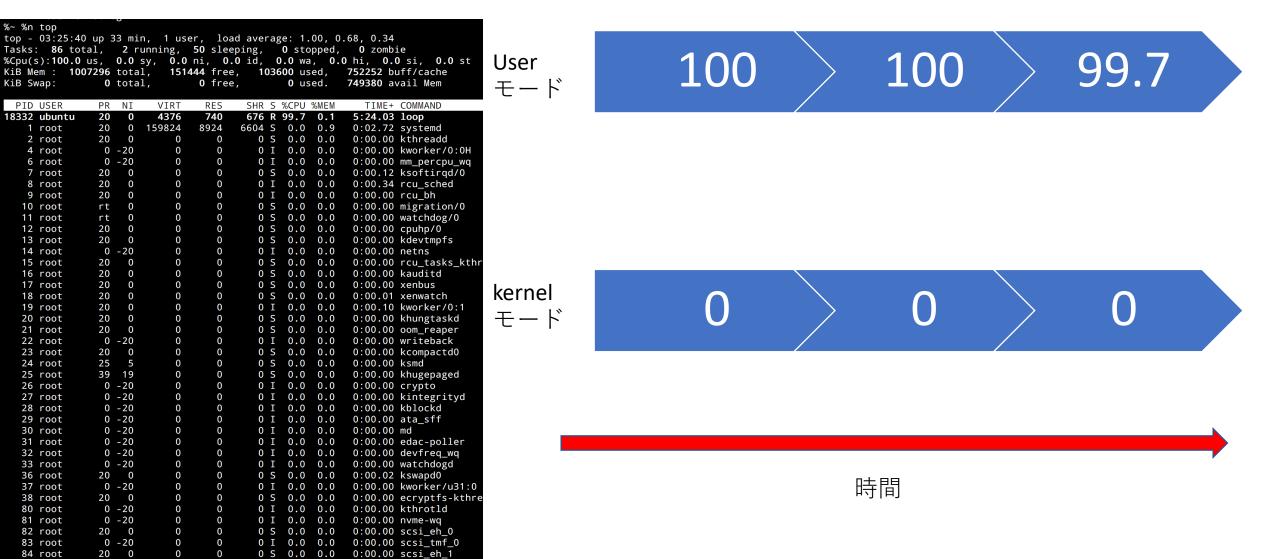# 課題 1

```
execve("./hello", ["./hello"], 0x7ffe513f3390 /* 24 vars */) = 0
brk(NULL)                               = 0x55fd8e33d000
access("/etc/ld.so.nohwcap", F_OK)      = -1 ENOENT (No such file or directory)
access("/etc/ld.so.preload", R_OK)      = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
fstat(3, {st_mode=S_IFREG|0644, st_size=25576, ...}) = 0
mmap(NULL, 25576, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7f5d2859c000
close(3)                                = 0
access("/etc/ld.so.nohwcap", F_OK)      = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\260\34\2\0\0\0\0\0"..., 832) = 832
fstat(3, {st_mode=S_IFREG|0755, st_size=2030544, ...}) = 0
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7f5d2859a000
mmap(NULL, 4131552, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7f5d27f8b000
mprotect(0x7f5d28172000, 2097152, PROT_NONE) = 0
mmap(0x7f5d28372000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1e7000) = 0x7f5d28372000
mmap(0x7f5d28378000, 15072, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f5d28378000
close(3)                                = 0
arch_prctl(ARCH_SET_FS, 0x7f5d2859b4c0) = 0
mprotect(0x7f5d28372000, 16384, PROT_READ) = 0
mprotect(0x55fd8c363000, 4096, PROT_READ) = 0
mprotect(0x7f5d285a3000, 4096, PROT_READ) = 0
munmap(0x7f5d2859c000, 25576)           = 0
fstat(1, {st_mode=S_IFCHR|0620, st_rdev=makedev(136, 0), ...}) = 0
brk(NULL)                               = 0x55fd8e33d000
brk(0x55fd8e35e000)                     = 0x55fd8e35e000
write(1, "hello world\n", 12)           = 12
exit_group(0)                           = ?
+++ exited with 0 +++
~
```

課題 2

```
%~ %n top
top - 03:25:40 up 33 min,  1 user,  load average: 1.00, 0.68, 0.34
Tasks:  86 total,   2 running,  50 sleeping,   0 stopped,   0 zombie
%Cpu(s):100.0 us,  0.0 sy,  0.0 ni,  0.0 id,  0.0 wa,  0.0 hi,  0.0 si,  0.0 st
KiB Mem :  1007296 total,   151444 free,   103600 used,   752252 buff/cache
KiB Swap:        0 total,        0 free,        0 used.   749380 avail Mem

  PID USER      PR  NI    VIRT    RES    SHR S %CPU %MEM    TIME+ COMMAND
18332 ubuntu    20   0    4376    740    676 R 99.7  0.1  5:24.03 loop
    1 root      20   0  159824   8924   6604 S  0.0  0.9  0:02.72 systemd
    2 root      20   0       0      0      0 S  0.0  0.0  0:00.00 kthreadd
    4 root       0 -20       0      0      0 I  0.0  0.0  0:00.00 kworker/0:0H
    6 root       0 -20       0      0      0 I  0.0  0.0  0:00.00 mm_percpu_wq
    7 root      20   0       0      0      0 S  0.0  0.0  0:00.12 ksoftirqd/0
    8 root      20   0       0      0      0 I  0.0  0.0  0:00.34 rcu_sched
    9 root      20   0       0      0      0 I  0.0  0.0  0:00.00 rcu_bh
   10 root      rt   0       0      0      0 S  0.0  0.0  0:00.00 migration/0
   11 root      rt   0       0      0      0 S  0.0  0.0  0:00.00 watchdog/0
   12 root      20   0       0      0      0 S  0.0  0.0  0:00.00 cpuhp/0
   13 root      20   0       0      0      0 S  0.0  0.0  0:00.00 kdevtmpfs
   14 root       0 -20       0      0      0 I  0.0  0.0  0:00.00 netns
   15 root      20   0       0      0      0 S  0.0  0.0  0:00.00 rcu_tasks_kthr
   16 root      20   0       0      0      0 S  0.0  0.0  0:00.00 kauditd
   17 root      20   0       0      0      0 S  0.0  0.0  0:00.00 xenbus
   18 root      20   0       0      0      0 S  0.0  0.0  0:00.01 xenwatch
   19 root      20   0       0      0      0 I  0.0  0.0  0:00.10 kworker/0:1
   20 root      20   0       0      0      0 S  0.0  0.0  0:00.00 khungtaskd
   21 root      20   0       0      0      0 S  0.0  0.0  0:00.00 oom_reaper
   22 root       0 -20       0      0      0 I  0.0  0.0  0:00.00 writeback
   23 root      20   0       0      0      0 S  0.0  0.0  0:00.00 kcompactd0
   24 root      25   5       0      0      0 S  0.0  0.0  0:00.00 ksmd
   25 root      39  19       0      0      0 S  0.0  0.0  0:00.00 khugepaged
   26 root       0 -20       0      0      0 I  0.0  0.0  0:00.00 crypto
   27 root       0 -20       0      0      0 I  0.0  0.0  0:00.00 kintegrityd
   28 root       0 -20       0      0      0 I  0.0  0.0  0:00.00 kblockd
   29 root       0 -20       0      0      0 I  0.0  0.0  0:00.00 ata_sff
   30 root       0 -20       0      0      0 I  0.0  0.0  0:00.00 md
   31 root       0 -20       0      0      0 I  0.0  0.0  0:00.00 edac-poller
   32 root       0 -20       0      0      0 I  0.0  0.0  0:00.00 devfreq_wq
   33 root       0 -20       0      0      0 I  0.0  0.0  0:00.00 watchdogd
   36 root      20   0       0      0      0 S  0.0  0.0  0:00.02 kswapd0
   37 root       0 -20       0      0      0 I  0.0  0.0  0:00.00 kworker/u31:0
   38 root      20   0       0      0      0 S  0.0  0.0  0:00.00 ecryptfs-kthre
   80 root       0 -20       0      0      0 I  0.0  0.0  0:00.00 kthrotld
   81 root       0 -20       0      0      0 I  0.0  0.0  0:00.00 nvme-wq
   82 root      20   0       0      0      0 S  0.0  0.0  0:00.00 scsi_eh_0
   83 root       0 -20       0      0      0 I  0.0  0.0  0:00.00 scsi_tmf_0
   84 root      20   0       0      0      0 S  0.0  0.0  0:00.00 scsi_eh_1
```

User
モード： 100 → 100 → 99.7

kernel
モード： 0 → 0 → 0

時間

課題３

```
top - 03:43:11 up 51 min,  1 user,  load average: 0.95, 0.39, 0.29
Tasks:  86 total,   2 running,  50 sleeping,   0 stopped,   0 zombie
%Cpu(s): 70.2 us, 29.8 sy,  0.0 ni,  0.0 id,  0.0 wa,  0.0 hi,  0.0 si,  0.0 st
KiB Mem :  1007296 total,   151476 free,   103396 used,   752424 buff/cache
KiB Swap:        0 total,        0 free,        0 used.   749592 avail Mem

  PID USER      PR  NI    VIRT    RES    SHR S %CPU %MEM     TIME+ COMMAND
18439 ubuntu    20   0    4376    796    732 R 99.9  0.1   1:59.26 ppidloop
    1 root      20   0  159824   8924   6604 S  0.0  0.9   0:02.73 systemd
    2 root      20   0       0      0      0 S  0.0  0.0   0:00.00 kthreadd
    4 root       0 -20       0      0      0 I  0.0  0.0   0:00.00 kworker/0:0H
    6 root       0 -20       0      0      0 I  0.0  0.0   0:00.00 mm_percpu_wq
    7 root      20   0       0      0      0 S  0.0  0.0   0:00.13 ksoftirqd/0
    8 root      20   0       0      0      0 I  0.0  0.0   0:00.35 rcu_sched
    9 root      20   0       0      0      0 I  0.0  0.0   0:00.00 rcu_bh
   10 root      rt   0       0      0      0 S  0.0  0.0   0:00.00 migration/0
   11 root      rt   0       0      0      0 S  0.0  0.0   0:00.00 watchdog/0
   12 root      20   0       0      0      0 S  0.0  0.0   0:00.00 cpuhp/0
   13 root      20   0       0      0      0 S  0.0  0.0   0:00.00 kdevtmpfs
   14 root       0 -20       0      0      0 I  0.0  0.0   0:00.00 netns
   15 root      20   0       0      0      0 S  0.0  0.0   0:00.00 rcu_tasks_kthr
   16 root      20   0       0      0      0 S  0.0  0.0   0:00.00 kauditd
   17 root      20   0       0      0      0 S  0.0  0.0   0:00.00 xenbus
   18 root      20   0       0      0      0 S  0.0  0.0   0:00.01 xenwatch
   19 root      20   0       0      0      0 I  0.0  0.0   0:00.10 kworker/0:1
   20 root      20   0       0      0      0 S  0.0  0.0   0:00.00 khungtaskd
   21 root      20   0       0      0      0 S  0.0  0.0   0:00.00 oom_reaper
   22 root       0 -20       0      0      0 I  0.0  0.0   0:00.00 writeback
   23 root      20   0       0      0      0 S  0.0  0.0   0:00.00 kcompactd0
   24 root      25   5       0      0      0 S  0.0  0.0   0:00.00 ksmd
   25 root      39  19       0      0      0 S  0.0  0.0   0:00.00 khugepaged
   26 root       0 -20       0      0      0 I  0.0  0.0   0:00.00 crypto
   27 root       0 -20       0      0      0 I  0.0  0.0   0:00.00 kintegrityd
   28 root       0 -20       0      0      0 I  0.0  0.0   0:00.00 kblockd
   29 root       0 -20       0      0      0 I  0.0  0.0   0:00.00 ata_sff
   30 root       0 -20       0      0      0 I  0.0  0.0   0:00.00 md
   31 root       0 -20       0      0      0 I  0.0  0.0   0:00.00 edac-poller
   32 root       0 -20       0      0      0 I  0.0  0.0   0:00.00 devfreq_wq
   33 root       0 -20       0      0      0 I  0.0  0.0   0:00.00 watchdogd
   36 root      20   0       0      0      0 S  0.0  0.0   0:00.02 kswapd0
   37 root       0 -20       0      0      0 I  0.0  0.0   0:00.00 kworker/u31:0
   38 root      20   0       0      0      0 S  0.0  0.0   0:00.00 ecryptfs-kthre
   80 root       0 -20       0      0      0 I  0.0  0.0   0:00.00 kthrotld
   81 root       0 -20       0      0      0 I  0.0  0.0   0:00.00 nvme-wq
   82 root      20   0       0      0      0 S  0.0  0.0   0:00.00 scsi_eh_0
   83 root       0 -20       0      0      0 I  0.0  0.0   0:00.00 scsi_tmf_0
   84 root      20   0       0      0      0 S  0.0  0.0   0:00.00 scsi_eh_1
```

User モード： 68.8 → 69.4 → 70.7

kernel モード： 31.2 → 30.6 → 29.3

時間