**NATIONAL UNIVERSITY OF COMPUTER AND EMERGING SCIENCES - FAST**



# Project Proposal

# CS-2006

# Operating Systems

**14/03/2023**

**Teacher: Dr Ghufran Ahmed**

**Section: BS(CS)-4F**

**Semester: Spring 2023**

**Sleeping Barber Problem (System call)**

This project will be submitted as a partial requirement for the course CS-2006 in spring 2023.

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**Member 2: 21K-3433 Syed Daniyal Haider**

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**Problem:**

The comparison is based on a fictitious barbershop with just one barber. There is a barbershop with one barber, one chair for the barber, and n chairs to wait for clients to sit in the chair, if any.

* If there isn't a client, the barber will fall asleep in his own chair.
* He needs to rouse the barber when a client shows up.
* The remaining customers can either wait if there are empty chairs in the waiting area or they can leave if there are no empty chairs when there are numerous clients and the barber is cutting a customer's hair.

**Solution:**

Three semaphores are needed to solve this issue. The first counts the number of customers in the waiting area and is for the customer (the customer in the barber chair is not included because he is not waiting). The second mutex is used to give the mutual exclusion necessary for the process to operate, and the barber 0 or 1 is used to determine if the barber is idle or working. The client keeps a record of how many customers are currently waiting in the waiting area, and when that number equals the number of chairs in the area, the next customer exits the barbershop.

The procedure barber is carried out when the barber arrives in the morning, forcing him to block on the semaphore clients because it is originally 0. The barber then retires to bed till the first client arrives. When a client first comes, he or she executes a customer procedure, acquiring the mutex for entering the critical region. If a second customer, then enters, the second one will be unable to do anything until the first one releases the mutex. The consumer then counts the number of chairs in the waiting area; if there are fewer people waiting than chairs, he sits; otherwise, he releases the mutex and departs. If a chair is available, the customer takes it, moves the variable waiting for value up, and raises their semaphore, which awakens the barber if he is sound asleep. Both the client and the barber are now awake, and the barber is prepared to give the client a haircut. When the haircut is over, the client leaves the procedure, and the barber goes to sleep if there are no more clients in the waiting area.

**Tools & Techniques:**

Because of system calls, the version of Ubuntu Linux on which we will be working may differ, and C/C++ Language will be used.

**Schedule:**

[To be submitted one week before the final exam of the spring 2023 semester]

 Accept

 Reject

**Course Teacher:** **Dr Ghufran Ahmed** **Signature:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_