File System Milestone #1

Team name: Fantastic Four

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Hex dump:

VCB: spans one block.
Magic number is 72 75 6F 46 74 6E 61 46.
Volume Size is 10,000,000 and is 0x989680 in hex.
Block size is 512 and is 0x200
FreeSpace location is 1and is 0x01.
Root directory location is 6 and in hex 0x06.

FreeSpace:
Spans five blocks and is highlighted in yellow.
The VCB, the FreeSpace bitMap, and root directory are indicated by 0xFF = 1111111 for VCB taking up block 0, bitmap blocks 1-5, root the root directory taking up six blocks.

Root Directory:
Location: start of the root directory is block 6 for both ".", and "..". The root directory spans 6 blocks with a total of 10 Directory entries for now.
Size of root directory in two spots for ".", and ".." is 2880 or 0xB40.
Filename goes on for 256 bytes and 0x2E is ASCII for ".".
TimeStamp: for created and last modified both the same:
000F10: 52 59 5B 63 00 00 00 00 52 59 5B 63 00 00 00 00 |

And repeats after this line for the ".." directory.
We did not initialize any of the directory entries yet. But we will have a way of knowing they are not initialized.

Dumping file SampleVolume, starting at block 1 for 11 blocks:

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000200: 72 75 6F 46 74 6E 61 46  80 96 98 00 00 02 00 00 | ruoFtnaF���.....
000210: 01 00 00 00 06 00 00 00  00 00 00 00 00 00 00 00 | ................
000220: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000230: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000240: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000250: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000260: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000270: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000280: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000290: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0002A0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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0002B0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0002C0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0002D0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0002E0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0002F0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................

000300: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000310: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000320: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000330: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000340: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000350: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000360: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000370: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000380: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000390: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0003A0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0003B0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0003C0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0003D0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0003E0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0003F0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................

000400: FF F0 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ��..............
000410: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000420: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000430: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000440: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000450: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000460: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000470: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000480: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000490: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0004A0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0004B0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0004C0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0004D0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0004E0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0004F0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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000500: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000510: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000520: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000530: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000540: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000550: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000560: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000570: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000580: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000590: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0005A0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0005B0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0005C0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0005D0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0005E0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0005F0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................

000600: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000610: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000620: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000630: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000640: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000650: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000660: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000670: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000680: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000690: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0006A0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0006B0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0006C0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0006D0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0006E0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0006F0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................

000700: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000710: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000720: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000730: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000740: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000750: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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000760: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000770: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000780: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000790: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0007A0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0007B0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0007C0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0007D0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0007E0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0007F0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................

000800: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000810: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000820: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000830: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000840: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000850: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000860: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000870: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000880: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000890: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0008A0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0008B0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0008C0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0008D0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0008E0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0008F0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................

000900: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000910: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000920: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000930: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000940: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000950: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000960: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000970: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000980: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000990: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0009A0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0009B0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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0009C0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0009D0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0009E0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0009F0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................

000A00: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000A10: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000A20: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000A30: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000A40: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000A50: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000A60: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000A70: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000A80: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000A90: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000AA0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000AB0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000AC0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000AD0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000AE0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000AF0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................

000B00: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000B10: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000B20: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000B30: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000B40: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000B50: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000B60: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000B70: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000B80: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000B90: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000BA0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000BB0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000BC0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000BD0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000BE0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000BF0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................

000C00: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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000C10: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000C20: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000C30: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000C40: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000C50: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000C60: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000C70: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000C80: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000C90: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000CA0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000CB0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000CC0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000CD0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000CE0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000CF0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................

000D00: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000D10: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000D20: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000D30: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000D40: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000D50: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000D60: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000D70: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000D80: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000D90: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000DA0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000DB0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000DC0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000DD0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000DE0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000DF0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................

000E00: 06 00 00 00 40 0B 00 00  06 00 00 00 2E 00 00 00 | ....@...........
000E10: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000E20: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000E30: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000E40: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000E50: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000E60: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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000E70: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000E80: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000E90: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000EA0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000EB0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000EC0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000ED0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000EE0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000EF0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................

000F00: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000F10: 52 59 5B 63 00 00 00 00  52 59 5B 63 00 00 00 00 | RY[c....RY[c....
000F20: 06 00 00 00 40 0B 00 00  06 00 00 00 2E 2E 00 00 | ....@...........
000F30: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000F40: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000F50: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000F60: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000F70: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000F80: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000F90: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000FA0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000FB0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000FC0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000FD0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000FE0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
000FF0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................

001000: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001010: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001020: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001030: 52 59 5B 63 00 00 00 00  52 59 5B 63 00 00 00 00 | RY[c....RY[c....
001040: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001050: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001060: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001070: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001080: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001090: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0010A0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0010B0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0010C0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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0010D0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0010E0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0010F0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................

001100: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001110: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001120: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001130: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001140: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001150: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001160: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001170: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001180: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001190: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0011A0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0011B0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0011C0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0011D0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0011E0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0011F0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................

001200: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001210: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001220: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001230: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001240: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001250: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001260: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001270: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001280: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001290: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0012A0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0012B0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0012C0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0012D0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0012E0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0012F0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................

001300: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001310: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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001320: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001330: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001340: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001350: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001360: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001370: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001380: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001390: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0013A0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0013B0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0013C0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0013D0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0013E0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0013F0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................

001400: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001410: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001420: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001430: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001440: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001450: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001460: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001470: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001480: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001490: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0014A0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0014B0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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001560: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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001580: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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0015B0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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0017D0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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0017E0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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0018B0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0018C0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0018D0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0018E0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0018F0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................

001900: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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001930: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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001960: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001970: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001980: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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0019A0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0019B0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0019C0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0019D0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0019E0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0019F0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................

001A00: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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001A20: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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001A50: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001A60: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001A70: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001A80: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001A90: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001AA0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001AB0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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001B00: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001B10: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001B20: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001B30: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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001B50: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001B60: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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001BF0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................

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001C10: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001C20: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001C30: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001C40: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001C50: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001C60: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001C70: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001C80: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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001CC0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001CD0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001CE0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001CF0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................

001D00: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001D10: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001D20: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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001D40: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001D50: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001D60: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001D70: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001D80: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
001D90: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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001DF0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................

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001F00: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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001F20: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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001F80: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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002040: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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002060: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
002070: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
002080: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
002090: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0020A0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0020B0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0020C0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0020D0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0020E0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0020F0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................

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002110: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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002130: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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002160: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
002170: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
002180: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
002190: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0021A0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0021B0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0021C0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0021D0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0021E0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0021F0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................

002200: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
002210: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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002230: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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002250: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
002260: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
002270: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
002280: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
002290: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0022A0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0022B0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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0022F0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................

002300: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
002310: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
002320: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
002330: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
002340: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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002360: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
002370: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
002380: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
002390: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
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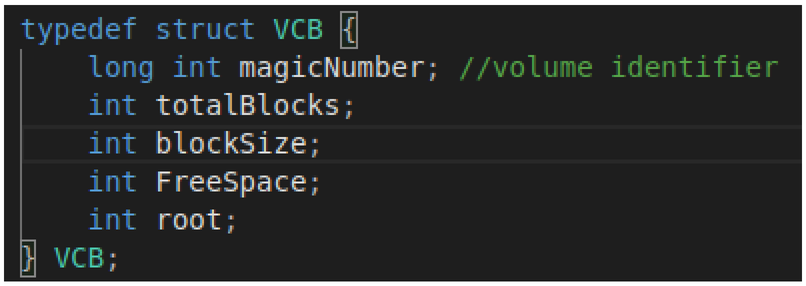
0023A0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0023B0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0023C0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0023D0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0023E0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
0023F0: 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 | ................
```

Description of the VCB structure:



```c
typedef struct VCB {
    long int magicNumber; //volume identifier
    int totalBlocks;
    int blockSize;
    int FreeSpace;
    int root;
} VCB;
```

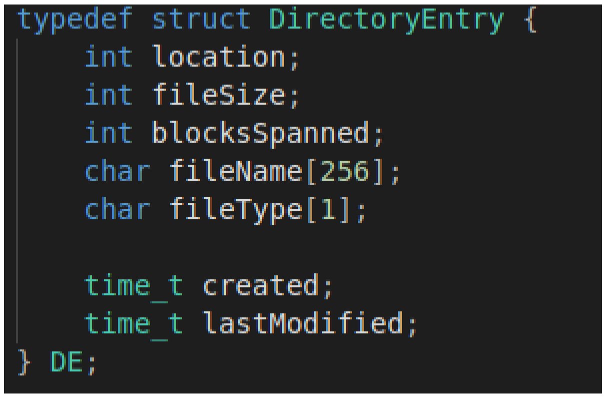
We chose to go with a bitMap for our FreeSpace management so we only needed to store the location of where it begins. How far it spans can be calculated with totalBlocks and blockSize. And similarly we only needed a location for our root directory.

Description of the Free Space structure:

We first initialize the free space by calling a function we create called initFreeSpace. We allocated the size of five blocks to the bitmap pointer and initialized the bits in the freespace. To mark occupied blocks we used 1’s and 0’s for free space. We set bits 1-5 in the bitmap occupied for the bitmap itself so the initial freespace is 11111100. The first bit of our bitmap is our volume control block.

For free space management, we have used bitmap, where each bit indicates a block. We have defined 0 as a free block and 1 as an allocated block in our bitmap. Our free space allocation algorithm works the following way: We take size (in bytes) as our parameter. This size will be given to our function by the user or any function in our file system that needs free space. Once our function is called, based on the size given as input, we calculate the number of blocks that are needed as free space. We have defined 512 bytes as the size for each block. Now, we iterate through the bitmap array the following way: To find free blocks, we take each element in the bitmap array one by one from the 0th index, check each bit in that element (or byte) and find the contiguous free blocks which would satisfy the request. Once we find enough contiguous free blocks, we return the block number from which the contiguous free blocks start. Our free space algorithm searches the bitmap in a linear way, takes each byte and checks each bit to find the free space blocks.

Description of the Directory System:



```c
typedef struct DirectoryEntry {
    int location;
    int fileSize;
    int blocksSpanned;
    char fileName[256];
    char fileType[1];

    time_t created;
    time_t lastModified;
} DE;
```

Our Directory system will have a root node with "." first directory Entry and ".." second directory entry followed by 8 other directory entries for files or Directories. We plan to expand the number of directory entries a directory can hold in the future. In the future we plan to identify directory entries that are not in use, currently they are just empty.

Table of who worked on which components:

Initializing the volume control block	Kristian
Free space	Justin and Anudeep
Initializing the root directory	Kristian and Pranjal

How we worked together, how often we met, how we met, and how we divided up the tasks:

We have been working together as a team. No one has been shy to bring up issues they have faced and questions they needed answers to. Since the release of the file system project, we have always met after class discussing and planning ideas for the project for about 10 to 15 minutes. For the past two weeks, we have done multiple zoom meetings to discuss the progress we have each made and potential ideas to improve our system. We have also met in the library common room to work on our project together utilizing the whiteboards to map out code. We divided up the work in pairs and worked together on the project as a whole.

Issues & Resolutions:

Issues faced while working on free space management:

I found it difficult to work with bits and manipulate them as per our need. For that reason, I took time to rewatch professor's lectures and other useful material on the internet to learn more on how to work with bits and manipulate them. After that, I started writing some useful helper routines to manipulate the bits.

Initially could not return the exact block number from which the free space allocation would start. To resolve this issue, I had to use a lot of print statements to understand how my code is behaving and what the values are at each iteration. Once I understood how the code was behaving, I had to make a couple of tweaks resetting the value of the requested number of blocks everytime we encountered a bit 1. After such small tweaks, I could return the right value to the user.

We faced a bunch of segmentation faults. To solve this issue, we used valgrind and added print statements to debug the memory issues.

We had calculation issues while trying to implement the root directory. To solve this issue we used print statements to print the size of the directory entry structure and carefully calculated the number of directory entries needed.

For some of us, it was our first time using github to work on a project with group members. We encountered merge conflicts. Thankfully, Pranjal is a github expert and was able to help us fix errors when trying to push and pull. We scheduled meetings to resolve all the conflicts using stash, drop, and merge git commands.

Volume Control Block:
Puting the volume control block together was not too hard, unfortunately we needed several other pieces of the project like the freeSpace bitMap, a way to allocate free space for the root directory and the root directory itself. We ended up hard coding most of the VCB initially to get the program up and running, and as we finished parts that were necessary we added them on.

Root Directory:
Like the Volume control block we needed a free block allocation routine to tell us where there is free space to put the root directory. While the free space allocation routine was being developed we hard coded the values in the root directory, like starting location. When the memory allocation routine was ready we were getting the wrong location for the first free block of memory to write the root directory too. We thought it was the memory allocation routine because when our root was supposed to start at 6 it was instead starting at 48. We thought 8*6 is 48 so we must be having some issues with bytes being confused with bits. Turns out our free space map was marking a byte = 0x01 as being full, that only means the 8th bit or 8th block in that byte is not empty. Luckily it was a quick fix after figuring that out.