

OS HW1 Programming projects

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分工: $\frac{1}{3}$ for each

Environment

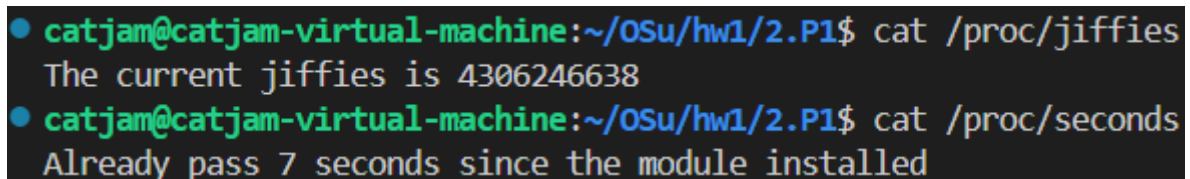
- OS: Ubuntu 22.04
- Kernel: 6.5.0-26-generic
- Compiler: gcc 12.3.9

Ch2 project 1

Commands

```
cd 2.P1
make
make install # for install module
cat /proc/jiffies
cat /proc/seconds
make remove # for remove module
make clean
```

Result image



```
• catjam@catjam-virtual-machine:~/OSu/hw1/2.P1$ cat /proc/jiffies
The current jiffies is 4306246638
• catjam@catjam-virtual-machine:~/OSu/hw1/2.P1$ cat /proc/seconds
Already pass 7 seconds since the module installed
```

Figure 1: The result for cat /proc/jiffies and cat /proc/seconds

Ch3 project 1

Commands

```
gcc 3.P1/osh.c -o osh
./osh
ls -l > out.txt
sort < out.txt
cat in.txt | sort -h --parallel=4
!!
rm out.txt
exit
```

Result image

```

catjam@catjam-virtual-machine:~/OSu/hw1$ ./osh
osh> ls -l > out.txt
osh> sort < out.txt
drwxrwxr-x 2 catjam catjam 4096 == 20 16:32 3.P3
drwxrwxr-x 2 catjam catjam 4096 == 21 00:36 3.P2
drwxrwxr-x 2 catjam catjam 4096 == 22 01:12 3.19
drwxrwxr-x 2 catjam catjam 4096 == 22 01:23 3.21
drwxrwxr-x 2 catjam catjam 4096 == 22 01:27 2.24
drwxrwxr-x 2 catjam catjam 4096 == 22 01:55 3.P1
drwxrwxr-x 2 catjam catjam 4096 == 22 02:01 3.27
drwxrwxr-x 2 catjam catjam 4096 == 22 23:24 2.P1
drwxrwxr-x 4 catjam catjam 4096 == 21 02:03 3.P4
-rw-r--r-- 1 catjam catjam 1001 == 22 23:28 out.txt
-rw-r--r-- 1 catjam catjam 5294520 == 17 16:20 cat.gif
-rw-rw-r-- 1 catjam catjam 1171910 == 22 23:31 project_docs.pdf
-rw-rw-r-- 1 catjam catjam 1377365 == 22 02:07 problem_docs.pdf
-rw-rw-r-- 1 catjam catjam 1651 == 22 02:07 problem_docs.typ
-rw-rw-r-- 1 catjam catjam 41 == 19 10:05 in.txt
-rw-rw-r-- 1 catjam catjam 737 == 22 23:31 project_docs.typ
-rwxrwxr-x 1 catjam catjam 16816 == 22 23:25 osh
total 7740
osh> cat in.txt | sort -h --parallel=4
April
2e-4
3.13
344
34213
45K
98K
12M
1G
osh> !!
April
2e-4
3.13
344
34213
45K
98K
12M
1G
osh> rm out.txt
osh> exit

```

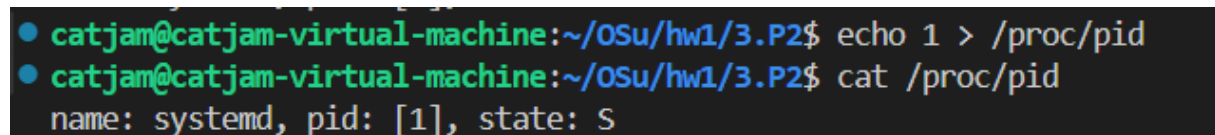
Figure 2: The result for `ls -l > out.txt`, `sort < out.txt`, `cat in.txt | sort -h --parallel=4`, `!!`, `rm out.txt`, `exit`

Ch3 project 2

Commands

```
cd 3.P2
make
make install # install module
echo 1 > /proc/pid
cat /proc/pid
make remove # remove module
```

Result image



```
catjam@catjam-virtual-machine:~/OSu/hw1/3.P2$ echo 1 > /proc/pid
catjam@catjam-virtual-machine:~/OSu/hw1/3.P2$ cat /proc/pid
name: systemd, pid: [1], state: S
```

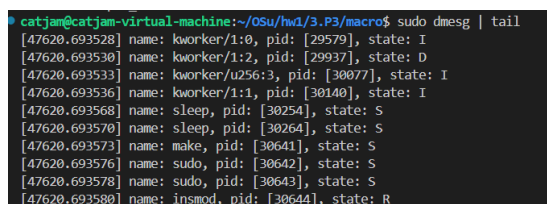
Figure 3: The result for `echo 1 > /proc/pid` and `cat /proc/pid`

Ch3 project 3

Commands

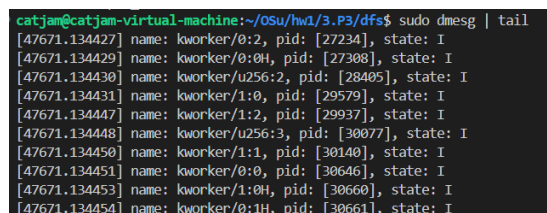
```
cd 3.P3/macro
make
make install
sudo dmesg | tail
make remove
cd ../dfs
make
make install
sudo dmesg | tail
make remove
```

Result image



```
catjam@catjam-virtual-machine:~/OSu/hw1/3.P3/macro$ sudo dmesg | tail
[47620.693528] name: kworker/1:0, pid: [29579], state: I
[47620.693530] name: kworker/1:2, pid: [29937], state: D
[47620.693533] name: kworker/u256:3, pid: [30077], state: I
[47620.693536] name: kworker/1:1, pid: [30140], state: I
[47620.693568] name: sleep, pid: [30254], state: S
[47620.693570] name: sleep, pid: [30264], state: S
[47620.693573] name: make, pid: [30641], state: S
[47620.693576] name: sudo, pid: [30642], state: S
[47620.693578] name: sudo, pid: [30643], state: S
[47620.693580] name: insmod, pid: [30644], state: R
```

Figure 4: The result for `sudo dmesg | tail` after `make install` and `make remove` in 3.P3/macro



```
catjam@catjam-virtual-machine:~/OSu/hw1/3.P3/dfs$ sudo dmesg | tail
[47671.134427] name: kworker/0:2, pid: [27234], state: I
[47671.134429] name: kworker/0:0H, pid: [27308], state: I
[47671.134430] name: kworker/u256:2, pid: [28405], state: I
[47671.134431] name: kworker/1:0, pid: [29579], state: I
[47671.134447] name: kworker/1:2, pid: [29937], state: I
[47671.134448] name: kworker/u256:3, pid: [30077], state: I
[47671.134450] name: kworker/1:1, pid: [30140], state: I
[47671.134451] name: kworker/0:0, pid: [30646], state: I
[47671.134453] name: kworker/1:0H, pid: [30660], state: I
[47671.134454] name: kworker/0:1H, pid: [30661], state: I
```

Figure 5: The result for `sudo dmesg | tail` after `make install` and `make remove` in 3.P3/dfs

Ch3 project 4

Commands

```
cd 3.P4/1
make
make install
sudo dmesg | tail
make remove
cd ../2
make
sudo insmod ./collatz.ko start=40
```

```
sudo dmesg | tail
sudo rmmod collatz
```

Result image

```
catjam@catjam-virtual-machine:~/OSu/hw1/3.P4/1$ sudo dmesg | tail
[47671.134447] name: kworker/1:2, pid: [29937], state: I
[47671.134448] name: kworker/u256:3, pid: [30077], state: I
[47671.134450] name: kworker/1:1, pid: [30140], state: I
[47671.134451] name: kworker/0:0, pid: [30646], state: I
[47671.134453] name: kworker/1:0H, pid: [30660], state: I
[47671.134454] name: kworker/0:1H, pid: [30661], state: I
[48186.024064] red: 138, green: 226, blue: 43
[48186.024103] red: 0, green: 123, blue: 167
[48186.024105] red: 128, green: 24, blue: 24
[48186.024107] red: 75, green: 0, blue: 130
```

Figure 6: The result for `sudo dmesg | tail` after `make install` and `make remove` in 3.P4/1

```
catjam@catjam-virtual-machine:~/OSu/hw1/3.P4/2$ sudo dmesg | tail
[48495.275734] collatz module removed
[48501.431342] value: 40
[48501.431351] value: 20
[48501.431352] value: 10
[48501.431353] value: 5
[48501.431355] value: 16
[48501.431356] value: 8
[48501.431357] value: 4
[48501.431357] value: 2
[48501.431358] value: 1
```

Figure 7: The result for `sudo dmesg | tail` after `sudo insmod ./collatz.ko start=40` and `sudo rmmod collatz` in 3.P4/2