LAHORE GARRISON UNIVERSITY

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Project : Hospital Management System

Discipline : BS(Hons)Computer Science

Operating System (Project Proposal)

Project Title: Hospital Management System

➢ Introduction

Our application is based on hospital management system as we know in most of the system there have many people access the system at a time so we use semaphores for critical section that's why our code can be accessed by only one admin at a time. We have total 3 admins **this logic based on FCFS** and we use a random function for random admin counts. In this scenario first admin enter in the critical section before entering in CS first lock=1 using semaphore after they complete all iteration before leaving it can update lock value=0 then other processes are come and complete their iterations. This problem is basically called critical section problem so that when one process has entered its critical section, no other process is allowed to execute in its critical section. In our code(system) three admins can access the system at any time a random keyword will generate a value according to the number of admins wants to login and run the code accordingly to the value provided by random keyword with the help of threads and semaphore will lock one the process as we know threads works on parallel process semaphore will lock the other processes until the first one will be executed.

In this project we use 4 departments:

1. OPD (FCFS)
2. Injury Department (Priority)
3. Operation Department (SJF)
4. Pharmacy Department (Producer and Consumer)

➢ Introduction of Algorithms

There are four types of algorithms that are used in our code:

1. **First Come First Serve (FCFS)** is an operating system scheduling algorithm that automatically executes queued requests and processes in order of their arrival Time.

2. **Shortest Job First (SJF)** is an algorithm in which the process having the smallest execution time (Burst Time) is chosen for the next execution. ... It significantly reduces the average waiting time for other processes awaiting execution. The full form of SJF is Shortest Job First.

3. **Priority scheduling** involves priority assignment to every process, and processes with higher priorities are carried out first, whereas tasks with equal priorities are carried out on a first-come-first-served (FCFS) or round robin basis.

4. The **Producer-Consumer** problem is a classic problem this is used for multi-process synchronization i.e., synchronization between more than one processes. In the producer-consumer problem, there is one Producer that is producing something and there is one Consumer that is consuming the products produced by the Producer.

➢ Functionality

This application serves four different departments accordingly to the Five different algorithms.

First, the main functionality is that our program handles multiple admins with the logic of critical sections, Semaphores and threads. When one admin is entered in the critical section first, they lock the CS and then enter after completing their execution it will unlock the semaphore.
Department's functionalities are given below:

1. **OPD (outpatient department)**

In this department we used FCFS algorithm to fulfil the requirements because in OPD department we know that all the patients are not in critical condition so that's why we use first come first serve logic and also this algorithm is also used in admins login functionality.

2. **Injury Department**

We use Priority scheduling algorithm to fulfill the requirements as the we know how it works according to the number of injuries increase the priority of the patient will increase critical condition will be managed manually.

3. **Operation Department**

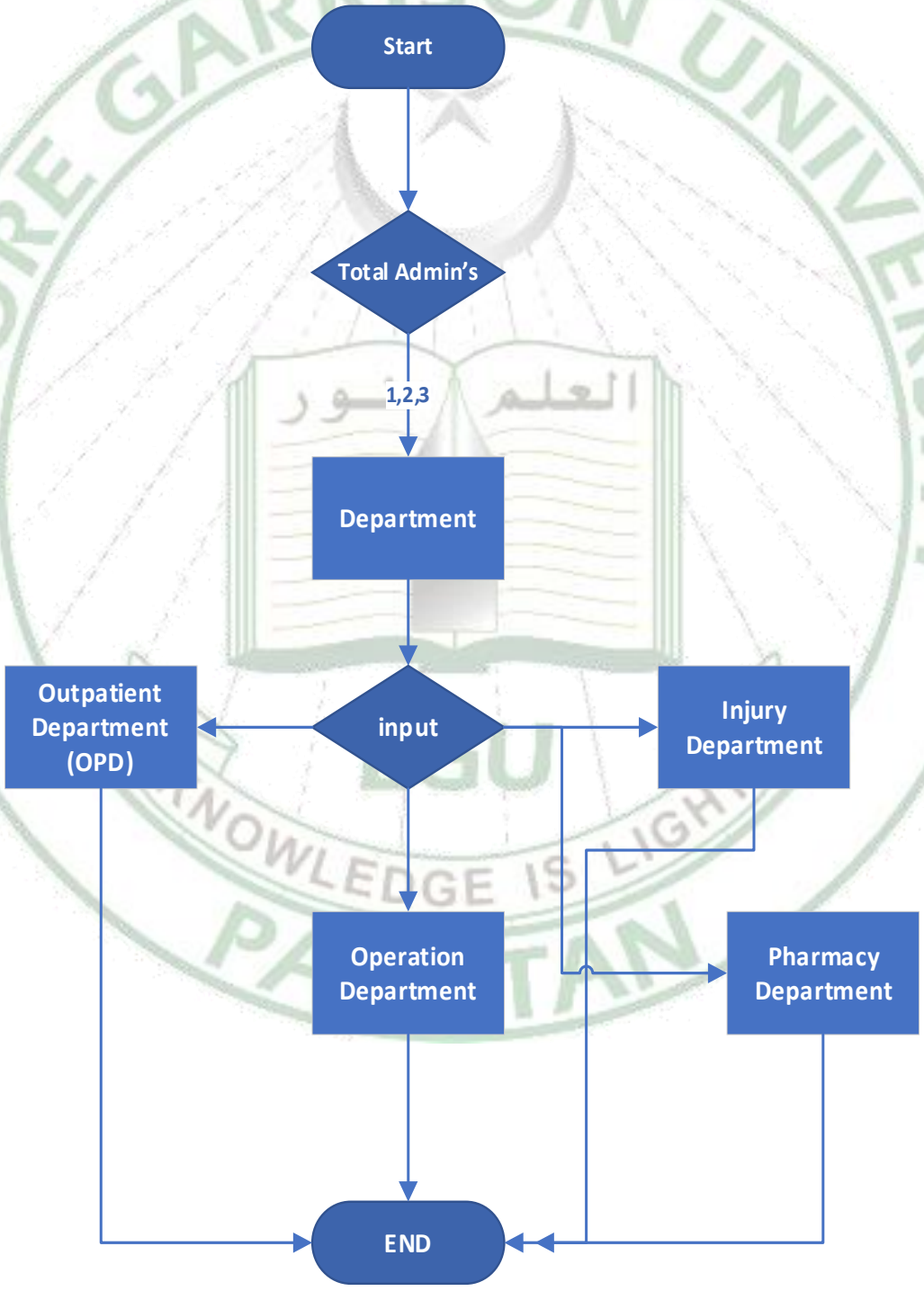
We use SJF in this department to fulfil the requirements small operations will be handled first and the time-consuming operations will be handled later critical conditions will be managed manually.

4. **Pharmacy**

we use Producer-Consumer algorithm because of pharmacy process as we know in pharmacy there is multiple processes are done at the same time customer purchase medicine and manager add or delete medicines.

We can also use file handling to maintain the record of the medicines and check it time by time so medicine manage full CRUD functionality.

➢ Flow Chart


Start
Total Admin's
1,2,3
Department
input
Outpatient Department (OPD)
Injury Department
Operation Department
Pharmacy Department
END

- **Languages**
  - ✓ C++

- **Tools**
  - ✓ Visual Studio / Dev C++
  - ✓ Git + Github

JAZAKALLAH