Brandon Angeles

CS 4348.002

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**Project 2 Design**

**/\* Project 2 Semaphores \*/**

**Semaphore BOA\_ready = 2**

**Semaphore TT\_Ready = 1**

**Semaphore CSW\_Ready = 1**

**Semaphore movieChoice = 0**

**Semaphore giveTicket = 0**

**Semaphore giveOrder = 0**

**Semaphore setBOAQueue = 1**

**Semaphore getBOAQueue = 1**

**Semaphore setTTQueue = 1**

**Semaphore getTTQueue = 1**

**Semaphore setCSWQueue = 1**

**Semaphore getCSWQueue = 1**

**Semaphore setTicketMutex = 1**

**Semaphore getTicketMutex = 0**

**// all set to 0 for each customer**

**Semaphore[] customerSem = new Semaphore[50]**

**/\* Project 2 Variables \*/**

**Queue BOAQueue**

**Queue TTQueue**

**Queue CSWQueue**

**boolean ticket;**

**Customer:**

**int ID**

**String movie**

**int movieIndex**

**String snackChoice**

**boolean snack**

**Print “Customer “ + ID + “ created, buying ticket to “ + movie**

**// Enter customer into Queue**

**wait(setBOAQueue)**

**setBOAQueue.add(customer[ID])**

**signal(setBOAQueue)**

**wait(BOA\_Ready)**

**signal(movieChoice)**

**wait(customerSem[ID])**

**wait(getTicketMutex) // Mutex for getting**

**signal(BOA\_Ready)**

**// If ticket is given then continue to the ticket taker, otherwise end customer() and join**

**if(ticket)**

**signal(setTicketMutex) // Mutex for setting**

**Print “Customer” + ID + “ in line to see ticket taker”**

**// Enter customer into Queue**

**wait(setTTQueue)**

**setTTQueue.add(customer[ID])**

**signal(setTTQueue)**

**wait(TT\_Ready)**

**signal(giveTicket)**

**wait(customerSem[ID])**

**signal(TT\_Ready)**

**if(snack)**

**Print “Customer” + ID + “ in line to buy ” + snackChoice**

**// Enter customer into Queue**

**wait(setCSWQueue)**

**setCSWQueue.add(customer[ID])**

**signal(setCSWQueue)**

**wait(CSW\_Ready)**

**signal(giveOrder)**

**wait(customerSem[ID])**

**signal(CSW\_Ready)**

**// Else**

**// Enter theater and join customer**

**else**

**Print “Customer “ + ID + “ enters theater to watch “ + movieChoice**

**// Else**

**else**

**signal(setTicketInfo) // Mutex for setting**

**// Leave theater and join customer**

**Print “Customer “ + ID + “ leaves”**

**Box Office Agent:**

**int ID**

**Customer customer**

**Print “Box Office Agent “ + ID + “ created”**

**wait(movieChoice)**

**// Remove Customer from queue**

**wait(getBOAQueue)**

**customer = BOAQueue.remove()**

**signal(getBOAQueue)**

**Print “Box Office Agent “ + ID + “ serving customer “ + customer.ID**

**// Check if movie is sold out, if not take a ticket from the count and let customer pass through. Else customer is turned away.**

**wait(setTicketMutex) // Mutex for setting**

**if (tickets[customer.movieIndex] > 0)**

**sleep(1.5 seconds)**

**ticket = true**

**tickets[customer.movieIndex] – 1**

**Print “Box Office Agent “ + ID + “ sold ticket for “ + customer.movie + “ to customer “ + customer.ID**

**else**

**ticket = false**

**Print “Box Office Agent “ + ID + “ informs customer “ + customer.ID + “ that “ + movie + “ is sold out”**

**signal(getTicketMutex) // Mutex for getting**

**signal(customerSem[customerID]) // Signal done with customer**

**Ticket Taker:**

**Customer customer**

**Print “Ticket Taker created”**

**wait(giveTicket)**

**// Remove Customer from queue**

**wait(getTTQueue)**

**customer = TTQueue.remove()**

**signal(getTTQueue)**

**sleep(.25 seconds)**

**print “Ticket Taken from customer “ + customer.ID**

**signal(customerSem[ID]) // Signal done with customer**

**Concession Stand Worker:**

**Customer customer**

**Print “Concession Stand Worker created”**

**wait(giveOrder)**

**// Get the snack the customer wants and give snack to customer**

**// Remove Customer from queue**

**wait(getCSWQueue)**

**customer = CSWQueue.remove()**

**signal(getCSWQueue)**

**Print “Order for “ + customer.snackChoice + “ taken from customer “ customer.ID**

**sleep(3 seconds)**

**Print customer.snackChoice + “ given to customer “ + customer.ID**

**signal(customerSem[customer.ID]) // Signal done with customer**

**Main:**

**// Save Array for the number of tickets for each movie from input file**

**String[] movies**

**int[] ticketCount**

**while(file.hasNext())**

**movies.add(file.nextString())**

**ticketCount.add(file.nextInt())**

**// Make array for snacks in theater**

**String snacks[] = {“Popcorn”, “Soda”, “Popcorn and Soda”}**

**// Create Two Box Office Agents, threads for each and assign each an ID  
BOA\_0 = new BOA(0)**

**BOA\_1 = new BOA(1)**

**Thread BOA\_0thr = new thread(BOA\_0)**

**Thread BOA\_0thr = new thread(BOA\_0)**

**Start Thread BOA\_0thr**

**Start Thread BOA\_1thr**

**// Create Ticket Taker and thread**

**TT = new TT()**

**Thread TTthr = new thread(TT)**

**Start Thread TT**

**// Create Concession Stand Worker and thread**

**CSW = new CSW()**

**Thread CSWthr = new thread(CSW)**

**Start Thread CSWthr**

**// Create 50 Customers, threads and assign each an ID**

**for int i = 1 to 50**

**// Find random movie((1/#movies)%), movieIndex**

**// Decide to get snack or not (50%), snack**

**// Find random snack(33%), snackChoice**

**Customer customer[i] = new Customer(ID, movies[movieIndex], movieIndex, snack, snacks[snackChoice])**

**Thread customerThr[i] = new Thread(customer[i])**

**Start customerThr[i]**

**// At the end join all customers and end program**

**for int i = 1 to 50**

**join customerThr[i]**

**print “Customer” + i + “ joined”**