

Lab #6: Stat

Overview

The purpose of this lab is for you to retrieve from the filesystem information pertaining to specified files.

You will use portions of this lab in Assignment #4, so be sure to write code that can be reused.

stat

Write a simplified version of the `stat` utility available on some Unix distributions. This program should take any number of file names as command-line arguments and output information pertaining to each file as described below (you should use the `stat` system call).

The output from your program should look as follows:

```
File: 'Makefile'
Type: Regular File
Size: 214
Inode: 4702722
Links: 1
Access: -rw-----
```

The `stat` system call provides more information about a file, but this lab only requires the above. The format of each field follows:

- **File:** the name of the file being examined.
- **Type:** the type of file output as “Regular File”, “Directory”, “Character Device”, “Block Device”, “FIFO”, or “Symbolic Link”
- **Size:** the number of bytes in the file.
- **Inode:** the file’s inode.
- **Links:** the number of links to the file.
- **Access:** the access permissions for the file. This field is the most involved since the output string can take many forms. The first bit of the access permissions denotes the type (similar to the second field above). The valid characters for the first bit are:

```
b – Block special file.
c – Character special file.
d – Directory.
l – Symbolic link.
p – FIFO.
- – Regular file.
```

The remaining bits denote the read, write and execute permissions for the user, group, and others. For the read and write bits, if set, the bit is printed as ‘r’ for read or ‘w’ for write. If not set, then ‘-’ is printed.

The execute bit depends on whether the file is `setuid` (i.e., the `setuid` bit is set) or `setgid` (i.e., the `setgid` bit is set). It should be set as follows,

```
s – setuid bit is set and owner execute bit set
S – setuid bit is set and owner execute bit not set
s – setgid bit is set and group execute bit set
S – setgid bit is set and group execute bit not set
x – if none of the above applies and the execute bit is set
- – if none of the above applies
```