CSE 314
IPC Offline for B1 (29/01/2014)

You have to simulate customer movements in the Sonali bank, BUET branch. Consider two types of customers only: type A presenting the students and type B presenting the teachers. In Sonali bank consider three Queues: X, Y and Z. Queue X is only for teachers (type B). Similarly, queue Y and Z are for students only (type A). For each queue there is a teller serving the customers. Customers come to the bank for either one of the two purposes: to deposit **or** to withdraw money. Queue X serves both purposes. So whenever a teacher comes to the bank, he/she goes to the queue X. On the other hand, queue Y and Z are used exclusively for depositing money and withdrawal of money respectively. So if a student comes for depositing money goes to queue Y, and if he/she comes for withdrawing money then goes to queue Z. A customer immediately leaves the bank after being served.

However, bank and each queue have limited capacity. Each queue has maximum capacity of 5 persons. The bank has maximum capacity of 20 persons (including the persons in X, Y, Z). So customers cannot access the bank if total number of existing customers inside the bank is 20. Otherwise customers enter the bank, one at a time. Again, if the target queue is full then the customer waits inside the bank. For example, if number of customers in Queue X, Y, Z and waiting inside the bank but not in any queue is respectively N1, N2, N3 and N4, then **N1+N2+N3+N4 <= 20**.

At a time one customer can be served in each queue. Similarly, customers waiting inside the bank join the target queue, one at a time, if the queue is not full (you are allowed to select the customer to join in any order from the waiting customers inside the bank). ***No customer keeps waiting inside the bank without joining a queue, if the target queue has free slot.*** After being served, customers leave the bank, one at a time.

Write a program to simulate this environment using sufficient number of threads and synchronization primitives. Use constant serving time (say 5 seconds) for each queue.