CIS 345/545 Sec. 50 Homework 2 Spring 2020

(Due: Mar. 2)

This homework helps you understand how to run and add test cases in the educational operating system Pintos (CSU version). Login a Linux workstation in FH133E. Type

```
tar xvfz ~cis345s/pub/pintos_csu.tar.gz
```

to uncompress and extract the files to your working directory. Next, use the following commands to compile and build the kernel `kernel.bin`:

```
cd pintos_csu/src/threads
make
```

Note that the test cases about threads located under `pintos_csu/src/tests/threads` have been compiled and included in the kernel. Use the following to run the test case `alarm-single`:

```
pintos -v -- run alarm-single
```

Take a screenshot of the terminal window and print it. The source code of the test case `alarm-single` can be found in `alarm-wait.c`.

In the second part of this homework, you are asked to add the producer/consumer program as a new test case. First, you need to copy the producer/consumer program from `~cis345s/pub/prod-cons.c` to the directory `pintos_csu/src/tests/threads/`. Then, you need to modify the file `prod-cons.c` to meet the Pintos system requirements, including the changes of the header files, types of mutex locks and semaphores, functions such as `thread_create()`, `lock_acquire()`, `lock_release()`, `sema_down()`, `sema_up()`, etc. Note that just use the default priority `PRIO_DEFAULT` for the producer and consumer threads when they are created. Furthermore, you have to rename the `main()` function to be `test_prod_cons()`.

You also need to do the following under the directory `pintos_csu/src/tests/threads/`:

- Add the pair {`"prod-cons"`, `test_prod_cons`} to the test table `tests[]` in the file `tests.c`.
- Add `test_prod_cons` as an `extern test_func` in the file `tests.h`.
- Add the source `tests/threads/prod-cons.c` to `tests/threads_SRC` in the file `Make.tests`.

Now you can switch back to the directory `pintos_csu/src/threads` to rebuild the kernel to include the new producer/consumer test case. Use following to run it:

```
pintos -v -- run prod-cons
```

Take a screenshot of the terminal window and print it.

Turnin

Each group (at most two students) has to submit the Pintos version `prod-cons.c` electronically using the following turnin command (on grail):

```
turnin -c cis345s -p hw2 prod-cons.c
```

Each group also needs to hand in a hard-copy document which includes the screenshots and the explanations of the execution results. The cover page should contain your picture(s) (taken in FH128 using iMac), name(s), and the login id you used to turnin the project. Start on time and good luck. If you have any questions, send e-mail to `sang@cis.csuohio.edu`.