**The Open University of Sri Lanka**

**Department of Electrical and Computer Engineering**

**Bachelor of Software Engineering Honours**

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**EEX5362**

**Performance Modelling**

**Mini Project – Deliverable 01**

**Name: L. B. J. Kasthuri**

**Student ID: S20003182**

**Registration No: 621435699**

**System Description**

The system chosen is the OPD (Out-Patient Department) of the District General Hospital in Negombo. Being a major base hospital in the Gampaha District, it serves a large patient population and operates as one of the largest OPDs in the country. The OPD serves about 1,500 - 2,000 patients per day within 8 hours from 8:00 AM to 4:00 PM. Morning hours from 8:00 AM to 12:00 PM are considered the peak hours.

Patient registration, record retrieval and issuing tokens are all done manually. There is a variety of patients categories at the OPD including routine follow-ups, minor cases and urgent cases. All of these patients are served in one place causing unnecessary delay. Due to the high demand and less availability of doctors, and poor performance, OPD waiting areas are always seen crowded queued. The core problem is the imbalance between patient demand and available clinical resources, resulting in delay of care delivery, poor patient satisfaction, and straining of hospital staff.

The stakeholders of the system are,

* Patients
* Consulting doctors
* Registration clerks
* Hospital management

The process of the OPD operation is shown below:

Arrival

Registration & Token Issuance

Waiting for Consultation

Consultation

Exit

The purpose of this mini project is to identify the performance bottlenecks, and analyze and model data to record system behaviour under various conditions, in order to provide insights for the hospital management for improving performance. The goal is to minimize patient waiting time and optimize resources.

**Performance Objectives**

1. To minimize the average patient waiting time (from registration to consultation).
2. To determine the primary constraint on system throughput and waiting time through analysis of resource utilization and queue lengths.
3. To optimize resource allocation by reallocating or adding additional doctors during peak hours.
4. To analyze the effect of implementing a priority-based queueing system on patient waiting time.

**Data Set**

GitHub repository:

<https://github.com/JananiKasthuri/EEX5362---Mini-Project?tab=readme-ov-file#eex5362---mini-project>

The simulation modelled 333 patients representing the daily patient population. This can be scaled to reflect the actual average by proportionally adjusting arrival rates and resource allocation.