**Semaphore Explanations**

Semaphore patientsWaiting (starts with 0): make the patient thread wait for the receptionist thread to be completed and the patient can move forward once signed in

Semaphore patientLeaving (starts with 0): makes the patient wait for the doctor to complete listening to the patient and when allowed then it will be able to leave the doctors office

Semaphore doctor[MAX\_DOCTORS] (starts with 0): is an array of semaphores that correlates to a doctor and makes the doctor wait for the nurse with the same ID as the doctor to bring a patient

Semaphore receptionist (starts with 0): makes the receptionist thread wait until a patient enters the doctor’s office and sits in the waiting room

Semaphore nurse (starts with 0): makes all nurses wait and let’s one random nurse thread in to take a patient to the doctor

Semaphore mutex (starts with 1): protects the list of incoming patients

Semaphore mutex2 (starts with 1): protects the list of patients with the receptionist and have been registered

Semaphore mutex3 (starts with 1): protects the list of patients and corresponding nurse that are being moved to a doctor’s office

Semaphore nurseWaitForDoctor[MAX\_DOCTORS] (starts with 0): is a semaphore array that makes the unique nurse wait for the doctor to finish checking the patient before assigning another patient

Semaphore noPatients (starts with 0): makes all doctor threads wait until a customer enters the hospital and is registered by the receptionist

**SUDO Code**

waitingRoom(customerInformation){

wait(mutex1);

patientEnters();

placePatientInfrontOfReceptionist();

signal(mutex);

signal(receptionist);

for(allDoctors){

signal(noPatients);

}

wait(patientsWaiting);

semwait(patientLeaving);

wait(mutex);

patientLeavingOffice();

signal(mutex);

}

receptionOffice(threadID){

while(true){

wait(receptionist);

wait(mutex);

getPatientInfo();

signal(mutex);

signInCustomer();

wait(mutex2);

assignCustomerToNurse();

signal(mutex2);

signal(patientsWaiting);

signal(nurse);

}

}

nurseMovePatient(nurseInformation){

while(true){

wait(nurse);

wait(mutex2);

getPatientInfoToMove();

signal(mutex2);

movedPatientFromWaitingRoom();

wait(mutex3);

tellsDoctorAboutPatient();

signal(mutex3);

signal(doctor[idNumber]);

wait(nurseWaitForDoctor[idNumber]);

}

}

doctorOffice(doctorInformation){

wait(noPatients);

while(true){

wait(doctor[idNumber]);

wait(mutex3);

getPatientInfo();

signal(mutex3);

checkPatient();

signal(nurseWaitForDoctor[idNumber]);

signal(patientLeaving);

}

}