Sector Offset	Structure
0	BPB
BPB_RsvdSecCnt	FAT
FirstRootSector	Root
FirstDataSector	Data
BPB_TotSec32	

16 bytes

4 bytes	4 bytes	4 bytes	4 bytes

BS_jmpBoot	BS_OEMName		*1	*2	*3
*4	*5	*6	*7	*8	*9	*10	BPB_HiddSec
BPB_TotSec32	*11	*12	*13	BS_VolID	BS_VolLab
BS_VolLab	BS_FilSysType	

...

*1 - BPB_BytsPerSec
*2 - BPB_SecPerClus
*3 - BPB_RsvdSecCnt
*4 - BPB_NumFATs
*5 - BPB_RootEntCnt
*6 - BPB_TotSec16
*7 - BPB_Media
*8 - BPB_FATSz16
*9 - BPB_SecPerTrk
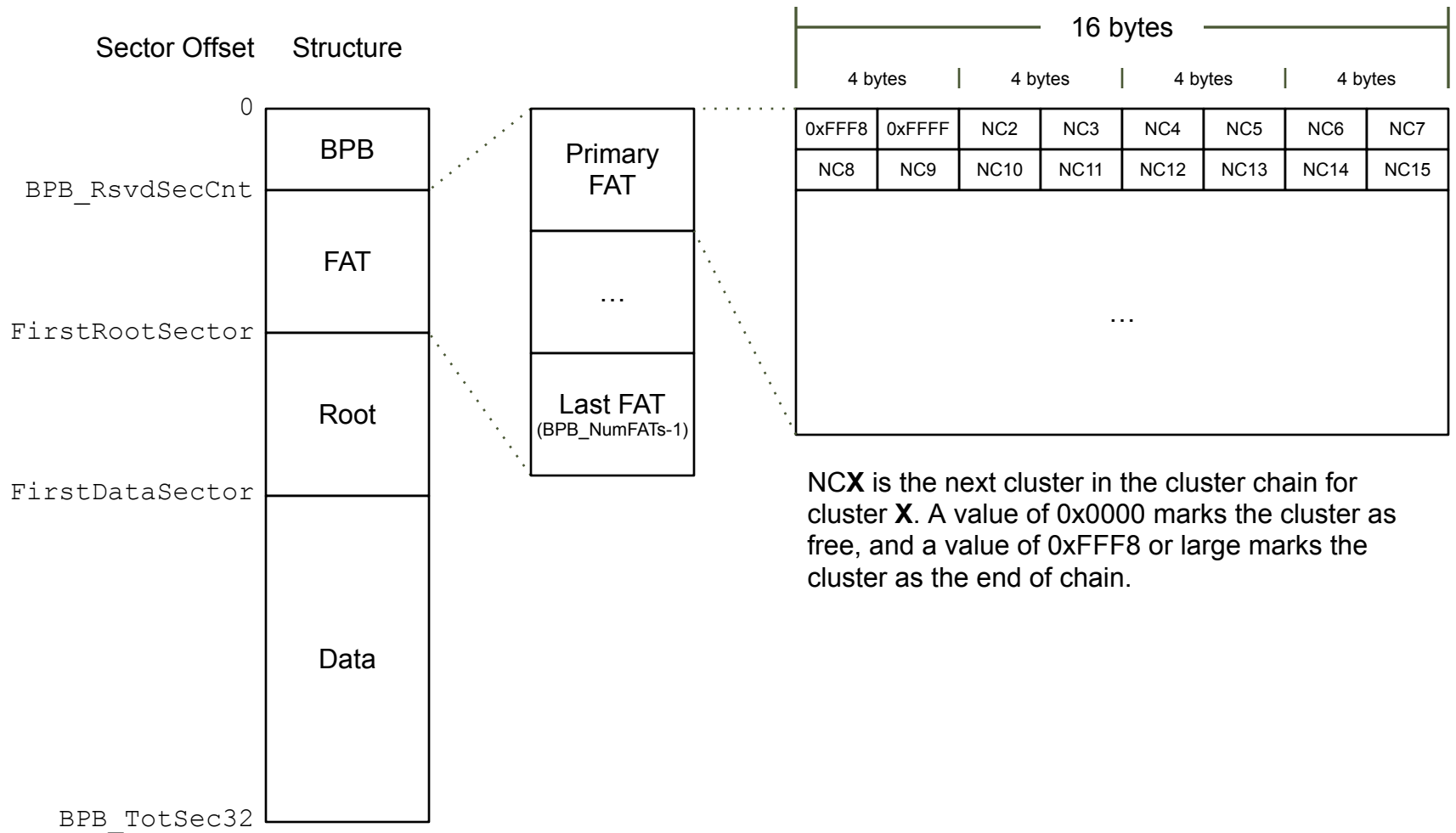*10- BPB_NumHeads
*11- BS_DrvNum
*12- BS_Reserved1
*13- BS_BootSig

FirstRootSector = BPB_RsvdSecCnt + BPB_NumFATs * BPB_FATSz16;
RootDirectorySectors = (BPB_RootEntCnt * 32) / 512;
FirstDataSector = FirstRootSector + RootDirectorySectors;
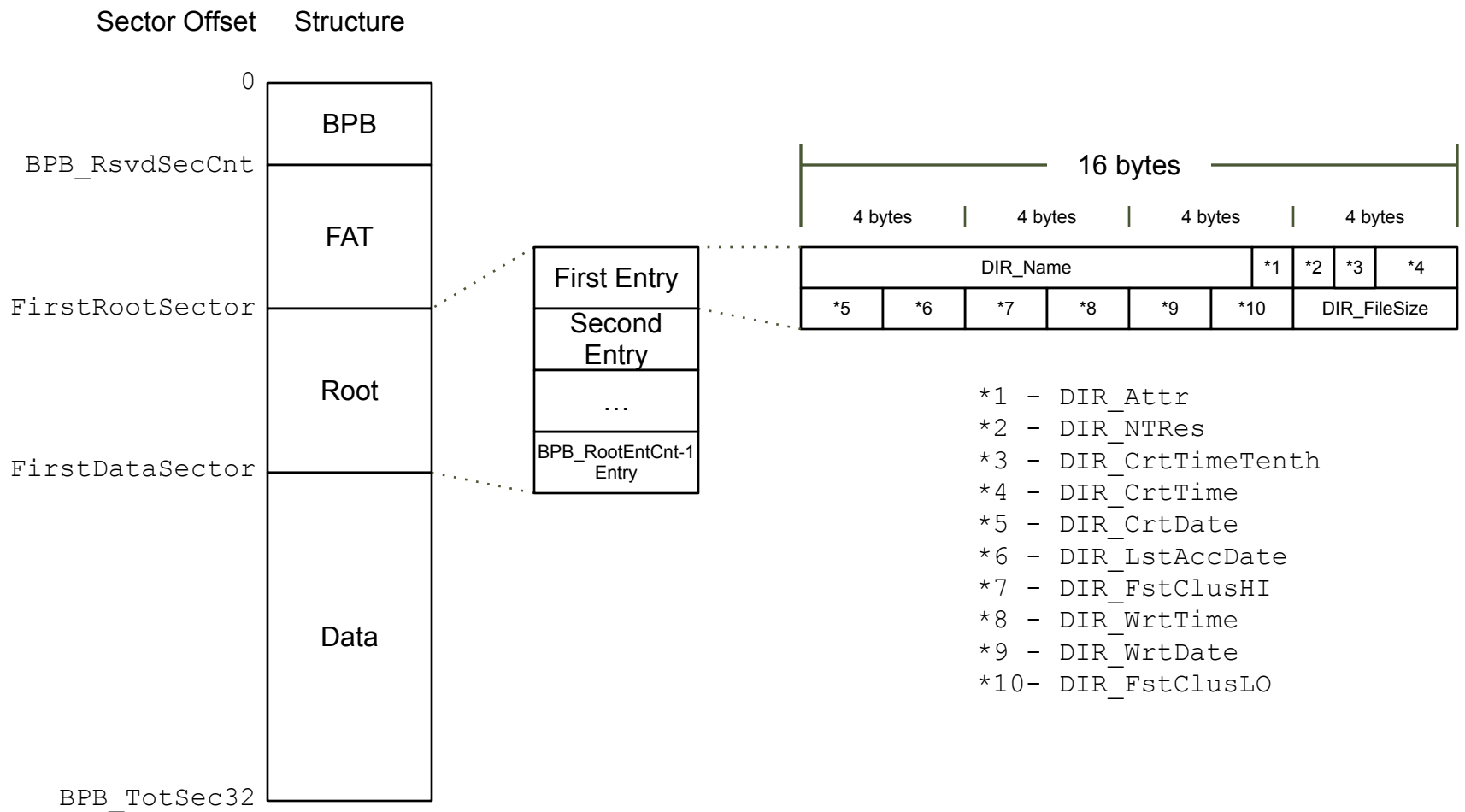ClusterCount = (BPB_TotSec32 - FirstDataSector) / BPB_SecPerClus;

Sector Offset   Structure

0

BPB

BPB_RsvdSecCnt

FAT

FirstRootSector

Root

FirstDataSector

Data

BPB_TotSec32

Primary FAT

...

Last FAT
(BPB_NumFATs-1)

16 bytes

4 bytes | 4 bytes | 4 bytes | 4 bytes

| 0xFFF8 | 0xFFFF | NC2 | NC3 | NC4 | NC5 | NC6 | NC7 |
| NC8 | NC9 | NC10 | NC11 | NC12 | NC13 | NC14 | NC15 |

...

NC**X** is the next cluster in the cluster chain for cluster **X**. A value of 0x0000 marks the cluster as free, and a value of 0xFFF8 or large marks the cluster as the end of chain.

```
FirstRootSector = BPB_RsvdSecCnt + BPB_NumFATs * BPB_FATSz16;
RootDirectorySectors = (BPB_RootEntCnt * 32) / 512;
FirstDataSector = FirstRootSector + RootDirectorySectors;
ClusterCount = (BPB_TotSec32 - FirstDataSector) / BPB_SecPerClus;
```

Sector Offset   Structure

0

| BPB |

BPB_RsvdSecCnt

| FAT |

FirstRootSector

| Root |

FirstDataSector

| Data |

BPB_TotSec32

First Entry

Second Entry

…

BPB_RootEntCnt-1 Entry

16 bytes

4 bytes | 4 bytes | 4 bytes | 4 bytes

| DIR_Name | | | | | *1 | *2 | *3 | *4 |
| *5 | *6 | *7 | *8 | *9 | *10 | DIR_FileSize | |

*1 - DIR_Attr
*2 - DIR_NTRes
*3 - DIR_CrtTimeTenth
*4 - DIR_CrtTime
*5 - DIR_CrtDate
*6 - DIR_LstAccDate
*7 - DIR_FstClusHI
*8 - DIR_WrtTime
*9 - DIR_WrtDate
*10- DIR_FstClusLO

```
FirstRootSector = BPB_RsvdSecCnt + BPB_NumFATs * BPB_FATSz16;
RootDirectorySectors = (BPB_RootEntCnt * 32) / 512;
FirstDataSector = FirstRootSector + RootDirectorySectors;
ClusterCount = (BPB_TotSec32 - FirstDataSector) / BPB_SecPerClus;
```
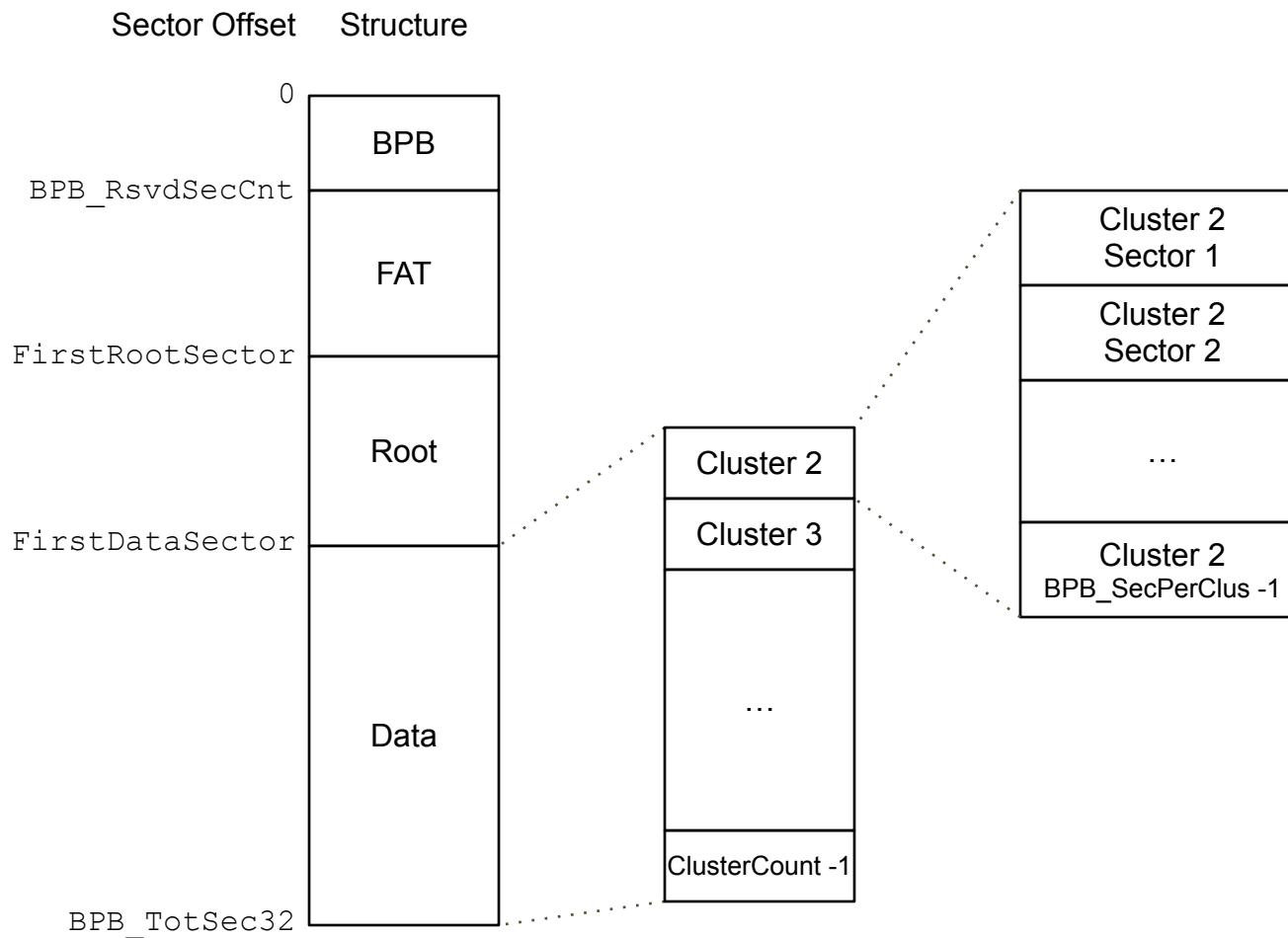
Sector Offset   Structure

```
                    0  ┌─────────────┐
                       │             │
                       │     BPB     │
                       │             │
    BPB_RsvdSecCnt     ├─────────────┤
                       │             │
                       │     FAT     │
                       │             │
     FirstRootSector   ├─────────────┤
                       │             │
                       │    Root     │
                       │             │
     FirstDataSector   ├─────────────┤
                       │             │
                       │             │
                       │             │
                       │    Data     │
                       │             │
                       │             │
                       │             │
       BPB_TotSec32    └─────────────┘
```
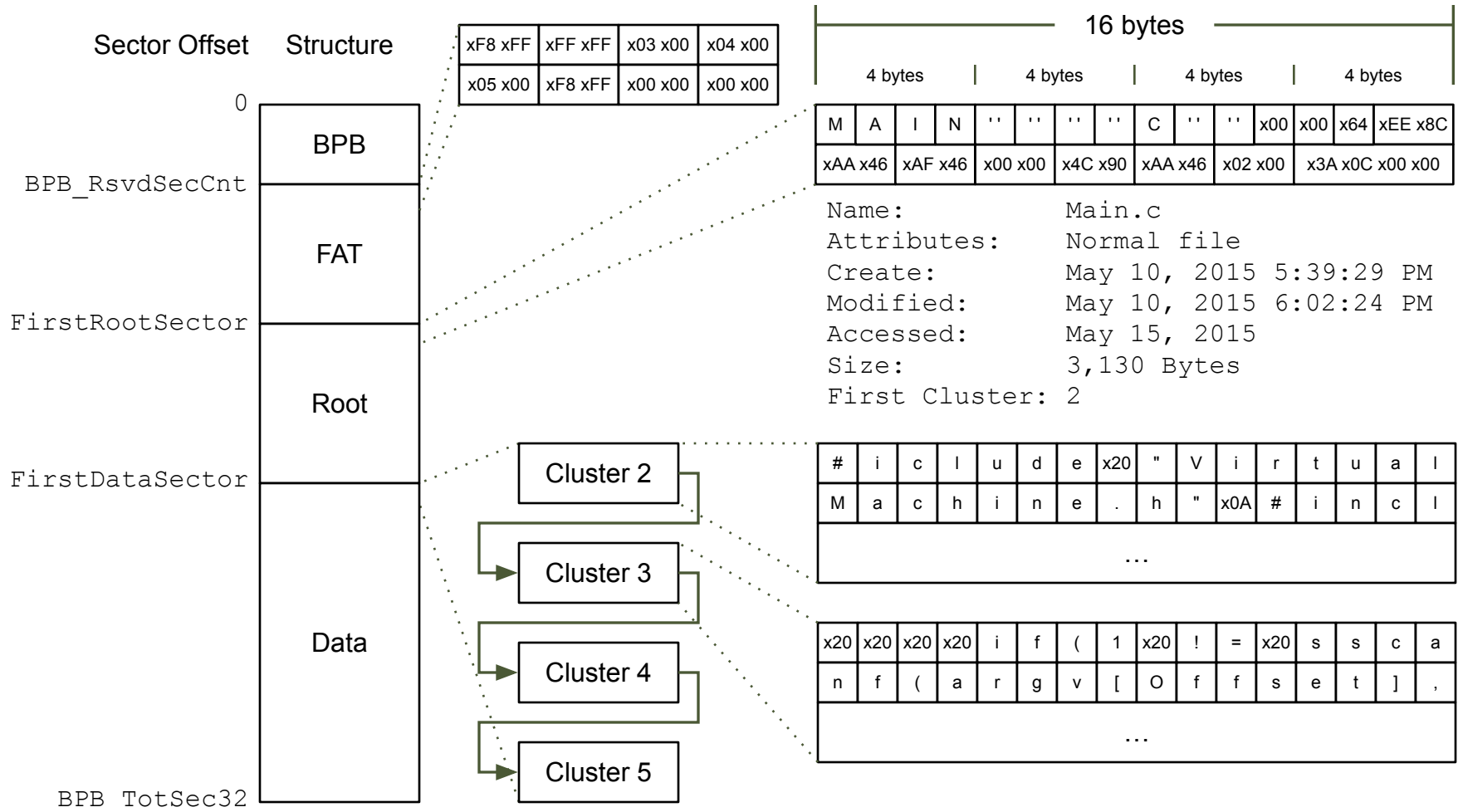
FirstRootSector = BPB_RsvdSecCnt + BPB_NumFATs * BPB_FATSz16;
RootDirectorySectors = (BPB_RootEntCnt * 32) / 512;
FirstDataSector = FirstRootSector + RootDirectorySectors;
ClusterCount = (BPB_TotSec32 - FirstDataSector) / BPB_SecPerClus;

Layout of Main.c in FAT assuming 2 Sectors per Cluster

Sector Offset | **Structure**

xF8 xFF	xFF xFF	x03 x00	x04 x00
x05 x00	xF8 xFF	x00 x00	x00 x00

0 — BPB

BPB_RsvdSecCnt — FAT

FirstRootSector — Root

FirstDataSector — Data

BPB_TotSec32

├──────────────── 16 bytes ────────────────┤

| 4 bytes | 4 bytes | 4 bytes | 4 bytes |

M	A	I	N	''	''	''	''	C	''	''	x00	x00	x64	xEE x8C

xAA x46	xAF x46	x00 x00	x4C x90	xAA x46	x02 x00	x3A x0C x00 x00

```
Name:          Main.c
Attributes:    Normal file
Create:        May 10, 2015 5:39:29 PM
Modified:      May 10, 2015 6:02:24 PM
Accessed:      May 15, 2015
Size:          3,130 Bytes
First Cluster: 2
```

Cluster 2
Cluster 3
Cluster 4
Cluster 5

#	i	c	l	u	d	e	x20	"	V	i	r	t	u	a	l
M	a	c	h	i	n	e	.	h	"	x0A	#	i	n	c	l

…

x20	x20	x20	x20	i	f	(	1	x20	!	=	x20	s	s	c	a
n	f	(	a	r	g	v	[	O	f	f	s	e	t	]	,

…

```
FirstRootSector = BPB_RsvdSecCnt + BPB_NumFATs * BPB_FATSz16;
RootDirectorySectors = (BPB_RootEntCnt * 32) / 512;
FirstDataSector = FirstRootSector + RootDirectorySectors;
ClusterCount = (BPB_TotSec32 - FirstDataSector) / BPB_SecPerClus;
```