**Artificial Intelligence Project Proposal Phase 1**

### **1. Project Title**

**Patient Queue Optimizer for Clinic**

2. Team Members

| **Name** | **Registration No.** | **Section** | **Email** |
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| JAN SHER | F2022266074 | V8 | F2022266074@umt.edu.pk |

### **3. Problem Statement**

Clinics often face long waiting times and mismanaged patient queues, causing frustration for both patients and doctors. This project aims to solve the problem by optimizing the patient queue using an AI system.

### **4. Objectives**

* To develop an AI system that manages and prioritizes patient queues efficiently.
* To reduce patient waiting time and improve clinic workflow.
* To prioritize patients based on urgency, appointment type, and doctor availability.
* To create a smart, fair, and easy-to-use queue system for clinics.

### **5. Project Description**

This project will create an AI-based system that helps clinics organize their patient queues in a better way. Instead of the traditional first-come-first-serve approach, our system will analyze different factors like appointment type, patient condition (emergency or normal), and doctor availability to decide the order of patients.

The system will take input from patients and staff through a user interface and process the data using decision-making algorithms. It will then display the optimized queue to both patients and doctors. This will reduce waiting time, avoid unnecessary delays, and improve overall clinic service.

### **6. Artificial Intelligence Technique(s) to be Used**

* **Rule-Based System** – to define queue priority rules based on patient type.
* **Utility-Based Agent** – to calculate and decide which patient should go next.
* **Decision Trees** – to help the system make quick and accurate queue decisions.

### **7. Proposed Environment (if applicable)**

* **Decision advisor for user inputs** – The AI agent will take patient information and appointment details and advise the best queue arrangement.

### **8. Tools / Languages / Libraries**

* **Programming Language:** Python
* **Tools:** PyCharm, Jupyter Notebook
* **Libraries:** tkinter (for UI), pandas, NumPy, matplotlib

### **9. Expected Challenges**

* Creating flexible and fair priority rules for all patient types.
* Handling real-time updates and reordering the queue when new patients arrive.
* Designing a simple and user-friendly interface for clinic staff and patients.

### **10. Evaluation Criteria**

* Accuracy and fairness of queue arrangement
* Reduced average waiting time for patients
* User satisfaction and ease of use
* Correct and quick execution of decision logic

11. Tentative Plan / Timeline

| **Week** | **Task Description** |
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| **Week 3–4** | ● Finalize project scope and AI approach (rule-based, utility-based, decision tree).● Gather information on clinic operations and patient flow.● Start building the patient input and data collection module. |
| **Week 5–6** | ● Develop core AI logic for patient prioritization.● Implement rule-based and utility-based decision system.● Test queue optimization logic with sample patient data. |
| **Week 7–8** | ● Design and develop user interface using tkinter.● Integrate AI logic with UI components.● Enable live queue updates based on new patient entries. |
| **Week 9** | ● Perform full system testing and fix any bugs.● Evaluate system performance (accuracy, waiting time reduction).● Prepare final documentation and project presentation. |