



# Sleeping Barber Problem

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# The Sleeping Barber Problem

- A barbershop consists of a waiting room with  $N$  chairs, and the barber room containing the barber chair.
- If there are no customers to be served the barber goes to sleep.
- If a customer enters the barbershop and all chairs are busy, then the customer leaves the shop.
- If the barber is busy, then the customer sits in one of the available free chairs. If the barber is asleep, the customer wakes the barber up.

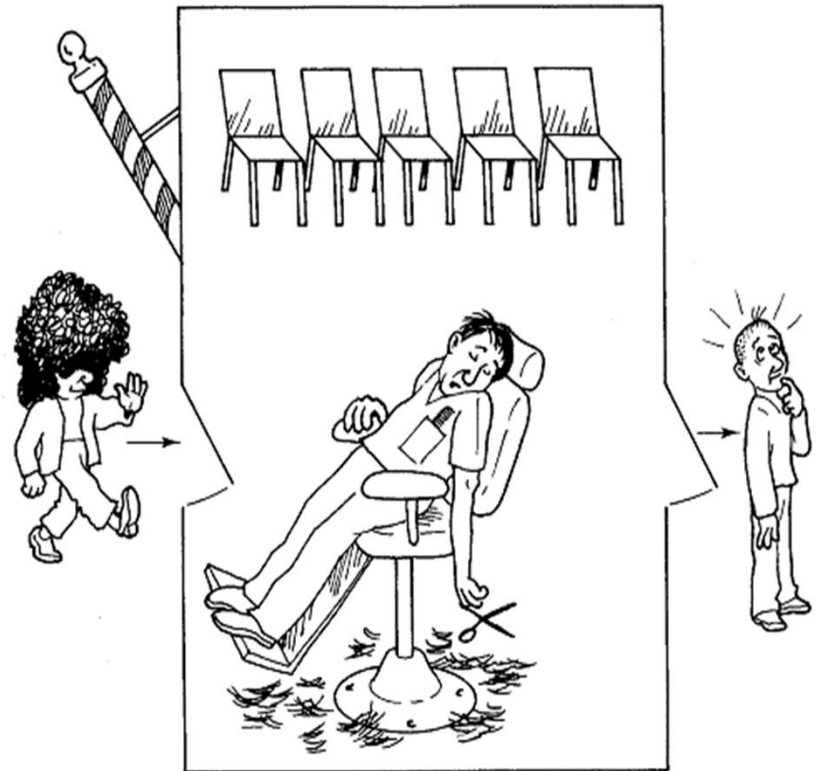


Fig. 2-22. The sleeping barber.

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The following pseudo-code guarantees synchronization between barber and customer and is deadlock free, but may lead to starvation of a customer

Semaphore Customers = 0

Semaphore Barber = 0

Semaphore accessSeats = 1

int NumberOfFreeSeats = N //total number of seats

The Barber (Thread/Process):

while(true) { //runs in an infinite loop

wait(Customers) //tries to acquire a customer - if none is available he goes to sleep

wait(accessSeats) //at this time he has been awakened - want to modify the number of available seats

NumberOfFreeSeats++ //one chair gets free signal(Barber) //the barber is ready to cut

signal(accessSeats) //we don't need the lock on the chairs anymore

//here the barber is cutting hair }

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## The Customer (Thread/Process):

```
while(true) { //runs in an infinite loop
wait(accessSeats) //tries to get access to the chairs
if ( NumberOfFreeSeats > 0 )
{ //if there are any free seats
NumberOfFreeSeats-- //sitting down on a chair signal(Customers) //notify the
    barber, who's waiting that there is a customer
signal(accessSeats) //don't need to lock the chairs anymore
wait(Barber) //now it's this customer's turn, but wait if the barber is busy
    //here the customer is having his hair cut
}
else
{ //there are no free seats //tough luck
    signal(accessSeats) //but don't forget to release the lock on the seats
//customer leaves without a haircut
}
}
```

Thank You