

Project 2 Design

List of Semaphores used and their purpose and Initial Value:

1. infoDeskWait
 - a. This was used to wait for the customer to arrive, to assign a number to that customer.
 - b. Initial Value: 0
2. go_to_waiting_area
 - a. This was used to tell the customer that once they get their number wait in the waiting area.
 - b. Initial Value: 0
3. cWaitingArea
 - a. This was used to let the announcer know that there is a customer in the waiting area.
 - b. Initial Value: 0
4. cGoAgent
 - a. This was used to let the customer know that the announcer called their number, and they are waiting for agent in the agent Line.
 - b. Initial value: 0
5. cInAgent
 - a. This was used to let the customer know they are in the agent line and once an agent is free it's their turn.
 - b. Initial Value: 0
6. readyAgent
 - a. This was used to signal that there is an agent ready to take a customer.
 - b. Initial Value: 0
7. aLine
 - a. This was used to keep track of how many customers were being sent to the Agent Line.
 - b. Initial Value: 4
8. aFinished
 - a. This is to signify that an agent has finished with one customer.
 - b. Initial value: 0
9. CMutex:
 - a. This is a mutex and was used to allow only one customer to be created at a time and then be added to the customer queue.
 - b. Initial Value: 1
10. Customer_Mutex_Agent:
 - a. This is a second mutex that was used to allow only one customer to be served by the agent.

- b. Initial Value: 1
- 11. Agent_Mutex_Customer:
 - a. This is third mutex that was used to allow only one eye test at a time for each customer served by the agent.
 - b. Initial Value: 1
- 12. cAtTest
 - a. This semaphore was used to know whether a customer was ready to take the test.
 - b. Initial Value: 0
- 13. cTakingTest
 - a. This was used to notify the agent that the customer is taking the test.
 - b. Initial Value: 0
- 14. cFinishedTest
 - a. This was used to let the agent know that the customer has finished taking the test and that it should the customer his license.
 - b. Initial Value: 0
- 15. Exit
 - a. Just to show that the customer has exited, and it is time to join their threads.
 - b. Initial Value: 0
- 16. CustNum
 - a. This is an array of customer to store the number given once announcer calls them.
 - b. N/A.
- 17. custReady
 - a. This is too used to store the customer ready to get served by an agent and holds the order at which the customer will be served.
 - b. N/A

Pseudo Code and Functions:

Class Customer

int custId

void run ()

{

wait(CMutex)

signal(infoDeskWait)

signal(CMutex)

```
wait(go_to_waiting_area)
signal(CWaitingArea)
wait(custNum[cNum])
signal(cGoAgent)
```

```
wait(customer_Mutex_Agent)
signal(cInAgent)
signal(customer_Mutex_Agent)
```

```
wait(readyAgent)
wait(agent_Mutex_Customer)
signal(agent_Mutex_Customer)
```

```
wait(DMV.custReady[custId])
signal(aLine)
signal(cAtTest)
```

```
wait(cTakingTest)
signal(cFinishedTest)
wait(aFinished)
signal(exit)
```

```
} // End of Run
```

Class Agent

```
Int agentId
```

```
Int custNum;
```

```
Void run ()
```

```
{
```

```
While (true)
```

```
{
```

```
wait(cInAgent);
```

```
wait(customer_Mutex_Agent)
```

```
wait(agent_Mutex_Customer)
signal(readyAgent);
signal(agent_Mutex_Customer)
```

```
signal(custReady[custNUM])
signal(customer_Mutex_Agent)
```

```
wait(cAtTest)
signal(cTakingTest)
signal(cFinishedTest)
signal(aFinished)
wait(exit)

    } // end of while
```

```
} // End of Run
```

Class Information Desk

```
Void run ()
{
While(true)
{
wait(infoDeskWait)
wait (CMutex)
signal (CMutex)
signal(go_to_waiting_area)

} // end of while

} // end of run
```

Class Announcer

```
Void run ()
{
While(true)
```

```
wait (CWaitingArea);  
wait(aLine);  
signal(custNum[count]);  
wait(cGoAgent);  
  
} // end of while  
  
} // end of run
```

Class DMV

```
Semaphore CMutex  
Semaphore customer_Mutex_Agent  
Semaphore agent_Mutex_Customer  
Semaphore cAtTest  
Semaphore cFinishedTest  
Semaphore exit  
Semaphore infoDeskWait
```

```
Semaphore go_to_waiting_area  
Semaphore CWaitingArea  
Semaphore cInAgent  
Semaphore cGoAgent  
Semaphore readyAgent
```

```
Semaphore aLine  
Semaphore aFinished  
Semaphore cTakingTest
```

```
Semaphore custNUM[20]
```

```
Semaphore = custReady[20]
```

```
runDMV ()
```

```
{
```

```
    // Creating all my threads for the simulation.
```

```
    Thread Info Desk.
```

```
    Thread Agent 1
```

```
    Thread Agent 0
```

```
    Thread Announcer
```

```
    For loop {Threads Customer [20]}
```

```
For Loop {Join customer Threads [20]}
```

```
// All threads are created and started here; they are also joined here.
```

```
}
```

```
Class Project2
```

```
Main ()
```

```
{
```

```
    New DMV object.
```

```
    DMV.runDMV()
```

```
}
```