

Jesse Knuckles

I pledge my honor that I have abided by the Stevens Honor System.

5.1: The below image shows that multiple processes can write to the queue or read from the queue concurrently without interfering with each other. It also shows that if the message is longer than `scull_fifo_elemsz`, only `scull_fifo_elemsz` will be written to and read from the queue.

```
jknuckle@debian:~/jknuckle-pa5/src$ sudo insmod ../driver/scull.ko scull_fifo_size=10 scull_fifo_elemsz=3
[sudo] password for jknuckle:
jknuckle@debian:~/jknuckle-pa5/src$ ./producer p 2
Device (/dev/scull) opened
write: Jesse Knuckles
write: Jesse Knuckles
Device (/dev/scull) closed
jknuckle@debian:~/jknuckle-pa5/src$ ./consumer p 2
Device (/dev/scull) opened
read: Jes
read: Jes
Device (/dev/scull) closed
jknuckle@debian:~/jknuckle-pa5/src$ id
uid=1000(jknuckle) gid=1000(jknuckle) groups=1000(jknuckle),24(cdrom),25(floppy),27(sudo),29(audio),30(dip),44(video),46(plugdev),100(users),106(netdev),111(bluetooth),113(lpadmin),116(scanner)
jknuckle@debian:~/jknuckle-pa5/src$
```

5.2: The below image shows that multiple processes can write to the queue or read from the queue concurrently without interfering with each other. It also shows that if `scull_fifo_elemsz` is larger than the length of the written message, the whole message will be written to and read from the queue.

```
jknuckle@debian:~/jknuckle-pa5/src$ sudo insmod ../driver/scull.ko scull_fifo_size=10 scull_fifo_elemsz=30
jknuckle@debian:~/jknuckle-pa5/src$ ./producer p 2
Device (/dev/scull) opened
write: Jesse Knuckles
write: Jesse Knuckles
Device (/dev/scull) closed
jknuckle@debian:~/jknuckle-pa5/src$ ./consumer p 2
Device (/dev/scull) opened
read: Jesse Knuckles
read: Jesse Knuckles
Device (/dev/scull) closed
jknuckle@debian:~/jknuckle-pa5/src$ id
uid=1000(jknuckle) gid=1000(jknuckle) groups=1000(jknuckle),24(cdrom),25(floppy),27(sudo),29(audio),30(dip),44(video),46(plugdev),100(users),106(netdev),111(bluetooth),113(lpadmin),116(scanner)
jknuckle@debian:~/jknuckle-pa5/src$
```

5.3: The below image shows that multiple processes can write to the queue or read from the queue concurrently without interfering with each other. It also shows that if there are more messages written to the queue than there are spaces in the queue, which is denoted by `scull_fifo_size`, the driver will block when the queue is full. It also shows that the driver will block when the queue is empty, since both slots of the queue were read from, and then the process blocked.

```
jknuckle@debian:~/jknuckle-pa5/src$ sudo insmod ../driver/scull.ko scull_fifo_size=2 scull_fifo_elemsz=30
jknuckle@debian:~/jknuckle-pa5/src$ ./producer p 5
Device (/dev/scull) opened
write: Jesse Knuckles
write: Jesse Knuckles
write: Jesse Knuckles
write: Jesse Knuckles
write: Jesse Knuckles
^C
jknuckle@debian:~/jknuckle-pa5/src$ ./consumer p 5
Device (/dev/scull) opened
read: Jesse Knuckles
read: Jesse Knuckles
^C
jknuckle@debian:~/jknuckle-pa5/src$ id
uid=1000(jknuckle) gid=1000(jknuckle) groups=1000(jknuckle),24(cdrom),25(floppy),27(sudo),29(audio),30(dip),44(video),46(plugdev),100(users),106(netdev),111(blue
etooth),113(lpadmin),116(scanner)
jknuckle@debian:~/jknuckle-pa5/src$
```

5.4: The below image shows that multiple processes can write to the queue or read from the queue concurrently without interfering with each other. It also shows that when writing to the queue, a process that is reading from the queue is unblocked, and vice-versa. And that these processes can use the queue, even if there aren't enough spaces in the queue to hold all the messages, by taking turns freeing and blocking to let the write/read to the queue occur.

```
jknuckle@debian:~/jknuckle-pa5/src$ sudo insmod ../driver/scull.ko scull_fifo_size=2 scull_fifo_elemsz=30
jknuckle@debian:~/jknuckle-pa5/src$ ./producer p 5
Device (/dev/scull) opened
write: Jesse Knuckles
write: Jesse Knuckles
write: Jesse Knuckles
write: Jesse Knuckles
write: Jesse Knuckles
Device (/dev/scull) closed
jknuckle@debian:~/jknuckle-pa5/src$
jknuckle@debian:~/jknuckle-pa5/src$ ./consumer p 5
Device (/dev/scull) opened
read: Jesse Knuckles
read: Jesse Knuckles
read: Jesse Knuckles
read: Jesse Knuckles
read: Jesse Knuckles
Device (/dev/scull) closed
jknuckle@debian:~/jknuckle-pa5/src$ id
uid=1000(jknuckle) gid=1000(jknuckle) groups=1000(jknuckle),24(cdrom),25(floppy),27(sudo),29(audio),30(dip),44(video),46(plugdev),100(users),106(netdev),111(blue
etooth),113(lpadmin),116(scanner)
jknuckle@debian:~/jknuckle-pa5/src$
```

6,633,6236789251,-;scull: FIFO SIZE=2, ELEMZ=30
da6,634,6249834624,-;scull open
jkr6,635,6249837873,-;scull write
da6,636,6249839228,-;scull write
jkr6,637,6261905507,-;scull open
da6,638,6261908594,-;scull read
6,639,6261909044,-;scull write
6,640,6261909138,-;scull read
6,641,6261909403,-;scull write
6,642,6261910409,-;scull read
6,643,6261910620,-;scull write
6,644,6261911647,-;scull read
6,645,6261912058,-;scull read
6,646,6261912378,-;scull close
6,647,6261913964,-;scull close

"jknuckle-pa5" selected