**CSC3021 Concurrent Programming – Assignment 3**

**Question 1 – Christmas Tree Shopping**

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| **Shared Variables**  int logger = 0;  Semaphore noOfLoggers = 3;  Semaphore treesLeft = 20;  Semaphore customerInStore = 0;  Seamphore noEntry = 0; | | |
| **Process Merchant** | **Process Customer [1..C]** | **Process Logger[1..L]** |
| while(true){  down(treeLeft);  down(customerInStore);  }  End Merchant | while(true){  if(logger == 0){  enter();  up(customerInStore);  exit();  }  else{  down(noEntry)  }  }  End Customer | while(true){  logger++;  down(noOfLoggers);  down(loggerInStore);  enter();  up(treesLeft);  up(treesLeft);  up(noOfLoggers);  exit();  logger--;  if(logger == 0){  up(noEntry)  }  }  End Logger |

**Question 2 – Lock-Free Hash Map**