Project Title:

FIFO Barbershop Problem

Submitted by:

Mohammad Awais Dar	**2020-CE-09**
Usama Fiaz	**2020-CE-11**
Faiz E Alam Butt	**2020-CE-17**
Shahzaib Javed	**2020-CE-25**

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Miss Darakhshan

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Department of Computer Engineering

University of Engineering and Technology, Lahore

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Abstract

The FIFO Barbershop Simulation Project shows how to use Python to create a barbershop in several threads. Customers are permitted to enter a waiting area with a limited number of chairs and receive services from a single barber under the program's First-In-First-Out (FIFO) policy. The synchronized interactions between customers and the barber are ensured using semaphores and queues, offering a practical demonstration of concurrent programming ideas.

1. Introduction

The FIFO Barbershop Problem project compares concurrent computing problems in contemporary operating systems to the difficulty of guaranteeing fairness in customer service. We intend to apply synchronization approaches, highlighting the significance of orderly resource allocation, by modelling a barbershop scenario.

2. Problem statement

The FIFO Barbershop Problem entails scheduling concurrent client arrivals, needing effective chair distribution, and averting confrontations. This is similar to how operating systems struggle to handle several processes at once. Our proposal emphasizes the requirement for fair execution and impasse prevention by focusing on developing a solution that ensures first-come, first-served service.

3. Proposed Methodology

In order to guarantee synchronized resource access in the FIFO Barbershop Problem, our methodology makes use of semaphores and queues. Chair availability is managed with semaphores, which replicate OS resource distribution. Customers are serviced in arrival order when there is a queue, which avoids race-related situations. This method is an excellent example of process coordination that works well and can be applied to real-world operating systems.

4. Expected outcome/results

After the FIFO Barbershop Problem project is implemented successfully, orderly customer service that reflects fair process scheduling in operating systems is anticipated. Our solution demonstrates the ability to improve the efficiency of process coordination by maximizing the usage of waiting chairs and preventing disputes. This provides important insights for practical OS implementations.

5. Applications in Operating systems

The synchronization strategies we developed for the FIFO Barbershop Problem project improve OS process coordination, guaranteeing equitable execution and averting conflicts. Important components of our solution, semaphores and queues provide useful insights for enhancing multitasking settings and boosting system dependability and efficiency.