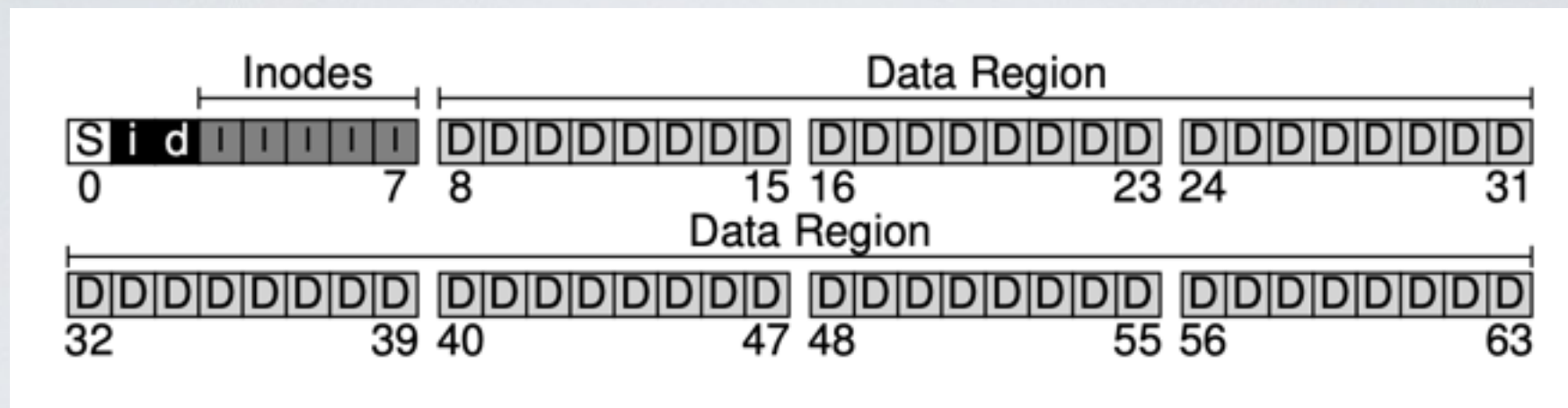


# Unix File System



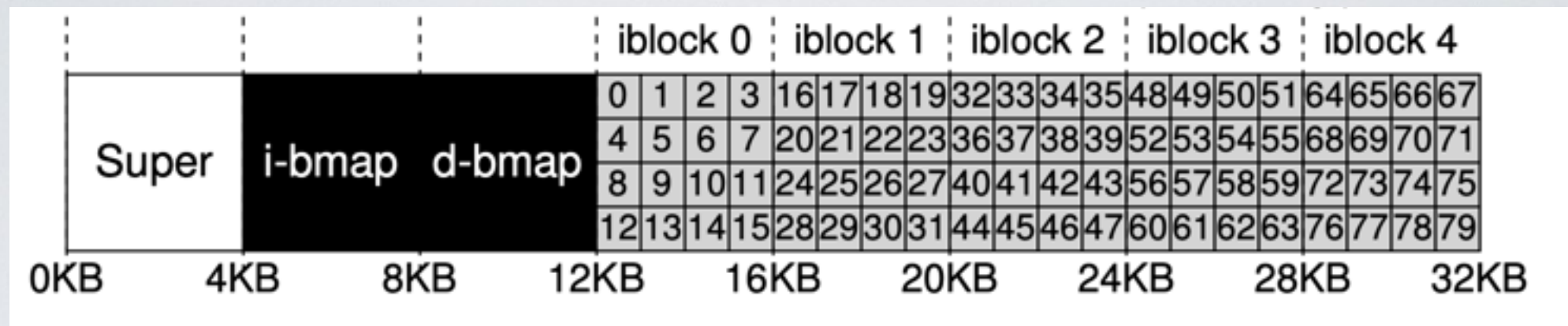
The disk is (physically) divided into sectors (usually 512 bytes per sector)

The file system is (logically) divided into blocks (e.g., 4 KB per block)

➔ Disk space is allocated in granularity of blocks

1. The data blocks "D" stored files (and directories) content
2. The inodes blocks "I" stores the inode table
3. The data bitmap "d" block d tracks which data block is free or allocated (one bit per block on the disk)
4. The inode bitmap "i" block i tracks which inode is free or allocated (one bit per inode)
5. The Superblock "S" (a.k.a Master Block or partition control block) contains:
  - a magic number to identify the file system type
  - the number of blocks dedicated to the two bitmaps and inodes

# The Inode Table



- **Physical Disk capacity in our example** (64 blocks of 4KB each)  
 $4 \times 64 = 256 \text{ KB}$
- **Logical capacity (8 blocks are reserved)**  
 $4 \times 56 = 224 \text{ KB}$  (the actual data storage space)
- **Maximum number of inodes** (each inode is 256 bytes)  
 $(5 * 4 * 1024) / 256 = 80 \text{ inodes}$  (i.e max number of files)
- **Size of the inode bitmap** (1 bit per inode)  
 $1 \times 80 \text{ inodes} = 80 \text{ bits}$  (out of 32K bits)
- **Size of the data bitmap** (1 bit per storage block)  
 $1 \text{ bit} \times 56 \text{ blocks} = 56 \text{ bits}$  (out of 32K bits, max data storage 128 MB)