# COMP3500: Project 4 - Part 3 Condition Variables for Cats and Mice

**Exercise 1:** Please initialize the following lock and two CVs?

static struct lock \*mutex;

static struct cv \*turn\_cv;

static struct cv \*done\_cv;

**Exercise 2:** How can cats wait until their turn?

lock(mutex);

cats\_wait\_count++; /\* Initial value = 0 \*/

if (turn\_type == NOCATMOUSE) {

turn\_type = CATS;

cats\_in\_this\_turn = 2; /\*Two cats per turn\*/

}

**/\* How? Discussions \*/**

/\* Wait until it is the cat turn. \*/

while (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_) {

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_;

}

cats\_in\_this\_turn--; /\* one cat in the kitchen \*/

cats\_eat\_count++; /\* Initial value = 0 \*/

print “Cat enters the kitchen.";

**Exercise 3:** Please complete the following “take\_a\_dish” code.

if (dish1\_busy == \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_) {

dish1\_busy = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_;

mydish = 1;

}

else {

dish2\_busy = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_;

mydish = 2;

}

print “Cat is eating.”; /\* which cat? \*/

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_; /\* release the lock \*/

clocksleep(1); /\* enjoys food \*/

**Exercise 4:** How to release a dish?

lock(mutex);

print “Cat finishes eating at dish”, mydish;

if (mydish == 1) /\* release dish 1 \*/

dish1\_busy = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_;

else /\* release dish 2 \*/

dish2\_busy = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_;

/\*update the number of cats in kitchen\*/

cats\_eat\_count\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_;

/\*update the number of waiting cats\*/

cats\_wait\_count\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_;

**Exercise 5:** How to implement “Switch Turn”. Consider Case 1 where (1) there is no waiting mouse and (2) there are waiting cats.

if (No waiting mouse && there are waiting cats) {

/\* Wake up one waiting cat to enter \*/

cats\_in\_this\_turn++;

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_; /\* How? \*/

}

**Exercise 6:** How to switch Turn? Complete the portion of the change\_turn() function.

/\*Case 1: there are waiting mice\*/

if (there are waiting mice) {

turn\_type = MICE;

mice\_in\_this\_turn = 2;

print “It is mice turn now.”;

}

else if (there are waiting cats) {

/\*let cats eat \*/

cats\_in\_this\_turn = 2;

}

else {/\*no waiting cats or mice\*/

turn\_type = NOCATMOUSE;

}

/\* **Wake up those waiting for turn change**\*/

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_;