

```
joe@ubuntu-partitioned:~$ df
Filesystem      1K-blocks    Used Available Use% Mounted on
/dev/sda1        3778616  835956   2731000   24% /
none              4         0         4      0% /sys/fs/cgroup
udev             240128     4   240124     1% /dev
tmpfs            50188     368   49820     1% /run
none             5120      0    5120     0% /run/lock
none            250936     0   250936     0% /run/shm
none            102400     0   102400     0% /run/user
/dev/sda5        2820244   4296   2652976    1% /home/cituser/joesfiles
/dev/sda2        1889292  397640   1377632   23% /var
/dev/sda8        466248    2318   435337    1% /demo/it3100
joe@ubuntu-partitioned:~$
```



```
joe@ubuntu-partitioned:~$ sudo umount /demo/it3100  
joe@ubuntu-partitioned:~$ echo "umount will remove it from the root filesystem"  
umount will remove it from the root filesystem  
joe@ubuntu-partitioned:~$ █
```



```
joe@ubuntu-partitioned:~$ echo "To make this mount at boot time, we need to edit  
the /etc/fstab file. Be careful as you are editing this as if you make an error  
, your system may no longer boot."
```

```
To make this mount at boot time, we need to edit the /etc/fstab file. Be careful  
as you are editing this as if you make an error, your system may no longer boot
```

```
·  
joe@ubuntu-partitioned:~$ sudo vi /etc/fstab
```

```
joe — joe@ubuntu-partitioned: ~ — ssh • ssh yavin — 80x24
# Use 'blkid' to print the universally unique identifier for a
# device; this may be used with UUID= as a more robust way to name devices
# that works even if disks are added and removed. See fstab(5).
#
# <file system> <mount point> <type> <options> <dump> <pass>
# / was on /dev/sda1 during installation
UUID=dfed8e52-c20f-4ac0-8de4-a5a23f0853e4 / ext4 errors=remount
-ro 0 1
# /var was on /dev/sda2 during installation
UUID=867b783a-4b01-4177-9660-a3b2400a1f07 /var ext4 defaults
0 2
# swap was on /dev/sda3 during installation
UUID=5c98ac22-25df-492e-966b-52e45bc66e2e none swap sw
0 0
/dev/fd0 /media/floppy0 auto rw,user,noauto,exec,utf8 0 0
#/dev/sda5 /home/cituser/joesfiles ext4 defaults
0 0
UUID=227ef53e-7c2e-4a63-9b61-c7d96825d52e /home/cituser/joesfiles
ext4 defaults 0 0
#Adding the new mount for /dev/sda8
#<fs> <mount point> <type> <options> <dump> <pass>
/dev/sda8 /demo/it3100 ext4 defaults 0 0
"/etc/fstab" 20L, 1090C written 19,51-70 Bot
```

```
joe@ubuntu-partitioned:~$ sudo mount /dev/sda8
joe@ubuntu-partitioned:~$ df
Filesystem      1K-blocks    Used Available Use% Mounted on
/dev/sda1        3778616  835964   2730992  24% /
none              4          0         4      0% /sys/fs/cgroup
udev             240128     4       240124   1% /dev
tmpfs            50188     368     49820   1% /run
none             5120      0       5120    0% /run/lock
none            250936     0     250936  0% /run/shm
none            102400     0     102400  0% /run/user
/dev/sda5        2820244   4296   2652976   1% /home/cituser/joesfiles
/dev/sda2        1889292  397648  1377624  23% /var
/dev/sda8        466248   2318   435337   1% /demo/it3100
joe@ubuntu-partitioned:~$ echo "The above mount command TESTS the entry I put in
to fstab. If it doesn't mount at this point go back and edit the fstab file"
The above mount command TESTS the entry I put into fstab. If it doesn't mount at
this point go back and edit the fstab file
joe@ubuntu-partitioned:~$ █
```



```
joe@ubuntu-partitioned:~$ echo "Seek the man page when needing to configure options on the ext4 filesystem"
Seek the man page when needing to configure options on the ext4 filesystem
joe@ubuntu-partitioned:~$ man mkfs.ext4
```



MKE2FS(8)

System Manager's Manual

MKE2FS(8)

NAME

mke2fs - create an ext2/ext3/ext4 filesystem

SYNOPSIS

```
mke2fs [ -c | -l filename ] [ -b block-size ] [ -D ] [ -f fragment-size ]
[ -g blocks-per-group ] [ -G number-of-groups ] [ -i bytes-per-inode ]
[ -I inode-size ] [ -j ] [ -J journal-options ] [ -N number-of-inodes ]
[ -n ] [ -m reserved-blocks-percentage ] [ -o creator-os ] [ -O
[^]feature[,...] ] [ -q ] [ -r fs-revision-level ] [ -E extended-
options ] [ -v ] [ -F ] [ -L volume-label ] [ -M last-mounted-directory ]
[ -S ] [ -t fs-type ] [ -T usage-type ] [ -U UUID ] [ -V ] device [
blocks-count ]
```

```
mke2fs -O journal_dev [ -b block-size ] [ -L volume-label ] [ -n ] [ -q ]
[ -v ] external-journal [ blocks-count ]
```

DESCRIPTION

mke2fs is used to create an ext2, ext3, or ext4 filesystem, usually in a disk partition. device is the special file corresponding to the device (e.g. /dev/hdXX). blocks-count is the number of blocks on the device. If omitted, **mke2fs** automagically figures the file system size.

Manual page mkfs.ext4(8) line 1 (press h for help or q to quit)



```
joe@ubuntu-partitioned:~$ echo "view the man page for fstab when seeking informa  
tion about that file.  "  
view the man page for fstab when seeking information about that file.  
joe@ubuntu-partitioned:~$ man 5 fstab
```




FSTAB(5)

File Formats

FSTAB(5)

NAME

`fstab` – static information about the filesystems

SYNOPSIS

`/etc/fstab`

DESCRIPTION

The file `fstab` contains descriptive information about the various file systems. `fstab` is only read by programs, and not written; it is the duty of the system administrator to properly create and maintain this file. Each filesystem is described on a separate line; fields on each line are separated by tabs or spaces. Lines starting with '#' are comments, blank lines are ignored. The order of records in `fstab` is important because `fsck(8)`, `mount(8)`, and `umount(8)` sequentially iterate through `fstab` doing their thing, though at boot time `mountall(8)` may process the file out-of-order when it believes it is safe to do so.

The first field (fs_spec).

This field describes the block special device or remote filesystem to be mounted.

Manual page `fstab(5)` line 1 (press h for help or q to quit)



```
joe@ubuntu-partitioned:~$ echo "Examples with the nearly universally accessible VFAT fs"
Examples with the nearly universally accessible VFAT fs
joe@ubuntu-partitioned:~$ echo "First I need to create a partition from empty free space"
First I need to create a partition from empty free space
joe@ubuntu-partitioned:~$ █
```



Home joe — joe@ubuntu-partitioned: ~ — ssh • ssh yavin — 80×24

```
joe@ubuntu-partitioned:~$ sudo cfdisk /dev/sda
```

cfdisk (util-linux 2.20.1)

Disk Drive: /dev/sda
Size: 17179869184 bytes, 17.1 GB
Heads: 255 Sectors per Track: 63 Cylinders: 2088

Name	Flags	Part Type	FS Type	[Label]	Size (MB)
			Unusable		1.05*
sda1	Boot	Primary	ext4		3999.27*
sda2		Primary	ext4		1999.64*
sda3		Primary	swap		1000.35*
sda5		Logical	ext4		3002.23*
sda6		Logical	ext3		1998.75*
sda7		Logical	ext4		3002.23*
sda8		Logical	ext4		501.75*
		Logical	Free Space		1674.64*

[Help] [**New**] [Print] [Quit] [Units]
[Write]

No more partitions
Create new partition from free space

cfdisk (util-linux 2.20.1)

Disk Drive: /dev/sda
Size: 17179869184 bytes, 17.1 GB
Heads: 255 Sectors per Track: 63 Cylinders: 2088

Name	Flags	Part Type	FS Type	[Label]	Size (MB)
			Unusable		1.05*
sda1	Boot	Primary	ext4		3999.27*
sda2		Primary	ext4		1999.64*
sda3		Primary	swap		1000.35*
sda5		Logical	ext4		3002.23*
sda6		Logical	ext3		1998.75*
sda7		Logical	ext4		3002.23*
sda8		Logical	ext4		501.75*
		Logical	Free Space		1674.64*

Size (in MB): 100

cfdisk (util-linux 2.20.1)

Disk Drive: /dev/sda
Size: 17179869184 bytes, 17.1 GB
Heads: 255 Sectors per Track: 63 Cylinders: 2088

Name	Flags	Part Type	FS Type	[Label]	Size (MB)
			Unusable		1.05*
sda1	Boot	Primary	ext4		3999.27*
sda2		Primary	ext4		1999.64*
sda3		Primary	swap		1000.35*
sda5		Logical	ext4		3002.23*
sda6		Logical	ext3		1998.75*
sda7		Logical	ext4		3002.23*
sda8		Logical	ext4		501.75*
		Logical	Free Space		1674.64*

[Beginning] [End] [Cancel]

Add partition at beginning of free space

16 Hidden FAT16	83 Linux	E4 SpeedStor
17 Hidden HPFS/NTFS	84 OS/2 hidden C: drive	EB BeOS fs
18 AST SmartSleep	85 Linux extended	EE GPT
1B Hidden W95 FAT32	86 NTFS volume set	EF EFI (FAT-12/16/32)
1C Hidden W95 FAT32 (LB	87 NTFS volume set	F0 Linux/PA-RISC boot
1E Hidden W95 FAT16 (LB	88 Linux plaintext	F1 SpeedStor
24 NEC DOS	8E Linux LVM	F4 SpeedStor
27 Hidden NTFS WinRE	93 Amoeba	F2 DOS secondary
39 Plan 9	94 Amoeba BBT	FB VMware VMFS
3C PartitionMagic recov	9F BSD/OS	FC VMware VMKCORE
40 Venix 80286	A0 IBM Thinkpad hiberna	FD Linux raid autodetec
41 PPC PReP Boot	A5 FreeBSD	FE LANstep
42 SFS	A6 OpenBSD	FF BBT
4D QNX4.x	A7 NeXTSTEP	
4E QNX4.x 2nd part	A8 Darwin UFS	

Enter filesystem type: 0B

cfdisk (util-linux 2.20.1)

Disk Drive: /dev/sda
Size: 17179869184 bytes, 17.1 GB
Heads: 255 Sectors per Track: 63 Cylinders: 2088

Name	Flags	Part Type	FS Type	[Label]	Size (MB)
			Unusable		1.05*
sda1	Boot	Primary	ext4		3999.27*
sda2		Primary	ext4		1999.64*
sda3		Primary	swap		1000.35*
sda5		Logical	ext4		3002.23*
sda6		Logical	ext3		1998.75*
sda7		Logical	ext4		3002.23*
sda8		Logical	ext4		501.75*
sda9		Logical	W95 FAT32		98.71*
		Logical	Free Space		1575.94*

[Bootable] [Delete] [Help] [Maximize] [Print]
[Quit] [Type] [Units] [Write]

Write partition table to disk (this might destroy data)

cfdisk (util-linux 2.20.1)

Disk Drive: /dev/sda
Size: 17179869184 bytes, 17.1 GB
Heads: 255 Sectors per Track: 63 Cylinders: 2088

Name	Flags	Part Type	FS Type	[Label]	Size (MB)
			Unusable		1.05*
sda1	Boot	Primary	ext4		3999.27*
sda2		Primary	ext4		1999.64*
sda3		Primary	swap		1000.35*
sda5		Logical	ext4		3002.23*
sda6		Logical	ext3		1998.75*
sda7		Logical	ext4		3002.23*
sda8		Logical	ext4		501.75*
sda9		Logical	W95 FAT32		98.71*
		Logical	Free Space		1575.94*

Are you sure you want to write the partition table to disk? (yes or no): ye

s

Warning!! This may destroy data on your disk!



```
joe@ubuntu-partitioned:~$ sudo fdisk -l
```

```
Disk /dev/sda: 17.2 GB, 17179869184 bytes
255 heads, 63 sectors/track, 2088 cylinders, total 33554432 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x0006f6c5
```

Device	Boot	Start	End	Blocks	Id	System
/dev/sda1	*	2048	7813119	3905536	83	Linux
/dev/sda2		7813120	11718655	1952768	83	Linux
/dev/sda3		11718656	13672447	976896	82	Linux swap / Solaris
/dev/sda4		13672448	30476437	8401995	5	Extended
/dev/sda5		13672511	19536172	2931831	83	Linux
/dev/sda6		19536236	23439967	1951866	83	Linux
/dev/sda7		23440031	29303692	2931831	83	Linux
/dev/sda8		29303756	30283657	489951	83	Linux
/dev/sda9		30283721	30476437	96358+	b	W95 FAT32

```
joe@ubuntu-partitioned:~$ █
```



home joe — joe@ubuntu-partitioned: ~ — ssh • ssh yavin — 80×24

```
joe@ubuntu-partitioned:~$ sudo mkfs -t vfat /dev/sda9
```



```
joe@ubuntu-partitioned:~$ sudo mkfs -t vfat /dev/sda9
```

```
mkfs.fat 3.0.26 (2014-03-07)
```

```
/dev/sda9: No such file or directory
```

```
joe@ubuntu-partitioned:~$ sudo partprobe
```

```
joe@ubuntu-partitioned:~$ █
```



```
[joe@ubuntu-partitioned:~$ sudo mkfs -t vfat /dev/sda9  
mkfs.fat 3.0.26 (2014-03-07)  
/dev/sda9: No such file or directory  
[joe@ubuntu-partitioned:~$ sudo partprobe  
[joe@ubuntu-partitioned:~$ sudo mkfs -t vfat /dev/sda9  
mkfs.fat 3.0.26 (2014-03-07)  
joe@ubuntu-partitioned:~$ █
```



```
joe@ubuntu-partitioned:~$ sudo mkdir /demo/it1100
joe@ubuntu-partitioned:~$ sudo mount /dev/sda9 /demo/it1100/
joe@ubuntu-partitioned:~$ df
```

Filesystem	1K-blocks	Used	Available	Use%	Mounted on
/dev/sda1	3778616	835964	2730992	24%	/
none	4	0	4	0%	/sys/fs/cgroup
udev	240128	4	240124	1%	/dev
tmpfs	50188	372	49816	1%	/run
none	5120	0	5120	0%	/run/lock
none	250936	0	250936	0%	/run/shm
none	102400	0	102400	0%	/run/user
/dev/sda5	2820244	4296	2652976	1%	/home/cituser/joesfiles
/dev/sda2	1889292	397648	1377624	23%	/var
/dev/sda8	466248	2318	435337	1%	/demo/it3100
/dev/sda9	96154	0	96154	0%	/demo/it1100

```
joe@ubuntu-partitioned:~$ █
```



```
joe@ubuntu-partitioned:~$ ls -la /demo/it1100/  
total 20  
drwxr-xr-x 2 root root 16384 Dec 31 1969 .  
drwxr-xr-x 4 root root 4096 Oct 4 09:34 ..  
joe@ubuntu-partitioned:~$ █
```



```
joe@ubuntu-partitioned:~$ ls -la /demo/it1100/
total 20
drwxr-xr-x 2 root root 16384 Dec 31 1969 .
drwxr-xr-x 4 root root 4096 Oct 4 09:34 ..
joe@ubuntu-partitioned:~$ sudo umount /demo/it1100
joe@ubuntu-partitioned:~$ df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/sda1       3.7G  817M  2.7G  24% /
none            4.0K   0    4.0K   0% /sys/fs/cgroup
udev           235M  4.0K  235M   1% /dev
tmpfs           50M   372K   49M   1% /run
none           5.0M   0    5.0M   0% /run/lock
none           246M   0    246M   0% /run/shm
none           100M   0    100M   0% /run/user
/dev/sda5       2.7G  4.2M  2.6G   1% /home/cituser/joesfiles
/dev/sda2       1.9G  389M  1.4G  23% /var
/dev/sda8       456M  2.3M  426M   1% /demo/it3100
joe@ubuntu-partitioned:~$ echo "no longer shows up after umount"
no longer shows up after umount
joe@ubuntu-partitioned:~$ █
```




```
joe@ubuntu-partitioned:~$ echo "Add to fstab to mount at boot time"  
Add to fstab to mount at boot time  
joe@ubuntu-partitioned:~$ sudo vi /etc/fstab
```

```
#
# <file system> <mount point> <type> <options> <dump> <pass>
# / was on /dev/sda1 during installation
UUID=dfed8e52-c20f-4ac0-8de4-a5a23f0853e4 / ext4 errors=remount
-ro 0 1
# /var was on /dev/sda2 during installation
UUID=867b783a-4b01-4177-9660-a3b2400a1f07 /var ext4 defaults
0 2
# swap was on /dev/sda3 during installation
UUID=5c98ac22-25df-492e-966b-52e45bc66e2e none swap sw
0 0
/dev/fd0 /media/floppy0 auto rw,user,noauto,exec,utf8 0 0
#/dev/sda5 /home/cituser/joesfiles ext4 defaults
0 0
UUID=227ef53e-7c2e-4a63-9b61-c7d96825d52e /home/cituser/joesfiles
ext4 defaults 0 0

#Adding the new mount for /dev/sda8
#<fs> <mount point> <type> <options> <dump> <pass>
/dev/sda8 /demo/it3100 ext4 defaults 0 0

#Add mount for vfat
/dev/sda9 /demo/it1100 vfat defaults 0 0
-- INSERT -- 23,41-66 Bot
```

```
joe@ubuntu-partitioned:~$ sudo mount /dev/sda9
joe@ubuntu-partitioned:~$ df
Filesystem      1K-blocks    Used Available Use% Mounted on
/dev/sda1        3778616  835968   2730988  24% /
none              4          0         4      0% /sys/fs/cgroup
udev             240128     4       240124   1% /dev
tmpfs            50188     372     49816   1% /run
none             5120      0       5120    0% /run/lock
none            250936     0     250936  0% /run/shm
none            102400     0     102400  0% /run/user
/dev/sda5        2820244   4296   2652976  1% /home/cituser/joesfiles
/dev/sda2        1889292  397656  1377616  23% /var
/dev/sda8        466248   2318   435337   1% /demo/it3100
/dev/sda9         96154     0     96154   0% /demo/it1100
joe@ubuntu-partitioned:~$ echo "remounted successfully"
remounted successfully
joe@ubuntu-partitioned:~$ █
```



joe — joe@ubuntu-partitioned: ~ — ssh • ssh yavin — 80×24

```
joe@ubuntu-partitioned:~$ echo "See man page for vfat options"  
See man page for vfat options  
joe@ubuntu-partitioned:~$ man mkfs.vfat
```



MKFS.FAT(8)

dosfstools

MKFS.FAT(8)

NAME

mkfs.fat - create an MS-DOS filesystem under Linux

SYNOPSIS

mkfs.fat [-a] [-A] [-b sector-of-backup] [-c] [-l filename] [-C] [-f number-of-FATs] [-F FAT-size] [-h number-of-hidden-sectors] [-i volume-id] [-I] [-m message-file] [-n volume-name] [-r root-dir-entries] [-R number-of-reserved-sectors] [-s sectors-per-cluster] [-S logical-sector-size] [-D drive-number] [-M FAT-media-type] [-v] device [block-count]

DESCRIPTION

mkfs.fat is used to create an MS-DOS filesystem under Linux on a device (usually a disk partition). device is the special file corresponding to the device (e.g /dev/sdXX). block-count is the number of blocks on the device. If omitted, **mkfs.fat** automatically determines the filesystem size.

OPTIONS

-a Normally, for any filesystem except very small ones, **mkfs.fat** will align all the data structures to cluster size, to make sure that as

Manual page mkfs.vfat(8) line 1 (press h for help or q to quit)

Joe

https://www.kernel.org/doc/Documentation/filesystems/vfat.txt

Apps eportfolio dixie Nginx HTTP Server... vSphere Design Bes... Geneology Imported From Firefox PowerTeacher

USING VFAT

To use the vfat filesystem, use the filesystem type 'vfat'. i.e.

```
mount -t vfat /dev/fd0 /mnt
```

No special partition formatter is required. mkdosfs will work fine if you want to format from within Linux.

VFAT MOUNT OPTIONS

uid=### -- Set the owner of all files on this filesystem.
The default is the uid of current process.

gid=### -- Set the group of all files on this filesystem.
The default is the gid of current process.

umask=### -- The permission mask (for files and directories, see umask(1)).
The default is the umask of current process.

dmask=### -- The permission mask for the directory.
The default is the umask of current process.

fmask=### -- The permission mask for files.
The default is the umask of current process.

allow_utime=### -- This option controls the permission check of mtime/atime.

- 20 - If current process is in group of file's group ID, you can change timestamp.
- 2 - Other users can change timestamp.

The default is set from `dmask` option. (If the directory is writable, utime(2) is also allowed. I.e. `-dmask & 022`)

Normally utime(2) checks current process is owner of the file, or it has CAP_FOWNER capability. But FAT filesystem doesn't have uid/gid on disk, so normal check is too unflexible. With this option you can relax it.

codepage=### -- Sets the codepage number for converting to shortname characters on FAT filesystem.



joe — joe@ubuntu-partitioned: ~ — ssh • ssh yavin — 80×24

```
joe@ubuntu-partitioned:~$ echo "Now to do an NTFS partition"  
Now to do an NTFS partition  
joe@ubuntu-partitioned:~$ sudo cfdisk /dev/sda
```

cfdisk (util-linux 2.20.1)

Disk Drive: /dev/sda
Size: 17179869184 bytes, 17.1 GB
Heads: 255 Sectors per Track: 63 Cylinders: 2088

Name	Flags	Part Type	FS Type	[Label]	Size (MB)
			Unusable		1.05*
sda1	Boot	Primary	ext4		3999.27*
sda2		Primary	ext4		1999.64*
sda3		Primary	swap		1000.35*
sda5		Logical	ext4		3002.23*
sda6		Logical	ext3		1998.75*
sda7		Logical	ext4		3002.23*
sda8		Logical	ext4		501.75*
sda9		Logical	vfat		98.71*
		Logical	Free Space		1575.94*

[Help] [**New**] [Print] [Quit] [Units]
[Write]

Create new partition from free space

cfdisk (util-linux 2.20.1)

Disk Drive: /dev/sda
Size: 17179869184 bytes, 17.1 GB
Heads: 255 Sectors per Track: 63 Cylinders: 2088

Name	Flags	Part Type	FS Type	[Label]	Size (MB)
			Unusable		1.05*
sda1	Boot	Primary	ext4		3999.27*
sda2		Primary	ext4		1999.64*
sda3		Primary	swap		1000.35*
sda5		Logical	ext4		3002.23*
sda6		Logical	ext3		1998.75*
sda7		Logical	ext4		3002.23*
sda8		Logical	ext4		501.75*
sda9		Logical	vfat		98.71*
		Logical	Free Space		1575.94*

Size (in MB): 200

cfdisk (util-linux 2.20.1)

Disk Drive: /dev/sda
Size: 17179869184 bytes, 17.1 GB
Heads: 255 Sectors per Track: 63 Cylinders: 2088

Name	Flags	Part Type	FS Type	[Label]	Size (MB)
			Unusable		1.05*
sda1	Boot	Primary	ext4		3999.27*
sda2		Primary	ext4		1999.64*
sda3		Primary	swap		1000.35*
sda5		Logical	ext4		3002.23*
sda6		Logical	ext3		1998.75*
sda7		Logical	ext4		3002.23*
sda8		Logical	ext4		501.75*
sda9		Logical	vfat		98.71*
		Logical	Free Space		1575.94*

[Beginning] [End] [Cancel]

Add partition at beginning of free space

cfdisk (util-linux 2.20.1)

Disk Drive: /dev/sda
Size: 17179869184 bytes, 17.1 GB
Heads: 255 Sectors per Track: 63 Cylinders: 2088

Name	Flags	Part Type	FS Type	[Label]	Size (MB)
			Unusable		1.05*
sda1	Boot	Primary	ext4		3999.27*
sda2		Primary	ext4		1999.64*
sda3		Primary	swap		1000.35*
sda5		Logical	ext4		3002.23*
sda6		Logical	ext3		1998.75*
sda7		Logical	ext4		3002.23*
sda8		Logical	ext4		501.75*
sda9		Logical	vfat		98.71*
sda10		Logical	Linux		197.41*
		Logical	Free Space		1378.53*

[Bootable] [Delete] [Help] [Maximize] [Print]
[Quit] [Type] [Units] [Write]

Change the filesystem type (DOS, Linux, OS/2 and so on)



16 Hidden FAT16	83 Linux	E4 SpeedStor
17 Hidden HPFS/NTFS	84 OS/2 hidden C: drive	EB BeOS fs
18 AST SmartSleep	85 Linux extended	EE GPT
1B Hidden W95 FAT32	86 NTFS volume set	EF EFI (FAT-12/16/32)
1C Hidden W95 FAT32 (LB	87 NTFS volume set	F0 Linux/PA-RISC boot
1E Hidden W95 FAT16 (LB	88 Linux plaintext	F1 SpeedStor
24 NEC DOS	8E Linux LVM	F4 SpeedStor
27 Hidden NTFS WinRE	93 Amoeba	F2 DOS secondary
39 Plan 9	94 Amoeba BBT	FB VMware VMFS
3C PartitionMagic recov	9F BSD/OS	FC VMware VMKCORE
40 Venix 80286	A0 IBM Thinkpad hiberna	FD Linux raid autodetec
41 PPC PReP Boot	A5 FreeBSD	FE LANstep
42 SFS	A6 OpenBSD	FF BBT
4D QNX4.x	A7 NeXTSTEP	
4E QNX4.x 2nd part	A8 Darwin UFS	

Enter filesystem type: 07

cfdisk (util-linux 2.20.1)

Disk Drive: /dev/sda
Size: 17179869184 bytes, 17.1 GB
Heads: 255 Sectors per Track: 63 Cylinders: 2088

Name	Flags	Part Type	FS Type	[Label]	Size (MB)
			Unusable		1.05*
sda1	Boot	Primary	ext4		3999.27*
sda2		Primary	ext4		1999.64*
sda3		Primary	swap		1000.35*
sda5		Logical	ext4		3002.23*
sda6		Logical	ext3		1998.75*
sda7		Logical	ext4		3002.23*
sda8		Logical	ext4		501.75*
sda9		Logical	vfat		98.71*
sda10		Logical	HPFS/NTFS/exFAT		197.41*
		Logical	Free Space		1378.53*

Are you sure you want to write the partition table to disk? (yes or no): ye

s

Warning!! This may destroy data on your disk!

cfdisk (util-linux 2.20.1)

Disk Drive: /dev/sda
Size: 17179869184 bytes, 17.1 GB
Heads: 255 Sectors per Track: 63 Cylinders: 2088

Name	Flags	Part Type	FS Type	[Label]	Size (MB)
			Unusable		1.05*
sda1	Boot	Primary	ext4		3999.27*
sda2		Primary	ext4		1999.64*
sda3		Primary	swap		1000.35*
sda5		Logical	ext4		3002.23*
sda6		Logical	ext3		1998.75*
sda7		Logical	ext4		3002.23*
sda8		Logical	ext4		501.75*
sda9		Logical	vfat		98.71*
sda10		Logical	HPFS/NTFS/exFAT		197.41*
		Logical	Free Space		1378.53*

[Bootable] [Delete] [Help] [Maximize] [Print]
s [Quit] [Type] [Units] [Write]

Quit program without writing partition table



```
joe@ubuntu-partitioned:~$ sudo fdisk -l
```

```
Disk /dev/sda: 17.2 GB, 17179869184 bytes
255 heads, 63 sectors/track, 2088 cylinders, total 33554432 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x0006f6c5
```

Device	Boot	Start	End	Blocks	Id	System
/dev/sda1	*	2048	7813119	3905536	83	Linux
/dev/sda2		7813120	11718655	1952768	83	Linux
/dev/sda3		11718656	13672447	976896	82	Linux swap / Solaris
/dev/sda4		13672448	30861997	8594775	5	Extended
/dev/sda5		13672511	19536172	2931831	83	Linux
/dev/sda6		19536236	23439967	1951866	83	Linux
/dev/sda7		23440031	29303692	2931831	83	Linux
/dev/sda8		29303756	30283657	489951	83	Linux
/dev/sda9		30283721	30476437	96358+	b	W95 FAT32
/dev/sda10		30476501	30861997	192748+	7	HPFS/NTFS/exFAT

```
joe@ubuntu-partitioned:~$
```



Home joe — joe@ubuntu-partitioned: ~ — ssh • ssh yavin — 80×24

```
joe@ubuntu-partitioned:~$ sudo mkfs.ntfs /dev/sda10
```




```
joe@ubuntu-partitioned:~$ sudo mkfs.ntfs /dev/sda10
Failed to access '/dev/sda10': No such file or directory
The device doesn't exist; did you specify it correctly?
joe@ubuntu-partitioned:~$ sudo partprobe
joe@ubuntu-partitioned:~$ echo "Remember if you reboot, you don't have to re-run
the partprobe command"
Remember if you reboot, you don't have to re-run the partprobe command
joe@ubuntu-partitioned:~$ sudo mkfs.ntfs /dev/sda10
Cluster size has been automatically set to 4096 bytes.
Initializing device with zeroes: 100% - Done.
Creating NTFS volume structures.
mkntfs completed successfully. Have a nice day.
joe@ubuntu-partitioned:~$ █
```

```
joe@ubuntu-partitioned:~$ sudo mkdir /demo/it4200
[sujoe@ubuntu-partitioned:~$ sudo mount /dev/sda10 /demo/it4200/
joe@ubuntu-partitioned:~$ mount
/dev/sda1 on / type ext4 (rw,errors=remount-ro)
proc on /proc type proc (rw,noexec,nosuid,nodev)
sysfs on /sys type sysfs (rw,noexec,nosuid,nodev)
none on /sys/fs/cgroup type tmpfs (rw)
none on /sys/fs/fuse/connections type fusectl (rw)
none on /sys/kernel/debug type debugfs (rw)
none on /sys/kernel/security type securityfs (rw)
udev on /dev type devtmpfs (rw,mode=0755)
devpts on /dev/pts type devpts (rw,noexec,nosuid,gid=5,mode=0620)
tmpfs on /run type tmpfs (rw,noexec,nosuid,size=10%,mode=0755)
none on /run/lock type tmpfs (rw,noexec,nosuid,nodev,size=5242880)
none on /run/shm type tmpfs (rw,nosuid,nodev)
none on /run/user type tmpfs (rw,noexec,nosuid,nodev,size=104857600,mode=0755)
none on /sys/fs/pstore type pstore (rw)
/dev/sda5 on /home/cituser/joesfiles type ext4 (rw)
/dev/sda2 on /var type ext4 (rw)
rpc_pipefs on /run/rpc_pipefs type rpc_pipefs (rw)
systemd on /sys/fs/cgroup/systemd type cgroup (rw,noexec,nosuid,nodev,none,name=systemd)
/dev/sda8 on /demo/it3100 type ext4 (rw)
/dev/sda9 on /demo/it1100 type vfat (rw)
/dev/sda10 on /demo/it4200 type fuseblk (rw,nosuid,nodev,allow_other,blksize=4096)
joe@ubuntu-partitioned:~$
```

```
joe@ubuntu-partitioned:~$ ls -la /demo/it4200/
```

```
total 8
```

```
drwxrwxrwx 1 root root 4096 Oct  4 09:43 .
```

```
drwxr-xr-x 5 root root 4096 Oct  4 09:43 ..
```

```
joe@ubuntu-partitioned:~$ df
```

Filesystem	1K-blocks	Used	Available	Use%	Mounted on
/dev/sda1	3778616	835968	2730988	24%	/
none	4	0	4	0%	/sys/fs/cgroup
udev	240128	4	240124	1%	/dev
tmpfs	50188	376	49812	1%	/run
none	5120	0	5120	0%	/run/lock
none	250936	0	250936	0%	/run/shm
none	102400	0	102400	0%	/run/user
/dev/sda5	2820244	4296	2652976	1%	/home/cituser/joesfiles
/dev/sda2	1889292	397656	1377616	23%	/var
/dev/sda8	466248	2318	435337	1%	/demo/it3100
/dev/sda9	96154	0	96154	0%	/demo/it1100
/dev/sda10	192748	2504	190244	2%	/demo/it4200

```
joe@ubuntu-partitioned:~$
```

```
# device; this may be used with UUID= as a more robust way to name devices
# that works even if disks are added and removed. See fstab(5).
#
# <file system> <mount point> <type> <options> <dump> <pass>
# / was on /dev/sda1 during installation
UUID=dfed8e52-c20f-4ac0-8de4-a5a23f0853e4 / ext4 errors=remount
-ro 0 1
# /var was on /dev/sda2 during installation
UUID=867b783a-4b01-4177-9660-a3b2400a1f07 /var ext4 defaults
0 2
# swap was on /dev/sda3 during installation
UUID=5c98ac22-25df-492e-966b-52e45bc66e2e none swap sw
0 0
/dev/fd0 /media/floppy0 auto rw,user,noauto,exec,utf8 0 0
#/dev/sda5 /home/cituser/joesfiles ext4 defaults
0 0
UUID=227ef53e-7c2e-4a63-9b61-c7d96825d52e /home/cituser/joesfiles
ext4 defaults 0 0

#Adding the new mount for /dev/sda8
#<fs> <mount point> <type> <options> <dump> <pass>
/dev/sda8 /demo/it3100 ext4 defaults 0 0

#Add mount for vfat
/dev/sda9 /demo/it1100 vfat defaults 0 0
/dev/sda10 /demo/it4200 ntfs defaults 0 0
:wq
```

```
joe@ubuntu-partitioned:~$ df
Filesystem      1K-blocks    Used Available Use% Mounted on
/dev/sda1        3778616  835972   2730984  24% /
none              4          0         4      0% /sys/fs/cgroup
udev             240128      4   240124    1% /dev
tmpfs            50188      376   49812    1% /run
none             5120        0    5120     0% /run/lock
none            250936      0   250936    0% /run/shm
none            102400      0   102400    0% /run/user
/dev/sda5        2820244    4296   2652976    1% /home/cituser/joesfiles
/dev/sda2        1889292  397656   1377616   23% /var
/dev/sda8         466248    2318   435337    1% /demo/it3100
/dev/sda9         96154       0    96154    0% /demo/it1100
/dev/sda10       192748    2504   190244    2% /demo/it4200
joe@ubuntu-partitioned:~$ sudo umount /dev/sda10
joe@ubuntu-partitioned:~$ sudo mount /dev/sda10
joe@ubuntu-partitioned:~$ █
```

```
joe — joe@ubuntu-partitioned: ~ — ssh • ssh yavin — 80x27
joe@ubuntu-partitioned:~$ sudo du -h /demo/
12K      /demo/it3100/lost+found
13K      /demo/it3100
4.0K     /demo/it4200
16K      /demo/it1100
37K      /demo/
joe@ubuntu-partitioned:~$ █
```

```
joe — joe@ubuntu-partitioned: ~ — ssh • ssh yavin — 80x27
joe@ubuntu-partitioned:~$ echo "how can we use the resource hog programs to test
the storage capacity of these new filesystems?"
how can we use the resource hog programs to test the storage capacity of these n
ew filesystems?
joe@ubuntu-partitioned:~$ █
```



joe — joe@ubuntu-partitioned: ~ — ssh • ssh yavin — 80×27

```
joe@ubuntu-partitioned:~$ wget http://cit.dixie.edu/it/3100/examples.examples/re  
source-hogs.tgz
```



```
joe — joe@ubuntu-partitioned: ~ — ssh • ssh yavin — 80x27
joe@ubuntu-partitioned:~$ ls
resource-hogs.tgz
joe@ubuntu-partitioned:~$ tar -xvzf resource-hogs.tgz
cpuhog
diskhog
fileiohog
inodehog
memhog
README.txt
joe@ubuntu-partitioned:~$ █
```

```
joe — joe@ubuntu-partitioned: ~ — ssh • ssh yavin — 80x27
joe@ubuntu-partitioned:~$ ls
cpuhog  diskhog  fileiohog  inodehog  memhog  README.txt  resource-hogs.tgz
joe@ubuntu-partitioned:~$ sudo mv *hog /usr/local/bin/
joe@ubuntu-partitioned:~$ █
```

```
joe — joe@ubuntu-partitioned: /demo/it3100 — ssh • ssh yavin — 80x27
joe@ubuntu-partitioned:~$ cd /demo/it3100/
joe@ubuntu-partitioned:/demo/it3100$ echo "we could do our tests in any of our new partitions. BUT make DOUBLY sure you are not in your ROOT partition or you will fill up your disk and a horrible death will ensue"
we could do our tests in any of our new partitions. BUT make DOUBLY sure you are not in your ROOT partition or you will fill up your disk and a horrible death will ensue
joe@ubuntu-partitioned:/demo/it3100$ █
```

```
joe — joe@ubuntu-partitioned: /demo/it3100 — ssh • ssh yavin — 80x27
joe@ubuntu-partitioned:/demo/it3100$ df .
Filesystem      1K-blocks  Used Available Use% Mounted on
/dev/sda8        466248    2318   435337    1% /demo/it3100
joe@ubuntu-partitioned:/demo/it3100$ █
```

```
joe — joe@ubuntu-partitioned: /demo/it3100 — ssh • ssh yavin — 80x27
[joe@ubuntu-partitioned:/demo/it3100$ echo "You can read about what diskhog does
in the readme file"
You can read about what diskhog does in the readme file
[joe@ubuntu-partitioned:/demo/it3100$ diskhog -h
usage: diskhog [-f name]
  -f name      : base of filenames
  -h           : display this message
[joe@ubuntu-partitioned:/demo/it3100$ sudo chown joe:joe .
[joe@ubuntu-partitioned:/demo/it3100$ diskhog -f garbage
0000 - ..
```

```
joe — joe@ubuntu-partitioned: /demo/it3100 — ssh • ssh yavin — 80x27
[joe@ubuntu-partitioned:/demo/it3100$ echo "You can read about what diskhog does
in the readme file"
You can read about what diskhog does in the readme file
[joe@ubuntu-partitioned:/demo/it3100$ diskhog -h
usage: diskhog [-f name]
  -f name      : base of filenames
  -h           : display this message
[joe@ubuntu-partitioned:/demo/it3100$ sudo chown joe:joe .
[joe@ubuntu-partitioned:/demo/it3100$ diskhog -f garbage
0000 - .....Error in write.joe@ubuntu-partitioned:/demo/it3100$ █
```

```
joe — joe@ubuntu-partitioned: /demo/it3100 — ssh • ssh yavin — 80x27
joe@ubuntu-partitioned:/demo/it3100$ ls -la
total 435198
drwxr-xr-x 3 joe  joe      1024 Oct  4 09:53 .
drwxr-xr-x 5 root root     4096 Oct  4 09:43 ..
-rwx----- 1 joe  joe  445624320 Oct  4 09:53 garbage-0000
drwx----- 2 root root     12288 Sep 30 09:53 lost+found
joe@ubuntu-partitioned:/demo/it3100$ echo "wow, what a large file"
wow, what a large file
joe@ubuntu-partitioned:/demo/it3100$ █
```

```
joe — joe@ubuntu-partitioned: /demo/it3100 — ssh • ssh yavin — 80x27
joe@ubuntu-partitioned:/demo/it3100$ sudo du .
12      ./lost+found
435194  .
joe@ubuntu-partitioned:/demo/it3100$ sudo df
Filesystem      1K-blocks    Used Available Use% Mounted on
/dev/sda1        3778616  836060   2730896  24% /
none              4            0         4      0% /sys/fs/cgroup
udev             240128       4        240124   1% /dev
tmpfs            50188        380      49808    1% /run
none             5120         0         5120    0% /run/lock
none            250936       0        250936   0% /run/shm
none            102400       0        102400   0% /run/user
/dev/sda5        2820244     4296    2652976   1% /home/cituser/joesfiles
/dev/sda2        1889292    397660   1377612  23% /var
/dev/sda8        466248    437499      156 100% /demo/it3100
/dev/sda9         96154       0        96154   0% /demo/it1100
/dev/sda10       192748     2504    190244   2% /demo/it4200
joe@ubuntu-partitioned:/demo/it3100$ █
```




```
joe@ubuntu-partitioned:/demo/it3100$ echo "we filled up that partition"  
we filled up that partition  
joe@ubuntu-partitioned:/demo/it3100$ █
```



```
joe@ubuntu-partitioned:/demo/it3100$ ls
```

```
garbage-0000  lost+found
```

```
joe@ubuntu-partitioned:/demo/it3100$ rm garbage-0000
```

```
joe@ubuntu-partitioned:/demo/it3100$ █
```

```
joe — joe@ubuntu-partitioned: /demo/it3100 — ssh • ssh yavin — 80x27
[joe@ubuntu-partitioned:/demo/it3100$ echo "inodehog creates many small files until no more inodes are left"
inodehog creates many small files until no more inodes are left
[joe@ubuntu-partitioned:/demo/it3100$ inodehog -h
usage: inodehog [-n name] [-s size] [-c files_per_dir]
  -c num          : files per directory (default == 1024)
  -s num          : size of files in KB (default == 1)
  -n file-name    : base name for files (default == hog)
  -h              : display this message
joe@ubuntu-partitioned:/demo/it3100$ █
```

```
joe — joe@ubuntu-partitioned: /demo/it3100 — ssh • ssh yavin — 80x27
[joe@ubuntu-partitioned:/demo/it3100$ inodehog -n garbage
```

```
joe — joe@ubuntu-partitioned: /demo/it3100 — ssh • ssh yavin — 80x27
joe@ubuntu-partitioned:/demo/it3100$ inodehog -n garbage
Failed to fopen garbage-00119/garbage-00893.
fopen failed:: No space left on device
Created 120 directories and 122749 files.
joe@ubuntu-partitioned:/demo/it3100$ █
```



```
joe@ubuntu-partitioned:/demo/it3100$ ls
```

```
garbage-00000  garbage-00025  garbage-00050  garbage-00075  garbage-00100
garbage-00001  garbage-00026  garbage-00051  garbage-00076  garbage-00101
garbage-00002  garbage-00027  garbage-00052  garbage-00077  garbage-00102
garbage-00003  garbage-00028  garbage-00053  garbage-00078  garbage-00103
garbage-00004  garbage-00029  garbage-00054  garbage-00079  garbage-00104
garbage-00005  garbage-00030  garbage-00055  garbage-00080  garbage-00105
garbage-00006  garbage-00031  garbage-00056  garbage-00081  garbage-00106
garbage-00007  garbage-00032  garbage-00057  garbage-00082  garbage-00107
garbage-00008  garbage-00033  garbage-00058  garbage-00083  garbage-00108
garbage-00009  garbage-00034  garbage-00059  garbage-00084  garbage-00109
garbage-00010  garbage-00035  garbage-00060  garbage-00085  garbage-00110
garbage-00011  garbage-00036  garbage-00061  garbage-00086  garbage-00111
garbage-00012  garbage-00037  garbage-00062  garbage-00087  garbage-00112
garbage-00013  garbage-00038  garbage-00063  garbage-00088  garbage-00113
garbage-00014  garbage-00039  garbage-00064  garbage-00089  garbage-00114
garbage-00015  garbage-00040  garbage-00065  garbage-00090  garbage-00115
garbage-00016  garbage-00041  garbage-00066  garbage-00091  garbage-00116
garbage-00017  garbage-00042  garbage-00067  garbage-00092  garbage-00117
garbage-00018  garbage-00043  garbage-00068  garbage-00093  garbage-00118
garbage-00019  garbage-00044  garbage-00069  garbage-00094  garbage-00119
garbage-00020  garbage-00045  garbage-00070  garbage-00095  lost+found
garbage-00021  garbage-00046  garbage-00071  garbage-00096
garbage-00022  garbage-00047  garbage-00072  garbage-00097
garbage-00023  garbage-00048  garbage-00073  garbage-00098
garbage-00024  garbage-00049  garbage-00074  garbage-00099
```

```
joe@ubuntu-partitioned:/demo/it3100$ █
```

```
joe — joe@ubuntu-partitioned: /demo/it3100 — ssh • ssh yavin — 80x27
joe@ubuntu-partitioned:/demo/it3100$ df .
Filesystem      1K-blocks  Used Available Use% Mounted on
/dev/sda8        466248 134104    303551  31% /demo/it3100
joe@ubuntu-partitioned:/demo/it3100$ du -s .
du: cannot read directory './lost+found': Permission denied
126842 .
joe@ubuntu-partitioned:/demo/it3100$ █
```

```
joe — joe@ubuntu-partitioned: /demo/it3100 — ssh • ssh yavin — 80x27
[joe@ubuntu-partitioned:/demo/it3100$ echo "the -i option to df will show our inode utilization"
the -i option to df will show our inode utilization
[joe@ubuntu-partitioned:/demo/it3100$ df . -i
Filesystem      Inodes  IUsed IFree IUse% Mounted on
/dev/sda8       122880 122880    0 100% /demo/it3100
joe@ubuntu-partitioned:/demo/it3100$
```



```
joe — joe@ubuntu-partitioned: /demo/it3100 — ssh • ssh yavin — 80x27
joe@ubuntu-partitioned:/demo/it3100$ sudo rm -rf garbage-00*
█
```

```
joe — joe@ubuntu-partitioned: /demo/it3100 — ssh • ssh yavin — 80x27
joe@ubuntu-partitioned:/demo/it3100$ sudo rm -rf garbage-00*
joe@ubuntu-partitioned:/demo/it3100$ df . -i
Filesystem      Inodes IUsed  IFree IUse% Mounted on
/dev/sda8       122880   11 122869    1% /demo/it3100
joe@ubuntu-partitioned:/demo/it3100$ █
```



```
joe@ubuntu-partitioned:/demo/it3100$ echo "Be careful. Don't use these hog programs on your root fs or your system will stop working. Don't delete files you don't mean to, your system will stop working."  
Be careful. Don't use these hog programs on your root fs or your system will stop working. Don't delete files you don't mean to, your system will stop working.  
joe@ubuntu-partitioned:/demo/it3100$ █
```