

Question 1: How many CPUs is contained on this machine?  
Use command `lscpu`, this shows the PC has 4 CPUs

```
shancoo ~ shan@backgarden:~ -- ssh shan@caoshan278251191.ddns.net -- 149x39
+ ~
+ ~ lscpu
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Address sizes:         39 bits physical, 48 bits virtual
Byte Order:            Little Endian
CPU(s):                4
On-line CPU(s) list:   0-3
Vendor ID:             GenuineIntel
Model name:            Intel(R) Core(TM) i5-6300U CPU @ 2.40GHz
CPU family:            6
Model:                 78
Thread(s) per core:    2
Core(s) per socket:    2
Socket(s):             1
Stepping:              3
CPU max MHz:           2400.0000
CPU min MHz:           400.0000
BogoMIPS:              4999.90
Flags:                 fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe sysca
ll nx pdpe1gb rdtscp lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfmperf pni pclmu
lqdq dtes64 monitor ds_cpl smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_time
r aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb invpcid_single pti ssbd ibrs ibpb stibp fsgsbase tsc_ad
just bmi1 avx2 smep bmi2 erms invpcid mpx rdseed adx smap clflushopt intel_pt xsaveopt xsavec xgetbv1 xsaves dtherm arat pln
pts hwp hwp_notify hwp_act_window hwp_epp md_clear flush_l1d arch_capabilities

Caches (sum of all):
L1d:                   64 KiB (2 instances)
L1i:                   64 KiB (2 instances)
L2:                    512 KiB (2 instances)
L3:                    3 MiB (1 instance)
NUMA:
NUMA node(s):          1
NUMA node0 CPU(s):     0-3
Vulnerabilities:
Itlb multihit:         KVM: Mitigation: VMX unsupported
L1tf:                  Mitigation; PTE Inversion
Mds:                   Mitigation; Clear CPU buffers; SMT vulnerable
Meltdown:              Mitigation; PTI
Mmio stale data:       Mitigation; Clear CPU buffers; SMT vulnerable
```

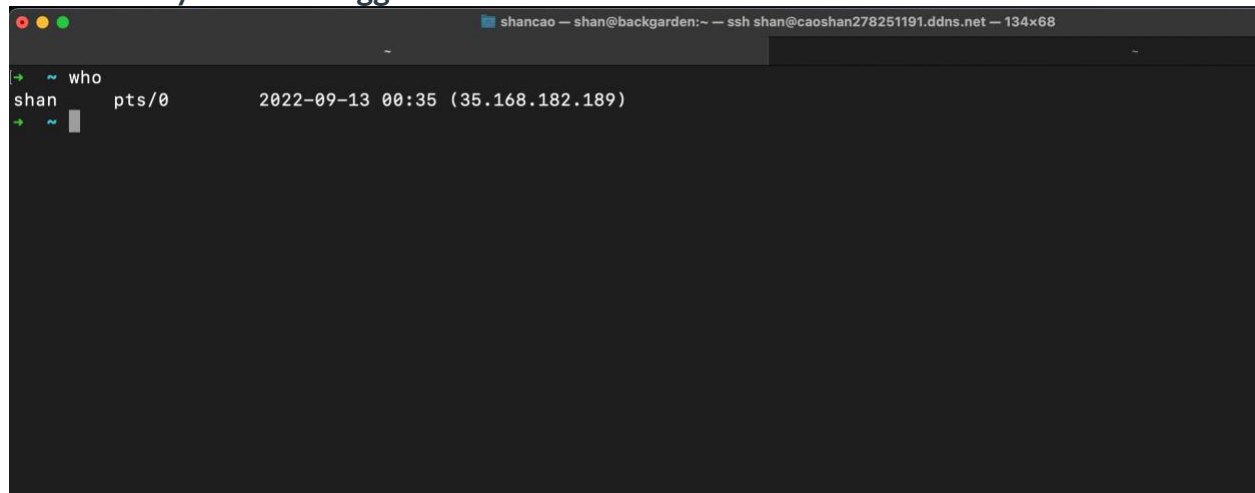
Question 2: What type of CPU is in this machine. How many physical cores are available on the machine?

**This CPU has Intel(R) Core (TM) i5-6300U CPU @ 2.40GH processor.**

**There are 4 physic cores on this machine**

Question 3: Using 'who', determine how many users are logged onto the machine?

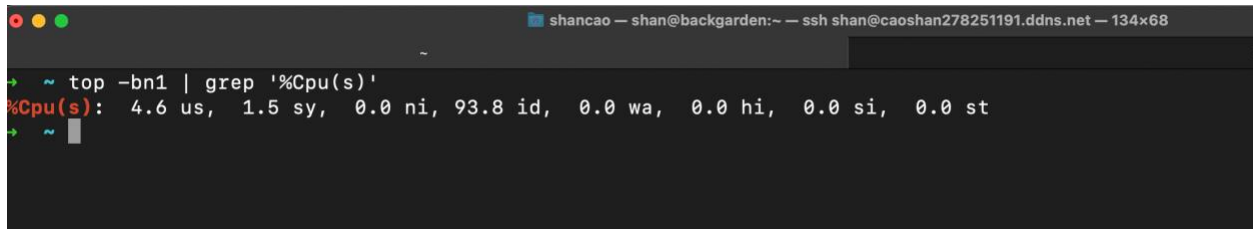
**There is only one user logged on this machine.**



```
shancao — shan@backgarden:~ — ssh shan@caoshan278251191.ddns.net — 134x68
→ ~ who
shan pts/0      2022-09-13 00:35 (35.168.182.189)
→ ~
```

Question 4: Using 'top', determine how much idle time is available on the machine.

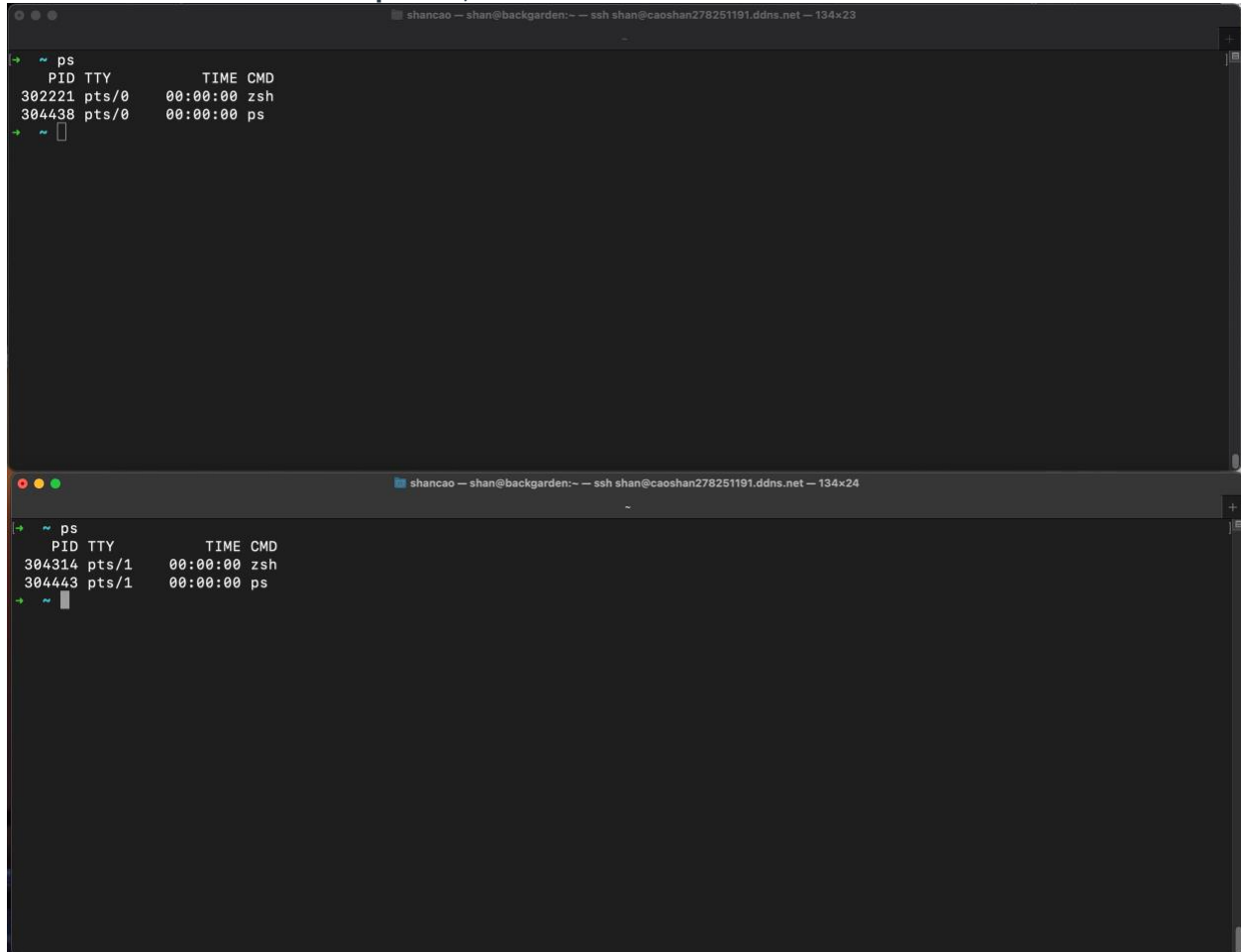
The top command will keep monitoring the status of the Linux, by the time that I grep the system CPU idle time, it is 93.8% idle.

A terminal window with a dark background. The title bar shows 'shancao — shan@backgarden:~ — ssh shan@caoshan278251191.ddns.net — 134x68'. The terminal shows a command prompt '~' followed by the command 'top -bn1 | grep '%Cpu(s)'' which has been executed. The output is '%Cpu(s): 4.6 us, 1.5 sy, 0.0 ni, 93.8 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st'. A second prompt '~' is visible on the next line.

```
shancao — shan@backgarden:~ — ssh shan@caoshan278251191.ddns.net — 134x68
~
→ ~ top -bn1 | grep '%Cpu(s)'
%Cpu(s): 4.6 us, 1.5 sy, 0.0 ni, 93.8 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
→ ~
```

Question 5: Open multiple bash windows (or terminals) and report their process IDs using "ps" command.

I have two bash window opened, the PID are 302221 and 304314



The image shows two terminal windows stacked vertically. Both windows have a title bar indicating they are SSH sessions to 'caoshan278251191.ddns.net'. The top window's title bar shows the user 'shancao' and the dimensions '134x23'. The bottom window's title bar shows the same user and dimensions '134x24'. Both windows have executed the 'ps' command, displaying a table of running processes.

Top Terminal Window Output:

```
~ ps
  PID TTY          TIME CMD
 302221 pts/0    00:00:00 zsh
 304438 pts/0    00:00:00 ps
```

Bottom Terminal Window Output:

```
~ ps
  PID TTY          TIME CMD
 304314 pts/1    00:00:00 zsh
 304443 pts/1    00:00:00 ps
```

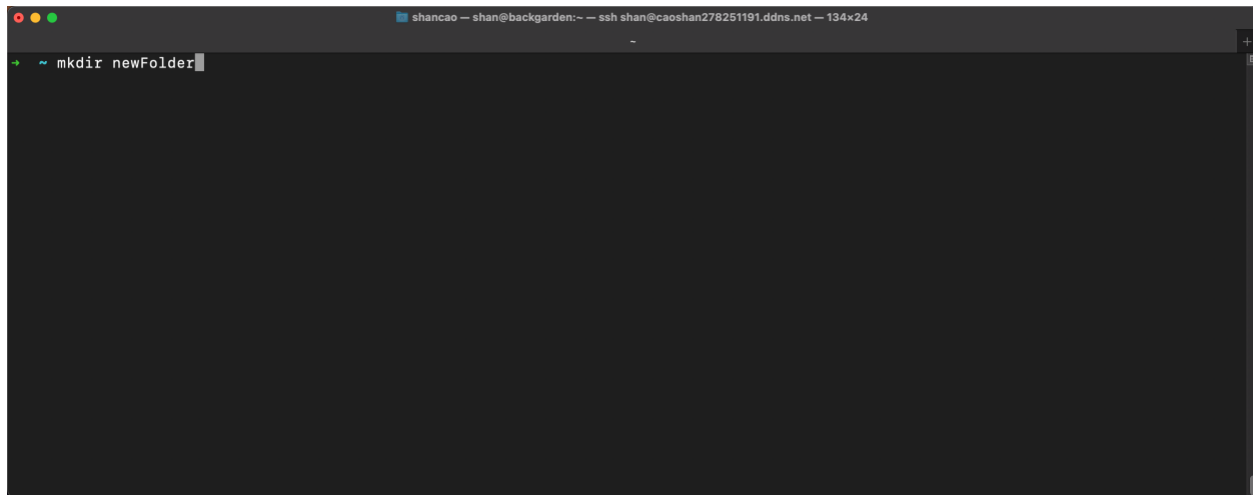
Question 6: Assume that the current umask for a temporary file is set to 002. How would you change the mask to something else, say 754?

```
shancoo — shan@backgarden:~ — ssh shan@caoshan278251191.ddns.net — 134x24
→ ~ umask -S
u=rwx,g=rwx,o=rx
→ ~ umask
002
→ ~ umask 754
→ ~ umask
0754
→ ~
```

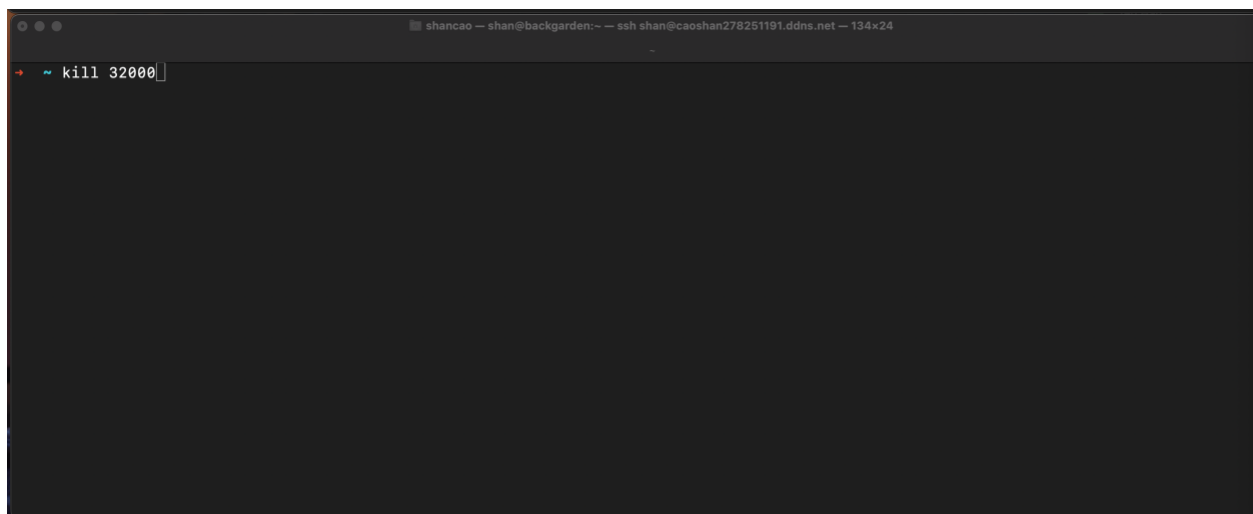
Question 7: Find four other linux Shell commands/System Programs not listed on the above link. Use 'man' command to find more details for each and provide an example for how to use them. Example: mkdir, kill, ls, cd, cal, cat, compress, date, diff, eval, find, mail, etc.

I use man command to check the manual of the following command mkdir kill vimdiff and tar

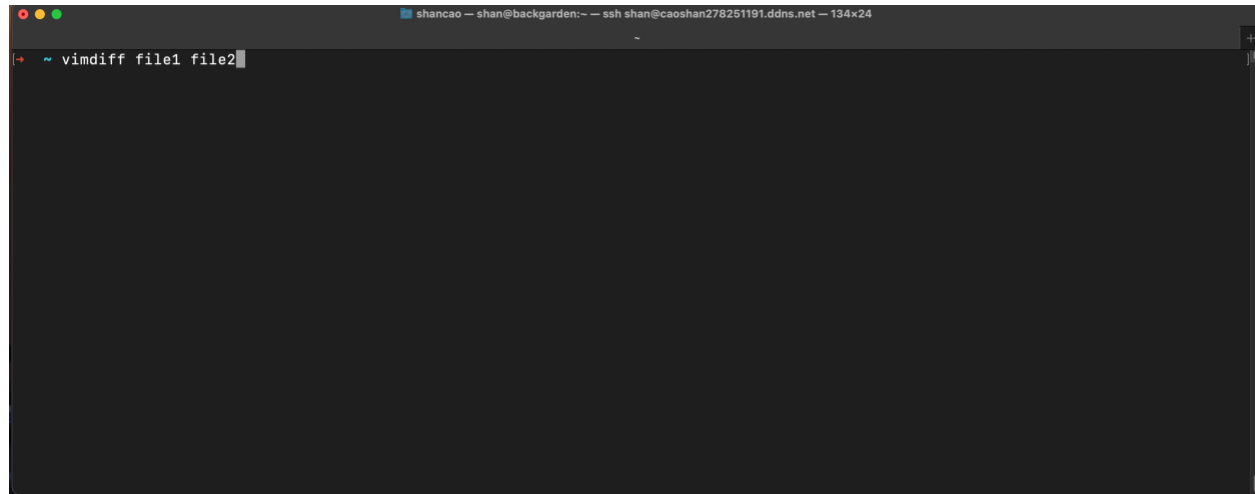
Use mkdir to create a new folder.

A terminal window with a dark background. The title bar shows 'shancao — shan@backgarden:~ — ssh shan@caoshan278251191.ddns.net — 134x24'. The prompt is '~ ' and the command 'mkdir newFolder' is entered, with the cursor at the end of the command.

Use Kill command to kill a process, the 32000 is a process ID that was taken from the top command

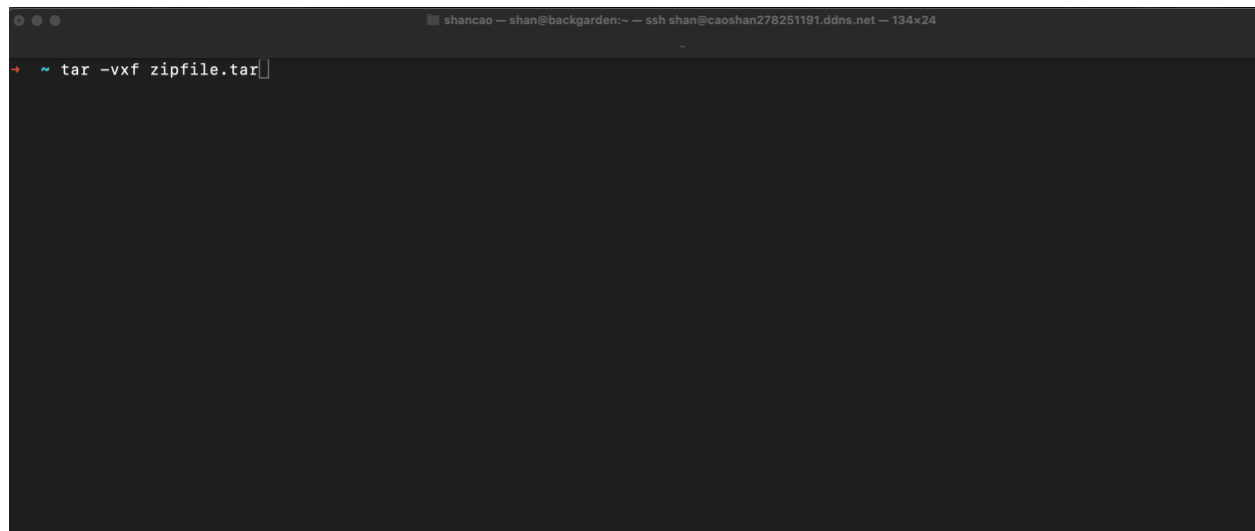
A terminal window with a dark background. The title bar shows 'shancao — shan@backgarden:~ — ssh shan@caoshan278251191.ddns.net — 134x24'. The prompt is '~ ' and the command 'kill 32000' is entered, with the cursor at the end of the command.

## Use vimdiff to find the difference between file1 and file2

A terminal window with a dark background. The title bar shows 'shancao - shan@backgarden:~ - ssh shan@caoshan278251191.ddns.net - 134x24'. The command prompt shows '~ vimdiff file1 file2' with a cursor at the end of the line.

```
shancao - shan@backgarden:~ - ssh shan@caoshan278251191.ddns.net - 134x24
~ vimdiff file1 file2
```

## Use tar extract a tarball file

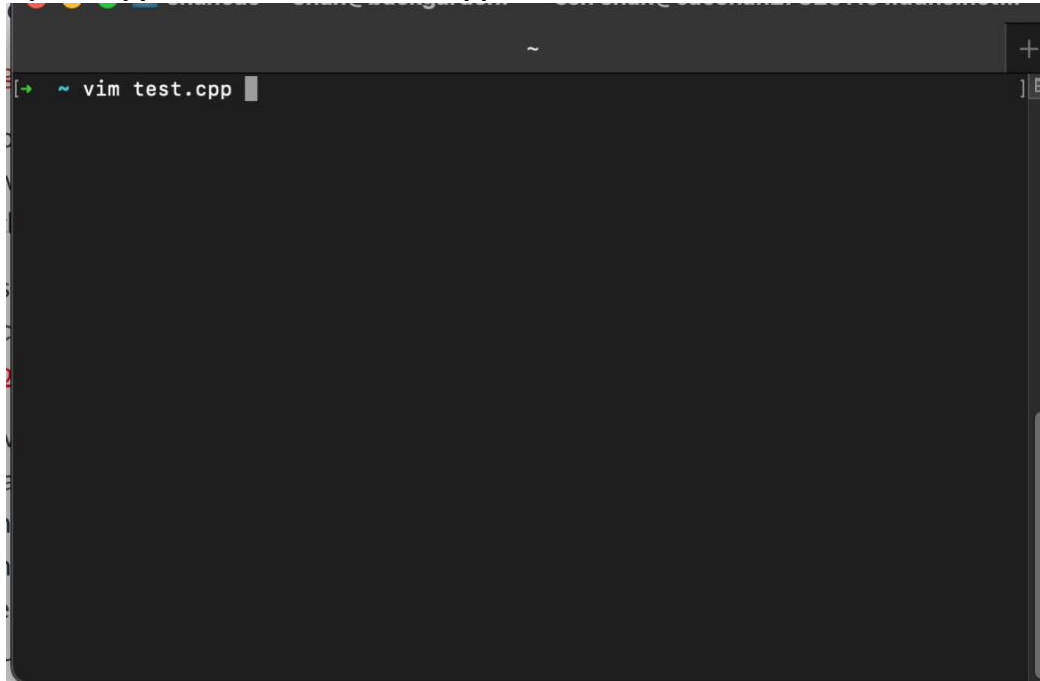
A terminal window with a dark background. The title bar shows 'shancao - shan@backgarden:~ - ssh shan@caoshan278251191.ddns.net - 134x24'. The command prompt shows '~ tar -vxf zipfile.tar' with a cursor at the end of the line.

```
shancao - shan@backgarden:~ - ssh shan@caoshan278251191.ddns.net - 134x24
~ tar -vxf zipfile.tar
```



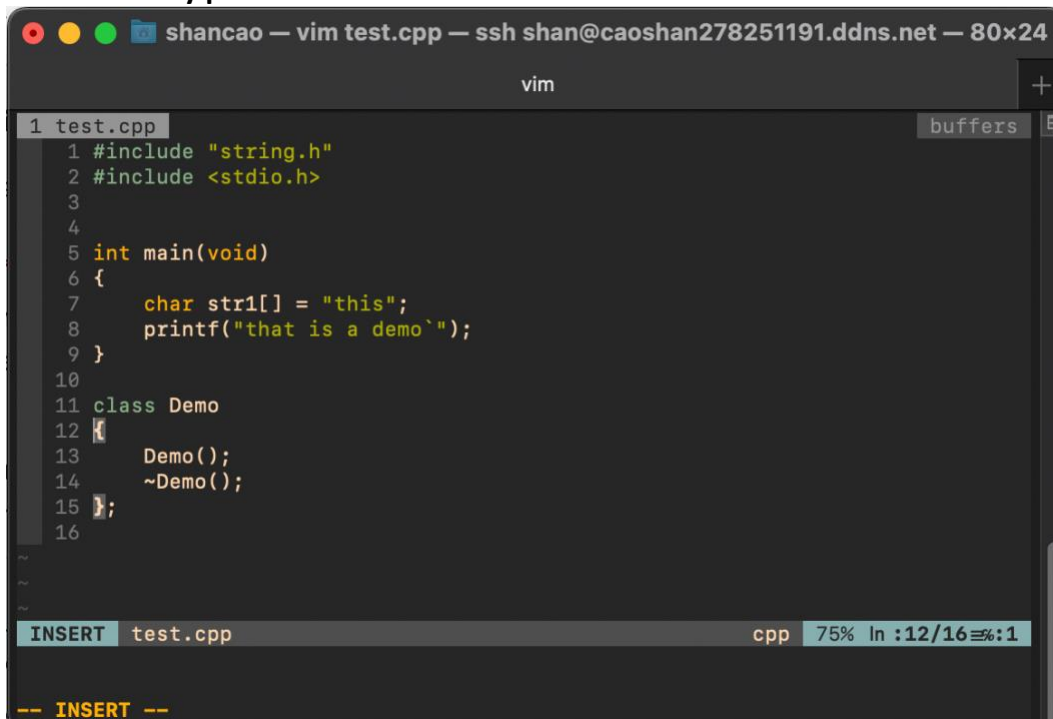
Question 8: Choose any editor from Emacs, vim, or vi. Show at least 4 commands or options (e.g., to open, edit, save, close, a file) with these editors. No other editor allowed!

**Open a cpp source file name test.cpp**



```
[~] vim test.cpp
```

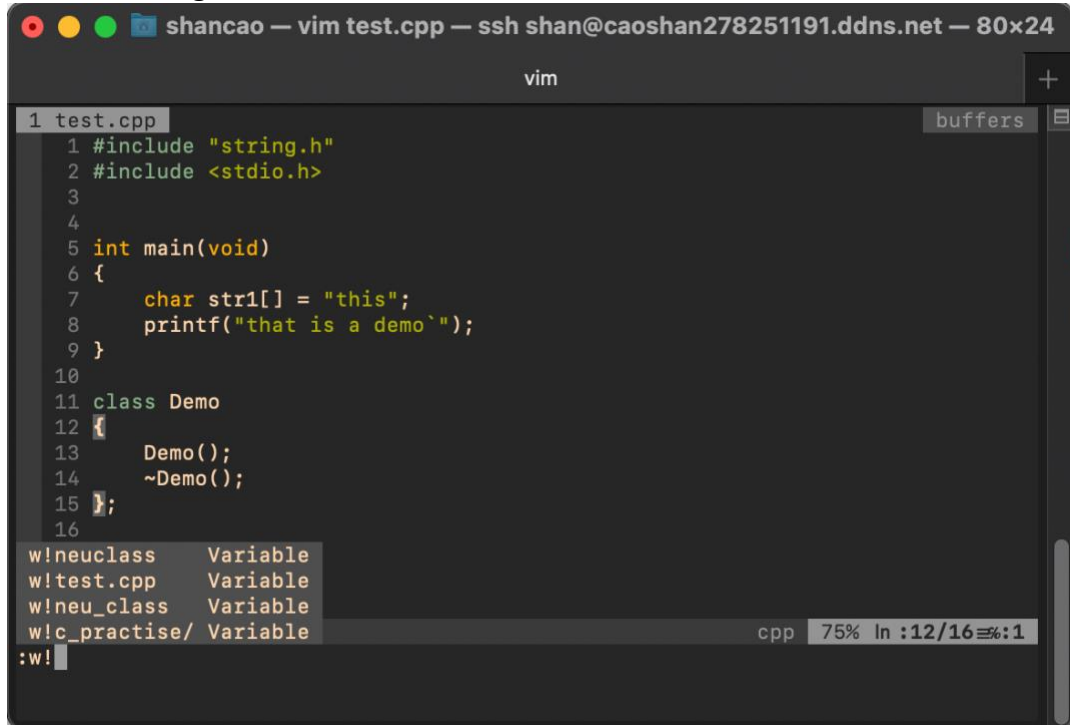
**Edit the file by put in insert mode**



```
shancao — vim test.cpp — ssh shan@caoshan278251191.ddns.net — 80x24
vim
1 test.cpp
1 #include "string.h"
2 #include <stdio.h>
3
4
5 int main(void)
6 {
7     char str1[] = "this";
8     printf("that is a demo`");
9 }
10
11 class Demo
12 {
13     Demo();
14     ~Demo();
15 };
16

INSERT test.cpp  cpp 75% ln :12/16≡:1
-- INSERT --
```

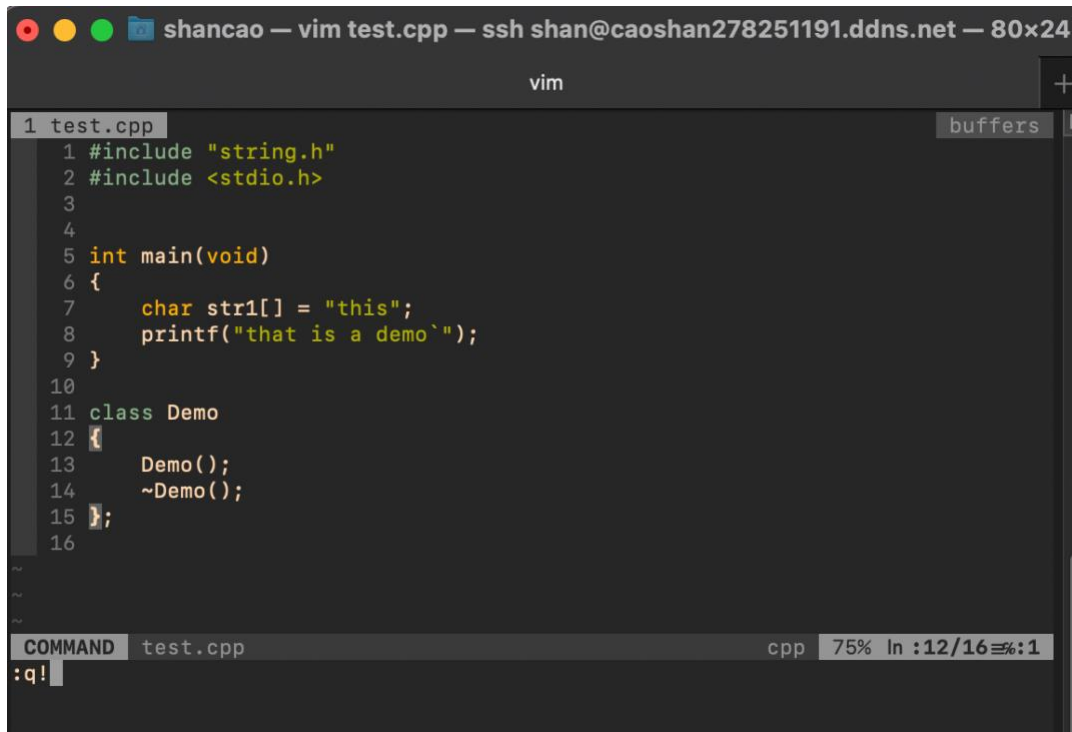
## Save the changes



```
1 test.cpp
1 #include "string.h"
2 #include <stdio.h>
3
4
5 int main(void)
6 {
7     char str1[] = "this";
8     printf("that is a demo`");
9 }
10
11 class Demo
12 {
13     Demo();
14     ~Demo();
15 };
16
```

w!neuclass Variable  
w!test.cpp Variable  
w!neu\_class Variable  
w!c\_practise/ Variable  
cpp 75% ln :12/16≡=:1  
:w!

## Close the vim



```
1 test.cpp
1 #include "string.h"
2 #include <stdio.h>
3
4
5 int main(void)
6 {
7     char str1[] = "this";
8     printf("that is a demo`");
9 }
10
11 class Demo
12 {
13     Demo();
14     ~Demo();
15 };
16
```

COMMAND test.cpp  
cpp 75% ln :12/16≡=:1  
:q!