同济大学计算机系

操作系统课程设计第一次作业

学　　号 2152809

姓　　名 曾崇然

专　　业 计算机科学与技术

授课老师 邓蓉老师

一. initial 程序

1. 获取文件管理相关的管理

```
BufferManager& bufferManager = Kernel::Instance().GetBufferManager();
DiskManager& diskManager = Kernel::Instance().GetDiskManager();
FileManager& fileManager = Kernel::Instance().GetFileManager();
FileSystem& fileSystem = Kernel::Instance().GetFileSystem();
State& state = Kernel::Instance().GetState();
OpenFileTable& openFIleTable = Kernel::Instance().GetOpenFileTable();
InodeTable& inodeTable = Kernel::Instance().GetInodeTable();
SuperBlock& superBlock = Kernel::Instance().GetSuperBlock();
Space& space = Kernel::Instance().GetSpace();
```

2. 重置所有数据结构中的内容

```
bufferManager.ResetBufferManager();
fileManager.ResetFileManager();
state.ResetState();
openFIleTable.ResetOpenFileTable();
inodeTable.ResetInodeTable();
superBlock.ResetSuperBlock();
space.ResetSpace();
```

3. 清空整个磁盘

```
unsigned char buffer[512];
for (int i = 0; i < 512; i++) {
    buffer[i] = 0;
}
for (int i = 0; i < 18000; i++) {
    diskManager.seekOneBlock(i);
    diskManager.writeOneBlock(buffer);
}
```

4. 初始化磁盘上的 Inode

```
//#1号Inode
Inode* pInode = inodeTable.GetFreeInode();
pInode->is_changed = true;
pInode->i_mode = 2;
pInode->i_nlink = 1;
pInode->i_number = 1;
pInode->i_size = 7 * 32;
pInode->i_addr[0] = 1024;
```

```
//#2号Inode
pInode = inodeTable.GetFreeInode();
pInode->is_changed = true;
pInode->i_mode = 2;
pInode->i_nlink = 1;
pInode->i_number = 2;
pInode->i_size = 2 * 32;
pInode->i_addr[0] = 1025;
```

```
//#3号Inode
pInode = inodeTable.GetFreeInode();
pInode->is_changed = true;
pInode->i_mode = 2;
pInode->i_nlink = 1;
pInode->i_number = 3;
pInode->i_size = 2 * 32;
pInode->i_addr[0] = 1026;
//#4号Inode
pInode = inodeTable.GetFreeInode();
pInode->is_changed = true;
pInode->i_mode = 2;
pInode->i_nlink = 1;
pInode->i_number = 4;
pInode->i_size = 3 * 32;
pInode->i_addr[0] = 1027;
//#5号Inode
pInode = inodeTable.GetFreeInode();
pInode->is_changed = true;
pInode->i_mode = 2;
pInode->i_nlink = 1;
pInode->i_number = 5;
pInode->i_size = 2 * 32;
pInode->i_addr[0] = 1028;
```

```
//#6号Inode
pInode = inodeTable.GetFreeInode();
pInode->is_changed = true;
pInode->i_mode = 1;
pInode->i_nlink = 1;
pInode->i_number = 6;
pInode->i_size = 8 * 512;
for (int i = 0; i < 7; i++) {
    pInode->i_addr[i] = 1029 + i;
}
```

```
//#7号Inode
pInode = inodeTable.GetFreeInode();
pInode->is_changed = true;
pInode->i_mode = 1;
pInode->i_nlink = 1;
pInode->i_number = 7;
```

5. 初始化数据块的磁盘内容

```
//初始化数据块
DirectoryEntry directoryEntry;
int* p = (int*)(&directoryEntry); //指向内存中的临时目录项，便于写入缓
Buf* pBuffer;
//1024#扇区
directoryEntry.m_ino = 1;
std::strcpy(directoryEntry.m_name, ".");
pBuffer = bufferManager.GetBlk(1024);
for (int i = 0; i < 8; i++) {
    *((int*)pBuffer->b_addr + i) = *(p + i);
} //.\0
directoryEntry.m_ino = 1;
std::strcpy(directoryEntry.m_name, "..");
pBuffer = bufferManager.GetBlk(1024);
for (int i = 0; i < 8; i++) {
    *((int*)pBuffer->b_addr + i + 8) = *(p + i);
} //..\0
directoryEntry.m_ino = 2;
std::strcpy(directoryEntry.m_name, "bin");
pBuffer = bufferManager.GetBlk(1024);
for (int i = 0; i < 8; i++) {
    *((int*)pBuffer->b_addr + i + 16) = *(p + i);
} //bin\0
directoryEntry.m_ino = 3;
std::strcpy(directoryEntry.m_name, "etc");
pBuffer = bufferManager.GetBlk(1024);
for (int i = 0; i < 8; i++) {
    *((int*)pBuffer->b_addr + i + 24) = *(p + i);
} //etc\0
directoryEntry.m_ino = 4;
std::strcpy(directoryEntry.m_name, "dev");
pBuffer = bufferManager.GetBlk(1024);
for (int i = 0; i < 8; i++) {
    *((int*)pBuffer->b_addr + i + 32) = *(p + i);
} //dev\0
```

```
directoryEntry.m_ino = 5;
std::strcpy(directoryEntry.m_name, "home");
pBuffer = bufferManager.GetBlk(1024);
for (int i = 0; i < 8; i++) {
    *((int*)pBuffer->b_addr + i + 40) = *(p + i);
}//home\0
directoryEntry.m_ino = 6;
std::strcpy(directoryEntry.m_name, "shell");
pBuffer = bufferManager.GetBlk(1024);
for (int i = 0; i < 8; i++) {
    *((int*)pBuffer->b_addr + i + 48) = *(p + i);
} //shell\0
//1025#扇区
directoryEntry.m_ino = 2;
std::strcpy(directoryEntry.m_name, ".");
pBuffer = bufferManager.GetBlk(1025);
for (int i = 0; i < 8; i++) {
    *((int*)pBuffer->b_addr + i) = *(p + i);
} //.\0
directoryEntry.m_ino = 1;
std::strcpy(directoryEntry.m_name, "..");
pBuffer = bufferManager.GetBlk(1025);
for (int i = 0; i < 8; i++) {
    *((int*)pBuffer->b_addr + i + 8) = *(p + i);
} //..\0
//1026#扇区
directoryEntry.m_ino = 3;
std::strcpy(directoryEntry.m_name, ".");
pBuffer = bufferManager.GetBlk(1026);
for (int i = 0; i < 8; i++) {
    *((int*)pBuffer->b_addr + i) = *(p + i);
} //.\0
directoryEntry.m_ino = 1;
std::strcpy(directoryEntry.m_name, "..");
pBuffer = bufferManager.GetBlk(1026);
for (int i = 0; i < 8; i++) {
    *((int*)pBuffer->b_addr + i + 8) = *(p + i);
} //..\0
//1027#扇区
```

```
//1027#扇区
directoryEntry.m_ino = 4;
std::strcpy(directoryEntry.m_name, ".");
pBuffer = bufferManager.GetBlk(1027);
for (int i = 0; i < 8; i++) {
    *((int*)pBuffer->b_addr + i) = *(p + i);
} //.\0
directoryEntry.m_ino = 1;
std::strcpy(directoryEntry.m_name, "..");
pBuffer = bufferManager.GetBlk(1027);
for (int i = 0; i < 8; i++) {
    *((int*)pBuffer->b_addr + i + 8) = *(p + i);
} //..\0
directoryEntry.m_ino = 7;
std::strcpy(directoryEntry.m_name, "tty1");
pBuffer = bufferManager.GetBlk(1027);
for (int i = 0; i < 8; i++) {
    *((int*)pBuffer->b_addr + i + 16) = *(p + i);
} //tty1\0
//1028#扇区
directoryEntry.m_ino = 5;
std::strcpy(directoryEntry.m_name, ".");
pBuffer = bufferManager.GetBlk(1028);
for (int i = 0; i < 8; i++) {
    *((int*)pBuffer->b_addr + i) = *(p + i);
} //.\0
directoryEntry.m_ino = 1;
std::strcpy(directoryEntry.m_name, "..");
pBuffer = bufferManager.GetBlk(1028);
for (int i = 0; i < 8; i++) {
    *((int*)pBuffer->b_addr + i + 8) = *(p + i);
} //..\0
//1035扇区
pBuffer = bufferManager.GetBlk(1035);
*((int*)pBuffer->b_addr) = 1036;
*((int*)pBuffer->b_addr) = 1037;
```

6. 管理空闲 inode

```
//将100个空闲inode号送入空闲inode号栈
superBlock.s_ninode = 100;
for (int i = 0; i < 100; i++) {
    superBlock.s_inode[i] = i + 8;
}
```

7. 管理空闲盘块

```
//将空闲盘块收入空闲盘块索引表
for (int i = 11; i <= 179; i++) {
    pBuffer = bufferManager.GetBlk(i * 100);
    *((int*)pBuffer->b_addr) = 100;
    for (int j = 1; j < 101; j++) {
        *((int*)pBuffer->b_addr + j) = (i + 1) * 100 - j + 1;
    }
}
*((int*)pBuffer->b_addr + 1) = 0;
superBlock.s_nfree = 63;
for (int i = 0; i < 63; i++) {
    superBlock.s_free[i] = 1100 - i;
}
```

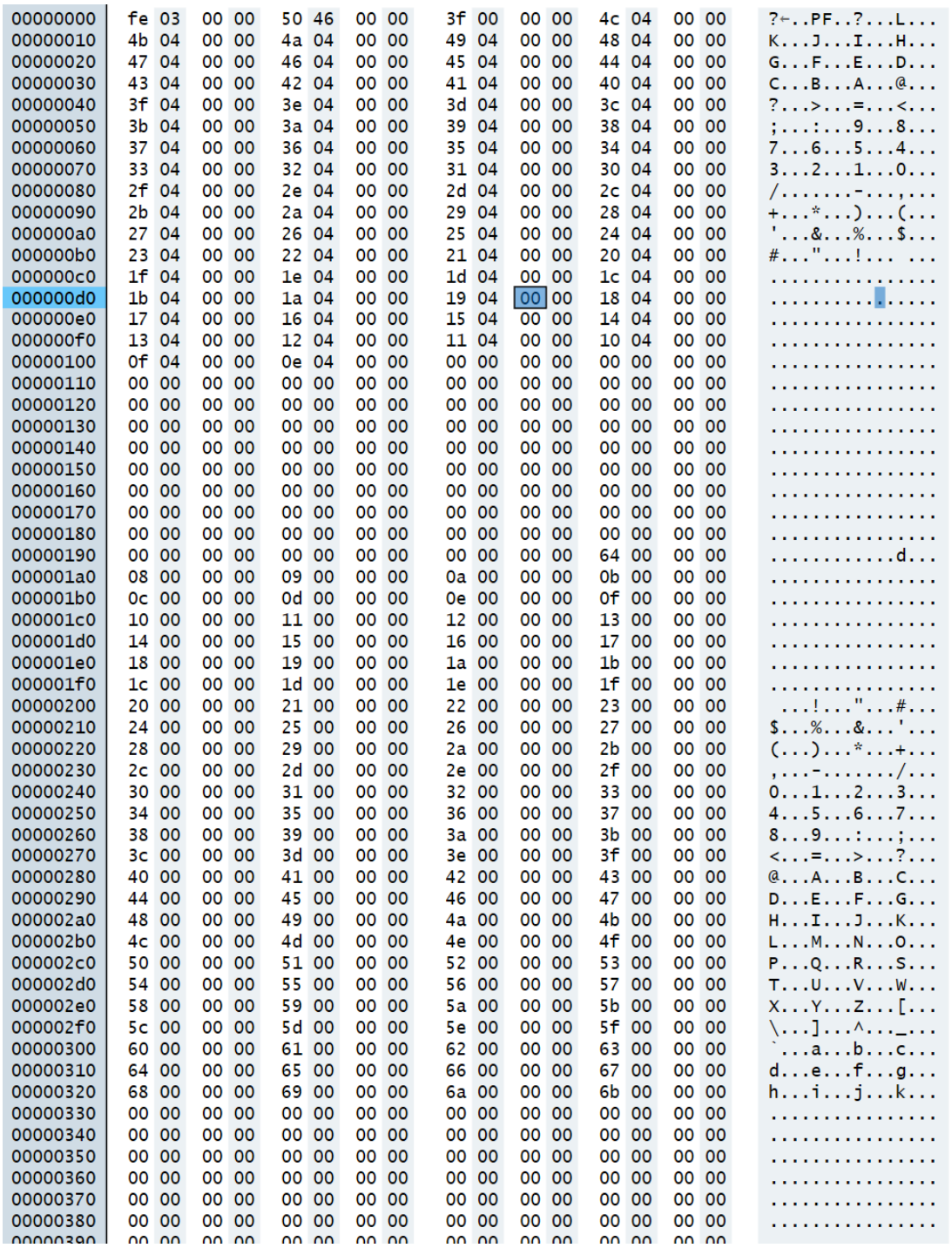
8. 将所做的更新落盘

```
//置superBlock修改标志
superBlock.s_fmod = 1;

//将修改更新到磁盘
fileSystem.Update();
```

二. 磁盘镜像文件内容

1. superBlock 的内容



00000000	fe	03	00	00	50	46	00	00	3f	00	00	00	4c	04	00	00	?←..PF..?...L...
00000010	4b	04	00	00	4a	04	00	00	49	04	00	00	48	04	00	00	K...J...I...H...
00000020	47	04	00	00	46	04	00	00	45	04	00	00	44	04	00	00	G...F...E...D...
00000030	43	04	00	00	42	04	00	00	41	04	00	00	40	04	00	00	C...B...A...@...
00000040	3f	04	00	00	3e	04	00	00	3d	04	00	00	3c	04	00	00	?...>...=...<...
00000050	3b	04	00	00	3a	04	00	00	39	04	00	00	38	04	00	00	;...:...9...8...
00000060	37	04	00	00	36	04	00	00	35	04	00	00	34	04	00	00	7...6...5...4...
00000070	33	04	00	00	32	04	00	00	31	04	00	00	30	04	00	00	3...2...1...0...
00000080	2f	04	00	00	2e	04	00	00	2d	04	00	00	2c	04	00	00	/.......-...,...
00000090	2b	04	00	00	2a	04	00	00	29	04	00	00	28	04	00	00	+...*...)...(...
000000a0	27	04	00	00	26	04	00	00	25	04	00	00	24	04	00	00	'...&...%...$...
000000b0	23	04	00	00	22	04	00	00	21	04	00	00	20	04	00	00	#..."...!... ...
000000c0	1f	04	00	00	1e	04	00	00	1d	04	00	00	1c	04	00	00	.....
000000d0	1b	04	00	00	1a	04	00	00	19	04	00	00	18	04	00	00	.....□.....
000000e0	17	04	00	00	16	04	00	00	15	04	00	00	14	04	00	00	.....
000000f0	13	04	00	00	12	04	00	00	11	04	00	00	10	04	00	00	.....
00000100	0f	04	00	00	0e	04	00	00	00	00	00	00	00	00	00	00	.....
00000110	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
00000120	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
00000130	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
00000140	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
00000150	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
00000160	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
00000170	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
00000180	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
00000190	00	00	00	00	00	00	00	00	00	00	00	00	64	00	00	00	.....d...
000001a0	08	00	00	00	09	00	00	00	0a	00	00	00	0b	00	00	00	.....
000001b0	0c	00	00	00	0d	00	00	00	0e	00	00	00	0f	00	00	00	.....
000001c0	10	00	00	00	11	00	00	00	12	00	00	00	13	00	00	00	.....
000001d0	14	00	00	00	15	00	00	00	16	00	00	00	17	00	00	00	.....
000001e0	18	00	00	00	19	00	00	00	1a	00	00	00	1b	00	00	00	.....
000001f0	1c	00	00	00	1d	00	00	00	1e	00	00	00	1f	00	00	00	.....
00000200	20	00	00	00	21	00	00	00	22	00	00	00	23	00	00	00	...!..."...#...
00000210	24	00	00	00	25	00	00	00	26	00	00	00	27	00	00	00	$...%...&...'...
00000220	28	00	00	00	29	00	00	00	2a	00	00	00	2b	00	00	00	(...)...*...+...
00000230	2c	00	00	00	2d	00	00	00	2e	00	00	00	2f	00	00	00	,...-......./...
00000240	30	00	00	00	31	00	00	00	32	00	00	00	33	00	00	00	0...1...2...3...
00000250	34	00	00	00	35	00	00	00	36	00	00	00	37	00	00	00	4...5...6...7...
00000260	38	00	00	00	39	00	00	00	3a	00	00	00	3b	00	00	00	8...9...:...;...
00000270	3c	00	00	00	3d	00	00	00	3e	00	00	00	3f	00	00	00	<...=...>...?...
00000280	40	00	00	00	41	00	00	00	42	00	00	00	43	00	00	00	@...A...B...C...
00000290	44	00	00	00	45	00	00	00	46	00	00	00	47	00	00	00	D...E...F...G...
000002a0	48	00	00	00	49	00	00	00	4a	00	00	00	4b	00	00	00	H...I...J...K...
000002b0	4c	00	00	00	4d	00	00	00	4e	00	00	00	4f	00	00	00	L...M...N...O...
000002c0	50	00	00	00	51	00	00	00	52	00	00	00	53	00	00	00	P...Q...R...S...
000002d0	54	00	00	00	55	00	00	00	56	00	00	00	57	00	00	00	T...U...V...W...
000002e0	58	00	00	00	59	00	00	00	5a	00	00	00	5b	00	00	00	X...Y...Z...[...
000002f0	5c	00	00	00	5d	00	00	00	5e	00	00	00	5f	00	00	00	\...]...^..._...
00000300	60	00	00	00	61	00	00	00	62	00	00	00	63	00	00	00	`...a...b...c...
00000310	64	00	00	00	65	00	00	00	66	00	00	00	67	00	00	00	d...e...f...g...
00000320	68	00	00	00	69	00	00	00	6a	00	00	00	6b	00	00	00	h...i...j...k...
00000330	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
00000340	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
00000350	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
00000360	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
00000370	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
00000380	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
00000390	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....

2. **inode 区的内容**

```
00000400  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
00000410  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
00000420  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
00000430  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
00000440  02 00  00 00  01 00  00 00   e0 00  00 00  00 04  00 00   ........?.......
00000450  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
00000460  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
00000470  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
00000480  02 00  00 00  01 00  00 00   40 00  00 00  01 04  00 00   ........@.......
00000490  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
000004a0  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
000004b0  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
000004c0  02 00  00 00  01 00  00 00   40 00  00 00  02 04  00 00   ........@.......
000004d0  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
000004e0  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
000004f0  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
00000500  02 00  00 00  01 00  00 00   60 00  00 00  03 04  00 00   ........`.......
00000510  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
00000520  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
00000530  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
00000540  02 00  00 00  01 00  00 00   40 00  00 00  04 04  00 00   ........@.......
00000550  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
00000560  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
00000570  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
00000580  01 00  00 00  01 00  00 00   00 10  00 00  05 04  00 00   ................
00000590  06 04  00 00  07 04  00 00   08 04  00 00  09 04  00 00   ................
```

3. 数据块部分内容

```
0007fff0  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
00080000  01 00  00 00  2e 00  00 00   17 e5  6f 09  ff 7f  00 00   ..........鎖←.□...
00080010  d0 f7  5f b9  7d 00  00 00   02 00  00 00  00 00  00 00   绪←_篦←..........
00080020  01 00  00 00  2e 2e  00 00   17 e5  6f 09  ff 7f  00 00   ..........鎖←.□...
00080030  d0 f7  5f b9  7d 00  00 00   02 00  00 00  00 00  00 00   绪←_篦←..........
00080040  02 00  00 00  62 69  6e 00   17 e5  6f 09  ff 7f  00 00   ....bin..鎖←.□...
00080050  d0 f7  5f b9  7d 00  00 00   02 00  00 00  00 00  00 00   绪←_篦←..........
00080060  03 00  00 00  65 74  63 00   17 e5  6f 09  ff 7f  00 00   ....etc..鎖←.□...
00080070  d0 f7  5f b9  7d 00  00 00   02 00  00 00  00 00  00 00   绪←_篦←..........
00080080  04 00  00 00  64 65  76 00   17 e5  6f 09  ff 7f  00 00   ....dev..鎖←.□...
00080090  d0 f7  5f b9  7d 00  00 00   02 00  00 00  00 00  00 00   绪←_篦←..........
000800a0  05 00  00 00  68 6f  6d 65   00 e5  6f 09  ff 7f  00 00   ....home.鎖←.□...
000800b0  d0 f7  5f b9  7d 00  00 00   02 00  00 00  00 00  00 00   绪←_篦←..........
000800c0  06 00  00 00  73 68  65 6c   6c 00  6f 09  ff 7f  00 00   ....shell.o.□...
000800d0  d0 f7  5f b9  7d 00  00 00   02 00  00 00  00 00  00 00   绪←_篦←..........
000800e0  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
000800f0  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
00080100  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
00080110  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
00080120  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
00080130  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
00080140  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
00080150  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
00080160  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
00080170  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
00080180  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
00080190  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
000801a0  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
000801b0  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
000801c0  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
000801d0  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
000801e0  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
000801f0  00 00  00 00  00 00  00 00   00 00  00 00  00 00  00 00   ................
00080200  02 00  00 00  2e 00  65 6c   6c 00  6f 09  ff 7f  00 00   ......ell.o.□...
00080210  d0 f7  5f b9  7d 00  00 00   02 00  00 00  00 00  00 00   绪←_篦←..........
00080220  01 00  00 00  2e 2e  00 6c   6c 00  6f 09  ff 7f  00 00   .......ll.o.□...
00080230  d0 f7  5f b9  7d 00  00 00   02 00  00 00  00 00  00 00   绪←_篦←..........
```