

Homework 9 Due Wednesday, 10-21-20

A. Virtual machines and recompiling the kernel

1. Carry out the steps of the *Kernel Compilation* lab

`https://www.stolaf.edu/people/rab/os/lab/linux-compile.html`

on your virtual machine.

2. Carry out the steps in the “User-level invocation and implementation of system calls” portion of the *Adding a System Call* lab

`https://www.stolaf.edu/people/rab/os/lab/newsyscall.html`

on your virtual machine using your unprivileged account.

Note: You **don’t** have to carry out the “Kernel-level implementation...” steps for this homework.

B. Review

Note: This is an example exam-like problem.

1. Consider the example multithreaded program `pthread.c` (`https://www.stolaf.edu/people/rab/os/pub/cs273/egs/pthreads.c_n` with line numbers added).
 - a) Print a copy of this program (with line numbers).
 - **Note:** On an exam, a printout would be provided.
 - b) What line number(s) cause all threads to be created? Also, draw a box labelled 2 on your printout.
 - c) What line number(s) are executed by those threads? Also, draw a box labelled 3 on your printout.
 - d) What line number(s) make up the critical section(s) in this code? Also, draw a box labelled 4 on your printout.
 - e) In what line number(s), if any, do thread(s) interact safely with a shared variable? Also, draw a box labelled 5 on your printout.
 - f) How does this code insure that all threads have completed their work before printing its final answer?

To submit this by-hand part, you can use the page

`https://www.stolaf.edu/people/rab/os/asgt/hw9+.html`

C. Submitting this assignment.

1. Create a `.tar` file *on your virtual machine* using your *privileged* account:

```
cd ~
mkdir oshw9
uname -a > oshw9/uname.out
sudo lshw > oshw9/lshw.out
hostnamectl > oshw9/hostnamectl.out
sudo tar cf oshw9.tar oshw9 ~username/testing
```

Here, `username` should be the username of your *unprivileged* account.

Note: This creates a TAR (Tape ARchive) file that packs the contents of all the files `oshw9/*` and `~username/testing/*` into a single file `oshw9.tar` .

2. Use the approach described in the first part of

```
https://www.stolaf.edu/people/rab/os/lab/newsyscall.html
```

to `scp` that tar file `oshw9.tar` from your virtual machine to your home directory on the Link machines.

```
scp oshw9.tar username@ipaddress:
```

3. **On a Link machine**, use the OS's *submit web page*

```
https://www.stolaf.edu/people/rab/os/proj_submit.html?deliv=hw9
```

to submit your tar file.

Note: We are not submitting via `stogit` since your tarball isn't source code (and will contain executables, `.o` files, etc.).