UNIVERSITY OF ENGINEERING AND TECHNOLOGY, LAHORE

REPORT OF OPERATING SYSTEM LAB

"*SLEEPING BARBER PROBLEM*"

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INTRODUCTION:

In computer science, the sleeping barber problem is a classic communication (inter) and synchronization problem that illustrates the complexities that arise when there are multiple operating system processes.

STATEMENT:

Imagine a barbershop with one barber, one barber chair, and a waiting room with n chairs (n may be 0) for waiting customers. The following rules apply:

- If there are no customers, the barber falls asleep in the chair
- A customer must wake the barber if he is asleep
- If a customer arrives while the barber is working, the customer leaves if all chairs are occupied and sits in an empty chair if it's available
- When the barber finishes a haircut, he inspects the waiting room to see if there are any waiting customers and falls asleep if there are none.

ABOUT:

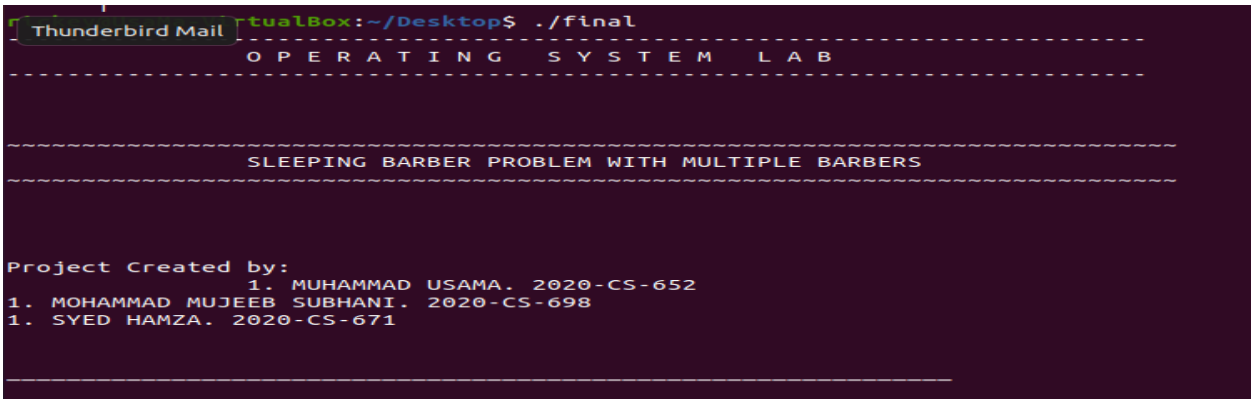
This uses semaphores (Semaphore APIs) available in Linux platform.

A barbershop consists of a barber room with 3 barber chairs and a waiting room having separate queues (three such queues) of 10 chairs each for each barber. The barbers are

trained for different types of haircuts. And hence, each waiting queue relates to different barbers who are experts in a specific type of haircut. Barbers serve the customers according to the haircut they want.

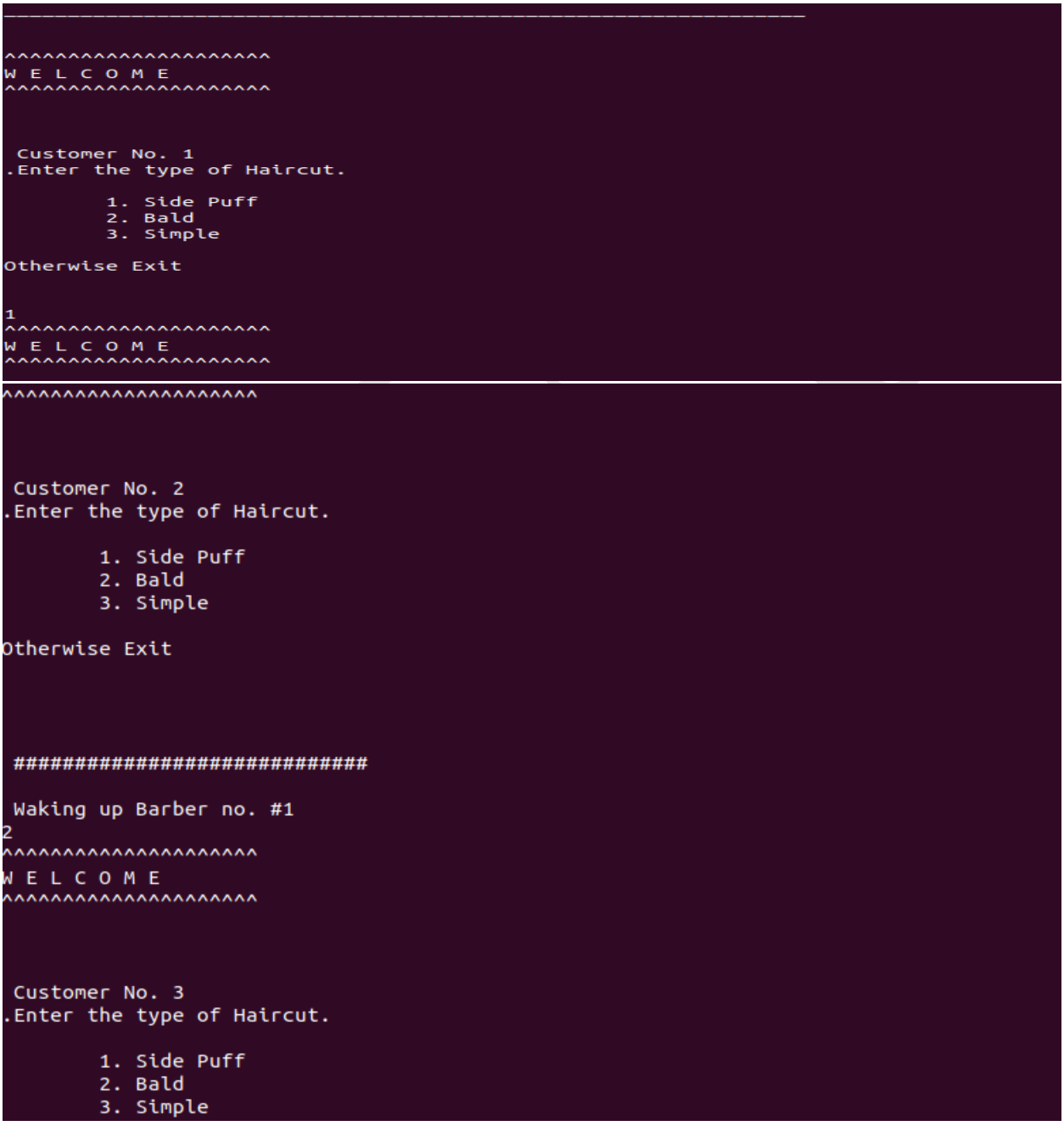
- ❖ 1st Barber takes 10 sec, 2nd barber takes 10 sec and 3rd barber takes 10 sec each for completing the haircut.
- ❖ If there are no customers to be served, all the barbers go to sleep.
- ❖ If a customer enters the barbershop and the chairs are occupied, then the customer leaves the shop
- ❖ If the barber is busy but chairs are available, then the customer sits in one of the free chairs in the waiting area
- ❖ If the barbers are asleep, the customer wakes up the barbers
- ❖ A customer after waiting in the original queue for 20 seconds changes his mind and decides to go for another type of hair cut that has least number of people waiting. Possibly, he has other things to do and does not mind having any type of haircut
- ❖ Barbers are paid as per the number of customers they serve

LAYOUT AND INFORMATION:



ASKING FOR CUTTING TYPE FROM CUSTOMERS (Initially added 10 customers):

NOTE: WAKING THE BARBERS AS CUSTOMERS ARRIVED.



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 ############################

 Waking up Barber no. #2

3
^^^^^^^^^^^^^^^^^^^^
W E L C O M E
^^^^^^^^^^^^^^^^^^^^



 Customer No. 4
.Enter the type of Haircut.

        1. Side Puff
        2. Bald
        3. Simple

Otherwise Exit
```

INCREMENT IN SALARY:

NOTE: Barbers going to sleep when no customers left.

```
 Customer # 1 got a haircut from barber no. 01.

 His current salary is Rs. 200
1
^^^^^^^^^^^^^^^^^^^^
W E L C O M E
^^^^^^^^^^^^^^^^^^^^



 Customer No. 11
.Enter the type of Haircut.

        1. Side Puff
        2. Bald
        3. Simple

Otherwise Exit



 Customer # 2 got a haircut from barber no. 02.

 His current salary is Rs. 200
3
 Customer # 3 got a haircut from barber no. 03.

 His current salary is Rs. 200
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^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

Barber # 3 has gone to sleep

35
Thanks for coming...!!!



 Customer # 6 got a haircut from barber no. 01.

 His current salary is Rs. 400

 Customer # 4 got a haircut from barber no. 02.

 His current salary is Rs. 400

 Customer # 7 got a haircut from barber no. 01.

 His current salary is Rs. 600

 Customer # 5 got a haircut from barber no. 02.

 His current salary is Rs. 600
Customer # 9 waited for 20 sec and went to barber #1

 Customer # 10 got a haircut from barber no. 01.
```

```
 Customer # 5 got a haircut from barber no. 02.

 His current salary is Rs. 600
Customer # 9 waited for 20 sec and went to barber #1

 Customer # 10 got a haircut from barber no. 01.

 His current salary is Rs. 800

 Customer # 8 got a haircut from barber no. 02.

 His current salary is Rs. 800



^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

Barber # 2 has gone to sleep


 Customer # 9 got a haircut from barber no. 01.

 His current salary is Rs. 1000



^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

Barber # 1 has gone to sleep
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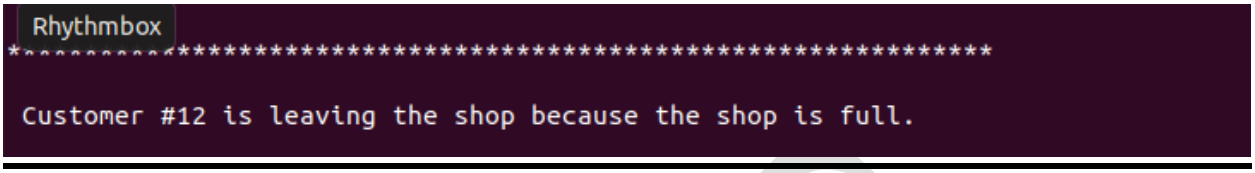
CUSTOMERS LEAVING BECAUSE THE SHOP IS FULL:



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