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CSS 430

Program 4

Due February 28th, 2021

Description of Program Flow

A barbershop consists of a waiting room with n waiting chairs and a barber room with nBarber chairs.

visitShop()

* If a customer enters the barbershop and all chairs (including both, waiting and barber chairs) are occupied, then the customer leaves the shop.
* When the customer first enters the barbershop, it checks if all barbers are occupied (busy with another customer).
* If all barbers are busy (sleeping queue is empty), then they see if they can take a waiting chair.
  + If all n waiting chairs are full,
    - The customer immediately leaves the barber shop.
  + If there is an available waiting chair,
    - The customer sits down behind every else in line who arrived before them and goes to sleep.
    - The customer now waits for an available barber to wake them up.
      * Once the customer has been woken up, they need to see if their barber is available yet (sleeping).
      * If the barber is not yet sleeping, the customer goes to sleep and waits for another signal from the barber to wake up, so they are not confused with a new customer arriving in the shop, and the barber does not start the haircut before the customer is ready.
* If there is an available barber (sleeping), then the customer wakes up the next available barber and takes a seat in a service (barber) chair.
  + A customer keeps track of their barber, and the barber keeps track of their customer.

leaveShop()

* The customer waits to hear from their barber that their haircut has been completed and goes to sleep.
* Once the barber has signaled them, the customer pays the barber
* The customer says goodbye to the barber and leaves the shop

helloCustomer()

Scenario 1:

* When a barber first arrives to the barbershop, they check if there was a customer already waiting before they arrived.
* If there was a customer already waiting,
  + Keep track of that customer’s id and wake them up (signal them).
  + Start the haircut service for that customer.
* If there was not a customer already waiting, the barber goes to sleep and waits for their first/new customer to wake them up.

Scenario 2:

* If a barber has just finished a haircut for another customer and has just signaled the next customer up from the waiting chairs,
  + The barber signals the customer again and goes to sleep to make sure that the two of them are synced, so that the barber does not start their haircut prematurely or service a new customer.
  + The barber starts the customer’s haircut.
* If a barber has not just finished a haircut and there are no more customers in the waiting chairs, then they go to sleep and wait until a new customer wakes them up.

byeCustomer()

* The barber finishes their customer’s haircut and signals them that they are done.
* The barber waits for the customer to pay them.
* Once the customer has paid, the barber checks to see if there are any customers waiting in the waiting chairs area.
* If there is at least one customer in the waiting chairs,
  + The barber will start to service them, and alert them that they can wake up.
* If there are no customers in the waiting chairs,
  + The barber goes back to sleep.