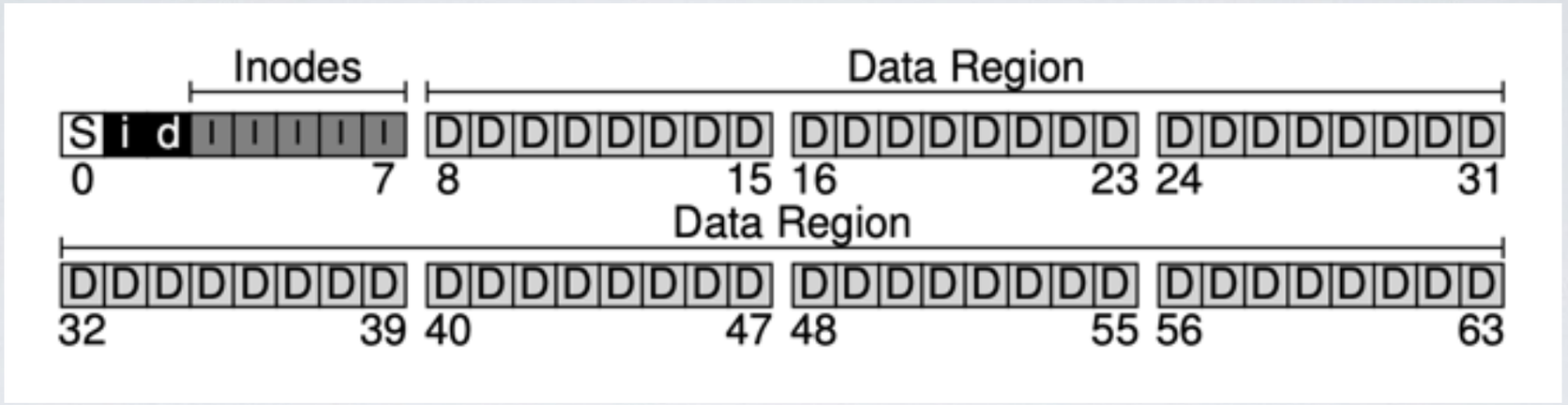
Unix File System



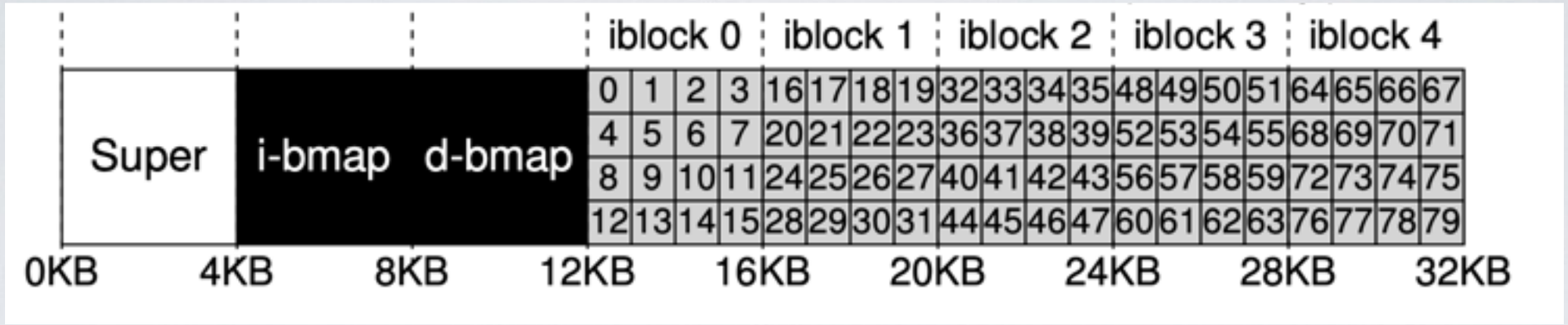
The disk is (physically) divided into sectors (usually 512 bytes per sector)

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