Exercise 1.1

```
cylee@workbench:~$ ps -f -u cylee
UID        PID  PPID  C STIME TTY         TIME CMD
cylee    45451     1  0 14:53 ?       00:00:00 /lib/systemd/systemd --user
cylee    45452 45451  0 14:53 ?       00:00:00 (sd-pam)
cylee    45541 45302  0 14:53 ?       00:00:00 sshd: cylee@pts/18
cylee    45542 45541  0 14:53 pts/18  00:00:00 -bash
cylee    52338 45542  0 15:06 pts/18  00:00:00 ps -f -u cylee
```

Exercise 1.2

```
cylee@workbench:~$ free -s 2 -c 5 -g
              total        used        free      shared  buff/cache   available
Mem:            376           0         375           0           0         376
Swap:             0           0           0

              total        used        free      shared  buff/cache   available
Mem:            376           0         375           0           0         376
Swap:             0           0           0

              total        used        free      shared  buff/cache   available
Mem:            376           0         375           0           0         376
Swap:             0           0           0

              total        used        free      shared  buff/cache   available
Mem:            376           0         375           0           0         376
Swap:             0           0           0

              total        used        free      shared  buff/cache   available
Mem:            376           0         375           0           0         376
Swap:             0           0           0
```

Swap memory is used when the physical memory is full. It moves the data from the physical memory to the virtual memory which is on hard disk. The process of moving data between physical memory and virtual memory is called swapping.

Exercise 4

```
Reading symbols from a.out...
Reading symbols from /Users/raylee/Desktop/a.out.dSYM/Contents/Resources/DWARF/a
.out...
(gdb) b 3
Breakpoint 1 at 0x100003f10: file gdb_exercise.c, line 3.
(gdb) r
Starting program: /Users/raylee/Desktop/a.out
[New Thread 0x2703 of process 2839]
[New Thread 0x2503 of process 2839]
warning: unhandled dyld version (16)

Thread 2 hit Breakpoint 1, func1 (a=9) at gdb_exercise.c:3
3           return tmp;
(gdb) backtrace
#0  func1 (a=9) at gdb_exercise.c:3
#1  0x0000000100003f3c in func2 (a=3, b=3) at gdb_exercise.c:7
#2  0x0000000100003f71 in func3 (a=1, b=2, c=3) at gdb_exercise.c:11
#3  0x0000000100003fa3 in main () at gdb_exercise.c:15
(gdb) p tmp
$1 = 18
```