2A)

fd=open("thefile",O_CREAT|O_TRUNC|O_WRONLY,0666);
write(fd,bufferA,1024);

file offset range (used hex)	LBN	Block #	What
0x000000 - 0x0007FF	0	42	bufferA (first 1KB)
0x000800 - 0x000FFF	0	42	free space in the same block, but still allocated

write(fd,bufferB,1024);

0x000800-0x000FFF	0	42	bufferB (block 42)

lseek(fd,4096,SEEK_SET);

0x001000-0x00BFFF	1-11	43-53 (respectively to LBN)	bufferC (11 x 4kB)

write(fd,bufferC,0xB000);

0x00C000-0x00CFFF	12	N/A	HOLE (unallocated and reads as zeroes). single indirect inode 54

lseek(fd,0xD000,SEEK_SET);
write(fd,bufferD,01000); #this is octal

0x00D000-0x00D1FF	13	55	bufferD (512 B)

i_block[12] = 54, slot[0] = 0 (hole), slot[1] = 55

lseek(fd,0x40C123,SEEK_SET);
write(fd,"ZZZ",3);

0x40C123-0x40C125	1036	58	bytes “ZZZ”

close(fd);

i_block[13] = 56, block 56: slot[0] = 57, block 57: slot[0] = 58

Final Block Map

i_block	LBN	Buffer	Data Block
0	0	A+B	42
1	1	C	43
2	2	C	44
3	3	C	45
4	4	C	46
5	5	C	47
6	6	C	48
7	7	C	49
8	8	C	50
9	9	C	51
10	10	C	52
11	11	C	53
12	12-1035		54
13			56
14			0

Single Indirect Block #54

LBN	slot	Data Block
12	0	0 (hole, wasn’t allocated)
13	1	55 (512 B, buffer D)
14-1035	2-1023	None

Double-Indirect #56

Slot	Data Block
0	57

1-1023	**0**

Single-Indirect Block #57

LBN	Slot	Data Block
1036	**0**	**58 (“ZZZ” at offset 0x123)**
1037+	**1-2023**	**None**

2B)

LBN 0 -> block 42
LBN 1-11 -> blocks 43-53
LBN 13 -> block 55
LBN 1036 -> block 58
14 total data blocks

single-indirect table -> block 54
double-indirect root -> block 56
single-indirect under the double -> block 57
3 metadata blocks

14 + 3 = 17 4kB blocks allocated
st_blocks = ((4096/512) X 17) = 136

write(bufferA, 1024) at offset 0
0 + 1024 = 0x000400

write(bufferB, 1024)
1024 + 1024 = 0x000800

lseek(0x1000) then write(bufferC, 0xB000)
0x1000 + 0xB000 = 0xC000

lseek(0xD000) then write(bufferD, 01000)
0xD000 + 0X200 = 0xD200

lseek(0x40C123) then write(“ZZZ”, 3)
0x40C123 + 3 = 0x40C126 (this is the largest offset we wrote to, which determines the size)

st_size = 0x40C126 = 4,243,750 bytes