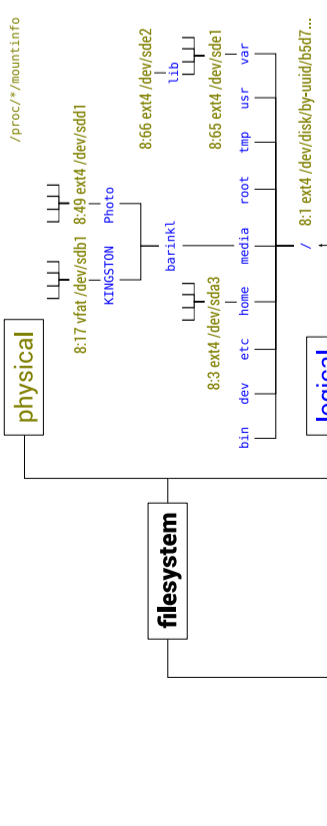
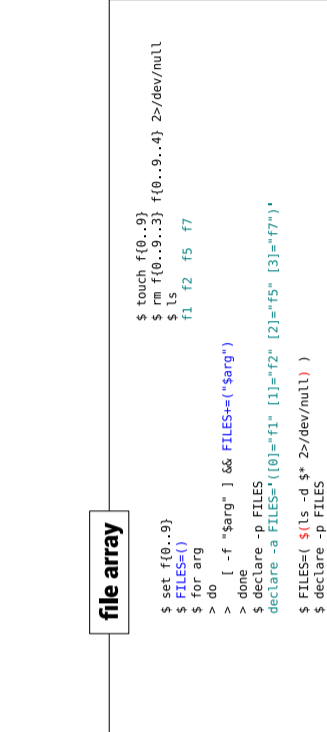


filenames



LINUXDAYS 2014



```
touch f(0..9)
rm f(0..9..3) f(0..9..4) 2>/dev/null
ls
f1 f2 f5 f7

set f(0..9)
FILES=(*)
for arg
do
  [ -f "$arg" ] && FILES+=("$arg")
done
declare -p FILES
declare -- FILES="*"
FILES=(ls -d * 2>/dev/null)
declare -p FILES
declare -- FILES="*"
FILES=(*)

for file in $(FILES); do
done

find . | wc -l
ls -F
2014-01-01/
2014-01-02/
...
2014-09-30/
2014-10-01/

ls -F
var_cache_edux_rz_users_2014-01-01.tgz
var_cache_edux_rz_users_2014-01-02.tgz
var_cache_edux_rz_users_2014-09-30.tgz
2014-10-01/

find . | wc -l
5088
```

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find . | wc -l
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```

file tree

```
function node {
  (depth+) >/dev/null 2>/dev/null II { ((depth--)); return; }
  (depth+) >/dev/null 2>/dev/null II { ((depth--)); return; }
  for item in *; do
    [IFS/; printf -- "%s/%s\n" "${parent[*]}" "$item" ]
    [ -d "$item" -a ! -L "$item" ] && node "$item"
  done
  unset parent[depth]
  declare -a parent
  shoot -s multiglob
  echo "${1:-}"
  node "${1:-}"
}

depth=0
declare -a parent
shoot -s multiglob
echo "${1:-}"
node "${1:-}"
```

file array

```
set f(0..9)
FILES=(*)
do [ -f "$arg" ] && FILES+=("$arg")
done
declare -p FILES
declare -- FILES="*"
FILES=(ls -d * 2>/dev/null)
declare -p FILES
declare -- FILES="*"
FILES=(*)

for file in $(FILES); do
done
```

file list

```
touch f(0..9)
rm f(0..9..3) f(0..9..4) 2>/dev/null
ls
f1 f2 f5 f7

set f(0..9)
FILES=(*)
for arg
do
  [ -f "$arg" ] && FILES+=("$arg")
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FILES=(ls -d * 2>/dev/null)
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var_cache_edux_rz_users_2014-09-30.tgz
2014-10-01/

find . | wc -l
5088
```

directory tree

```
ls -la /
2 .
786433 bin
178 initrd.img
11 lost+found
262145 media
1835900 proc
1570000 root
1570000 tmp
1570000 usr
1570000 var
```

file

```
struct ext4_dir_entry_2 {
  le32 inode;
  le16 rec_len;
  le16 name_len;
  char name[EXT4_NAME_LEN]; /* File name */
};
```

filename (pathname component)

- unique (byte representation - no Unicode normalization)
- case-sensitive
- up to 255 bytes long, except "0" string terminator
- "/" directory separator
- special items "." and ".."

special characters

- at the beginning
- anywhere
- non-ASCII/control characters
- white-spaces/special pattern characters
- for item in ...
- globbing
- bash
- ls
- is
- find

extended i-node structure

```
struct ext4_inode {
  le16 _mode;
  le16 _size;
  le32 _size_lo;
  le32 _time;
  le32 _atime;
  le32 _mtime;
  le32 _ctime;
  le16 _gid;
  le16 _links_count;
  le32 _blocks_lo;
  le32 _blocks_hi;
  ...
  le32 _blocks; /* Pointers to blocks */
};
```

file

DATA BLOCKS

```
$ echo LinuxDays > file
$ cat file
LinuxDays
```

filemetadata

```
$ stat file
File: file
Size: 10      Blocks: 8      IO Block: 4096   regular file
Device: 803h/2051d Inode: 16303137  Links: 1
Access: (0644/-rw-r--r--)  Uid: ( 1000/  barinkl)   Gid: ( 1000/  barinkl)
Modify: 2014-09-27 18:57:24.587189687 +0200
Change: 2014-09-27 18:57:24.587189687 +0200
 Birth: -
```

removing

```
$ find . -xdev -inum 2379699 -delete
```

listing

```
$ touch é
$ ls
a7b a7b é x7y
$ ls | cat
a
a7b
é
x7y
$ f=$(ls)
$ od -c <<< "$f"
0000000 360 237 222 251 \n
0000020  X Y B Y \n
0000024
```

removing

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Info sources

- <http://lxr.free-electrons.com/source/fs/ext4/ext4.h>
- https://ext4.wiki.kernel.org/index.php/Ext4_Disk_Layout#Directory_Entries

man bash; man ls; man find