UNIVERSITI TEKNOLOGI MALAYSIA, JOHOR BAHRU

FACULTY OF COMPUTING

SECD2523-08 DATABASE

Phase 1: Project Proposal & Database Requirements

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1. ***Introduction:***

In the ever-evolving landscape of healthcare, Ajman University Private Dental Clinic has experienced its fair share of challenges, from navigating the complexities of healthcare in the midst of a global pandemic to grappling with payment processing woes. These trials have shown how urgent it is to move past pen and paper processes and into a new era of healthcare management.

2. Background Study:

The COVID-19 epidemic caused previously unheard-of disruptions to the healthcare system. Like many others, the clinic had to make quick adjustments to guarantee the security of its personnel and clients. The manual, paper-based systems that had served the clinic for years suddenly revealed their limitations in a world where contactless interactions and efficient data management became paramount. Difficult obstacles included patient tracking, scheduling modifications, and the requirement for quick access to correct information.

Apart from the obstacles caused by the pandemic, the clinic also faced problems with processing payments. Financial hardship and administrative challenges resulted from delayed reimbursements caused by antiquated billing and payment practices. More accessible payment choices were requested by patients as well, underscoring the significance of a flexible and patient-centered billing strategy.

Ajman University Private Dental Clinic has started a revolutionary journey to improve its healthcare management system after realizing these difficulties. We offer a novel solution that resulted from the clinic's will to advance and provide greater community service. By smoothly transferring from manual techniques to a reliable database-driven system, our project seeks to transform healthcare management. This shift is expected to promote accuracy, efficiency, and unmatched patient care.

This all-inclusive solution is ready to tackle wider problems related to inefficient administration, inaccurate data, and inadequate data analysis capabilities, in addition to the acute concerns brought on by the COVID-19 pandemic. The clinic is putting itself in a position to move with agility and resilience through the future healthcare landscape by adopting a forward-thinking approach. The project imagines a time when advanced technology is easily integrated into healthcare administration, improving patient outcomes and raising the bar for care. In this transformed landscape, the Ajman University Private Dental Clinic will stand as a beacon of innovation and excellence, setting new standards for healthcare providers in the region and beyond.

3. ***Problem Statement:***

The proposed project seeks to address these challenges by transitioning to an advanced, database-driven system that will improve operational efficiency and patient care. Among the various problems and challenges Ajman University Private Dental Clinic faces is the following:

Inefficient Data Recording: The Ajman University Clinic's healthcare management system currently relies heavily on manual data recording methods involving pens and paper. Due to the outdated methodology, staff members must invest a great deal of time and energy in duties like data entry, retrieval, and changes, which leads to major inefficiencies. These inefficiencies delay patient care in addition to impeding operational productivity.

Data Accuracy and Consistency Issues: The manual nature of the existing system makes it inherently prone to errors, resulting in inaccuracies and inconsistencies in data. The clinic's capacity to keep accurate and trustworthy patient records is jeopardized by issues such as handwriting that is difficult to read, duplicate data, and the possibility of data loss during transmission or storage. The decision-making processes of the clinic and patient care may be significantly impacted by these errors.

Limited Data Analysis Capabilities: The current system in place at the clinic lacks the essential data analysis tools needed to extract valuable insights from the wealth of information it generates. This absence of analytical capabilities

hampers the clinic's capacity to make data-informed decisions, recognize treatment trends, and allocate resources efficiently, thereby hindering the optimization of patient care and resource allocation.

Excessive Administrative Burden: The manual, paper-based system imposes a significant administrative burden on the clinic's staff. This burden encompasses managing physical records, coordinating appointment schedules, and processing payments through conventional methods. The cumulative effect of these administrative tasks diverts valuable time and resources away from patient care and towards administrative duties.

Patient Experience and Accessibility Challenges: Patients frequently encounter difficulties in accessing services due to the inefficiencies inherent in the current system. This affects various aspects, including appointment scheduling, feedback collection, and access to their medical records, resulting in potential patient dissatisfaction, extended waiting times, and communication challenges with the clinic.

Payment and Billing Constraints: The existing system falls short of providing the flexibility that modern patients demand when it comes to payment and billing options. Patients face limitations in how they can settle their bills or process insurance claims, impacting the overall experience and convenience of accessing healthcare services.

4. Proposed Solutions:

In response to the complex challenges identified in the preceding problem statement, our proposed solutions are strategically designed to not only avoid existing obstacles but also pave the way for an era of data-driven healthcare excellence. The following are the solutions:

I. Integration of Data Analytics Tools:

- To harness the wealth of data generated by the clinic, we propose integrating advanced data analytics tools. These tools will enable the clinic to extract valuable insights, identify treatment trends, and optimize resource allocation, ultimately improving patient care.

II. Streamlining Administrative Processes:

- The proposed system will automate administrative tasks such as appointment scheduling, billing, and payment processing. This streamlining of administrative processes will reduce the burden on staff, allowing them to focus more on patient care and less on paperwork.

III. Enhanced Patient Access and Communication:

- We recommend implementing a patient portal that provides easy access to appointment scheduling, secure messaging with healthcare providers, and the ability to view their medical records. This will enhance the patient's experience and improve communication between patients and the clinic.

IV. Flexible Payment and Billing Options:

- The new system will offer a range of payment and billing options to cater to modern patient preferences. This includes online payment methods, insurance claims processing, and transparent billing statements, ensuring a convenient and hassle-free experience for patients.

V. Staff Training and Change Management:

- We propose a comprehensive training program for clinic staff to ensure a smooth transition to the new system. Change management strategies will be implemented to facilitate a seamless shift from manual processes to the digital platform.

VI. Data Security and Compliance:

- Data security and patient confidentiality are paramount. We will implement robust data security measures and ensure compliance with healthcare regulations to protect patient information and maintain trust.

VII. Continuous Monitoring and Improvement:

- Our project includes ongoing monitoring and regular evaluation of the system's performance. We will solicit feedback from both staff and patients to make continuous improvements, ensuring that the system evolves to meet the clinic's changing needs.

Feasibility Study:

Assumptions	
Discount rate	0.1%
Sensitivity factor (cost)	1.1
Sensitivity factor (benefit)	0.9
Annual change (production cost)	0.07
Annual change (benefit)	0.05

Cost		
Development	**$**	**Comment**
EHR Hardware	15000.00	-
Network Setup	10000.00	-
Software Tools	5000.00	-
Database Software	5000.00	

Production	**$**	**Comment**
Training	8000.00	per year
IT Support Salary	30000.00	per year

Benefit	**$**	**Comment**
Intangible Benefit		
Patient Engagement Boost	2000.00	per month
Reputation Improvement	2000.00	per month
Tangible Benefit		
Reduced Admin Costs	1000.00	per month
Increased Efficiency Revenue	1500.00	per month
Improved Record Accuracy	500.00	per month

The profitability index of 2.49 indicates a favorable investment, as it surpasses the threshold of one.

COST BENEFIT ANALYSIS (CBA) FOR Ajman University Private Dental Clinic												
CRITERIA	YEAR											
	0		1		2		3		4		5	
1. COST	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL
A. DEVELOPMENT												
Development												
EHR Hardware	15000	16500										
Network Setup	10000	11000										
Software Tools	5000	5500										
Database Software	5000	5500										
TOTAL DEVELOPMENT COST	35000	38500										
B. PRODUCTION												
Production												
Training			8000	8800	8800	9416	9416	10075	10075	10780	10780	11535
IT Support Salary			30000	33000	33000	35310	35310	37782	37782	40426	40426	43256
ANNUAL PRODUCTION COST				41800		44726		47857		51207		54791
PRESENT VALUE (PV)				38000		36964		35956		34975		34021
ACCUMULATED COST				76500		113464		149419		184394		218415
2. BENEFIT												
Intangible Benefit												
Patient Engagement Boost			2000	21600	21600	22680	22680	23814	23814	25005	25005	26255
Reputation Improvement			2000	21600	21600	22680	22680	23814	23814	25005	25005	26255
Tangible Benefit												
Reduced Admin Costs			1000	10800	10800	11340	11340	11907	11907	12502	12502	13127
Increased Efficiency Revenue			1500	16200	16200	17010	17010	17861	17861	18754	18754	19691
Improved Record Accuracy			500	5400	5400	5670	5670	5954	5954	6251	6251	6564
ANNUAL BENEFIT				75600		79380		83349		87516		91892
PRESENT VALUE (PV)				68727		65603		62621		59775		57058
ACCUMULATED BENEFIT				68727		134331		196952		256727		313785
GAIN/LOSS				-7773		20867		47533		72333		95370
PROFITABILITY INDEX (PI)				2.48								

VIII. Electronic Health Records (EHR) System:

- We recommend adopting a robust EHR system that allows for the digital capture, storage, and retrieval of patient records. This system will ensure accurate and consistent data entry, minimizing the risk of errors associated with manual recording.

5. ***Objectives:***

Our project for Ajman University Private Dental Clinic is guided by a set of thorough objectives that align with the clinic's mission and its vision for a more efficient and patient-centered healthcare management system. These objectives incorporate a range of vital goals, targeting to address the clinic's existing challenges while embracing the opportunities presented by modern healthcare practices. Our key objectives are as follows:

I. **Perfect Transition to a Database-Driven System:**

- Our foremost objective is to smoothly transition the clinic from its traditional pen-and-paper operations to an advanced Electronic Health Records (EHR) system. This upgrade will eliminate manual data entry, simplifying processes and reducing human errors.

II. **Enhanced Data Accuracy and Consistency:**

- We aim to improve data accuracy and consistency by eradicating issues associated with manual record-keeping, such as illegible handwriting and data duplication. The EHR system will ensure that patient records are accurate, reliable, and easily accessible.

III. **Empower Data-Driven Decision-Making:**

- Our project will empower the clinic to leverage data analytics tools for valuable insights. This will enable informed decisions, identification of treatment trends, efficient resource allocation, and ultimately, an elevated standard of patient care.

IV. **Administrative Efficiency and Staff Focus on Patient Care:**

- We seek to streamline administrative processes, including appointment scheduling, billing, and payment processing, to relieve staff from administrative burdens. This shift will enable healthcare professionals to dedicate more time to patient care.

V. **Improved Patient Experience and Accessibility:**

- Our objective is to enhance the patient experience through a user-friendly patient portal that facilitates easy appointment scheduling, secure communication with healthcare providers, and convenient access to medical records. This will reduce wait times and enhance overall patient satisfaction.

VI. **Flexible Payment and Billing Options:**

- We will provide a range of flexible payment and billing options to cater to modern patient preferences. This includes online payment methods, insurance claims processing, and transparent billing statements, ensuring a hassle-free experience.

VII. **Staff Training and Change Management:**

- Comprehensive staff training and change management strategies will be implemented to ensure a smooth transition to the new system. Our goal is to equip staff with the skills and knowledge necessary for a successful digital transformation.

VIII. **Data Security and Compliance:**

- We will implement robust data security measures to safeguard patient information and ensure compliance with healthcare regulations. Preserving patient data confidentiality and trust is a top priority.

IX. **Continuous Monitoring and Improvement:**

- We will establish mechanisms for ongoing monitoring and regular evaluation of the system's performance. Actively seeking feedback from both staff and patients, we will work to continuously enhance the system, ensuring that it evolves to meet the clinic's changing needs.

These objectives collectively form the foundation of our project, aiming to propel Ajman University Private Dental Clinic into a future where healthcare management is not only efficient and precise but also patient-centric and adaptable to the ever-evolving healthcare landscape.

6. Scope:

System Oriented:

- Development and implementation of a comprehensive Electronic Health Records (EHR) system.
- User registration and login functionality for staff.
- Digital storage and retrieval of patient records, replacing manual data entry.
- Integration of advanced data analytics tools to extract valuable insights.
- Automation of administrative processes, including appointment scheduling, billing, and payment processing.

- Development and implementation of a patient portal for enhanced patient experience and communication.
- Provision of flexible payment and billing options, including online payment methods and insurance claims processing.
- Comprehensive staff training programs and change management strategies to support the transition to the new system.
- Implementation of robust data security measures to protect patient information and ensure compliance with healthcare regulations.
- Ongoing monitoring and evaluation of the system's performance and continuous improvement.
- Adherence to compliance with healthcare regulations and standards.

User Oriented (Clinic Staff):

- Access to the EHR system for patient data management.
- User accounts with role-based permissions.
- Training and support for staff to effectively use the EHR system.

User Oriented (Patients):

- Access to the patient portal for appointment scheduling, secure communication with healthcare providers, and access to medical records.
- Payment options for services, including online payment methods and insurance claims processing.

User Oriented (Administrator):

- Oversight of system implementation, monitoring, and management.
- Ensuring data security and compliance with healthcare regulations.

In order to ensure every individual is aware of the project's scope and to make it clear what will and won't be included in the database application, it is important

that the system boundaries are defined. These borders define the project's bounds and help in stakeholders' understanding of the system's range.

What Will Be Included (Boundaries of Database Application)?

- **Electronic Health Records (EHR) System:** The primary focus of the project is the development and implementation of an advanced Electronic Health Records (EHR) system.The main element of the system will be to enable the digital extraction, storing, and retrieval of patient records and to switch from conventional pen and paper methods to the computerized approach.

- **User Registration and Login Functionality:** There will be staff-only user registration and login features included in the database application's boundaries. Role-based permissions will give staff members restricted and secure access to patient data.

- **Integration of Data Analytics Tools:** The project includes the integration of sophisticated data analytics tools. These tools are intended to help with data-informed decision-making by utilizing the huge amount of data generated in the clinic. The technology will optimize resource allocation by studying trends and patterns, which will ultimately result in a higher standard of patient care.

- **Automation of Administrative Processes:** Administrative processes, such as appointment scheduling, billing, and payment processing, will be automated within the system. The goal of this automation is to free up clinic employees from administrative duties so they can concentrate more on patient care and less on paperwork.

- **Patient Portal:** The project includes the development and implementation of a patient portal.Through practical features like appointment scheduling, secure communication with healthcare providers, and access to their medical records, this portal will help patients. It enhances the patient experience and makes it easier for patients and the clinic to communicate.

- **Payment and Billing Options:** To accommodate the preferences of contemporary patients, the system will provide a wide variety of flexible payment and billing options. In order to give patients a hassle-free experience, this includes implementing online payment options, processing insurance claims, and providing transparent billing statements.

- **Staff Training Programs:** To guarantee a seamless transition to the new system, extensive staff training programs will be put into place. These courses are intended to give employees the abilities and information required for an effective digital transformation. The efficient use of the EHR system and other automated procedures depends on this training.

- **Data Security Measures:** To protect patient data and guarantee adherence to health care laws, the database application will implement strong data security measures. Trust must be upheld, and patient data confidentiality must be protected.

- **Ongoing Monitoring and Evaluation:** The implementation phase is not the end of the project. It has tools for continuing observation and routine assessment of the system's functionality. The clinic will actively seek feedback from both staff and patients in order to drive continuous improvements and make sure the system adapts to the changing needs of the clinic.

- **Data Migration:** The transfer of current patient data from manual records to the EHR system is implied even though it isn't stated explicitly.

A crucial component of the project is making sure the data migration process runs smoothly and accurately.

What Will Not Be Included (Major User Views)?

- **Specific User Interface Design:** The comprehensive design of the EHR system's user interface (UI) is outside the purview of this project. The functionality of user registration and login is covered, but the precise design components and user interface layout might not be stated clearly in this scope. This gives the UI design flexibility to adjust to the changing needs of the clinic.

- **Hardware and Infrastructure Procurement:** This project does not cover the acquisition and procurement of hardware and infrastructure components required for the database application. Servers, networking hardware, and other tangible infrastructure elements fall under this category. These elements might be included in a different procurement procedure.

- **Clinical Decision Support:** Using clinical decision support algorithms or tools in the database application is not specifically mentioned in the project. These might not fit within the parameters. If these tools are ever used, the system might be able to supply the data needed to support them.
- **Custom Reporting:** Although data analytics tools will be integrated, the scope does not specifically address the creation of custom reports or dashboards for data analysis. Depending on future requirements, the creation of customized reports may be viewed as an additional scope or as a separate project.

- **Third-Party Software Integration:** The project might need to integrate with systems or software from third parties that aren't specifically stated. Depending on the particular requirements, such integrations may be deemed outside the defined scope and necessitate further project

planning. External systems for processing insurance claims or exchanging data with other healthcare providers are examples of these integrations.

- **Regulatory Compliance Auditing:** Although the project places a strong emphasis on data security and compliance, it does not specifically include external audits, certifications, or comprehensive regulatory compliance auditing procedures within its scope. While system development and implementation are the primary focus of the project, these aspects may also be included in ongoing compliance efforts.

- **Long-Term System Maintenance:** The project scope does not specifically address the EHR system's long-term support and maintenance after it has been initially implemented. This covers regular technical support, system upgrades, and software updates. To handle these aspects, a different maintenance plan or agreement might be required.

User Views:

- **Staff User Views:** Access to patient information, appointment scheduling, and medical history may be necessary for physicians, nurses, and other healthcare providers. For reviewing patient data and documenting treatment specifics, they need an interface that is easy to use.

- **Administrative Staff:** The system can be used by receptionists and administrative staff to schedule appointments, process payments, and bill clients. They require an interface which makes these administrative duties easier.

- **Data Entry Staff:** Employees in charge of data entry and record keeping will have unique user views for updating records and entering data. An organized data entry interface is part of this.

- **Technical Support Staff:** For maintenance and troubleshooting purposes, IT support staff may have access to the system. They may offer diagnostics and system monitoring as user views.

- **Patient Portal:** Patients will use a patient portal to make appointments, securely communicate with medical professionals, access their health records, and look over their bill details. The patient interface on the portal is one of their user views.

Administrator User View:

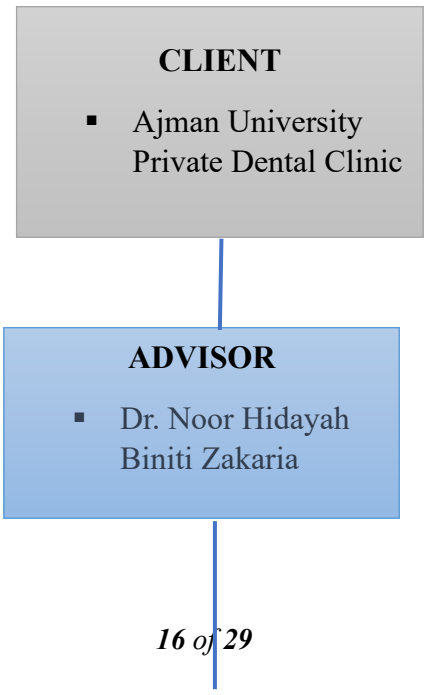
- **System Administrators:** Those with administrator user views are in charge of the general upkeep and administration of the EHR system. Data access control, user management, and system configuration are some of these perspectives.

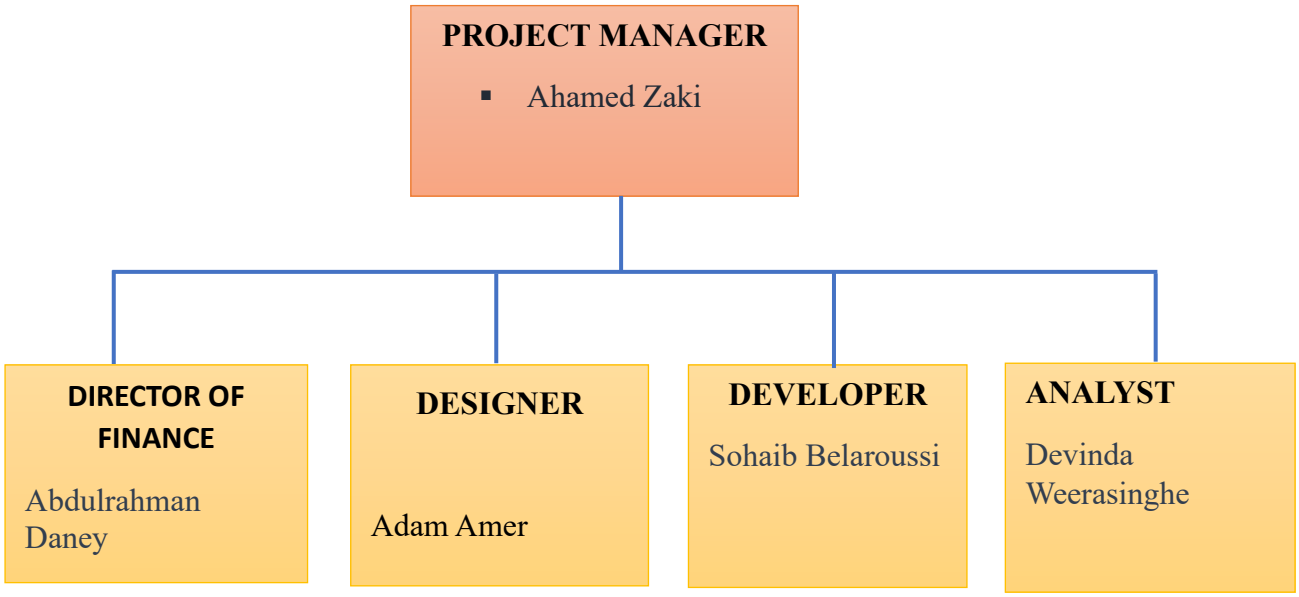
- **Compliance Officers:** Those in charge of making sure data security and regulations are followed may have special access to auditing and compliance monitoring tools.

This project scope statement outlines the functionalities and features of the proposed system the Ajman for University Private Dental Clinic, categorizing them by the system components and user roles. It provides a clear overview of the project's objective and functionality.

7. ***Project Planning:***

Human Resources:

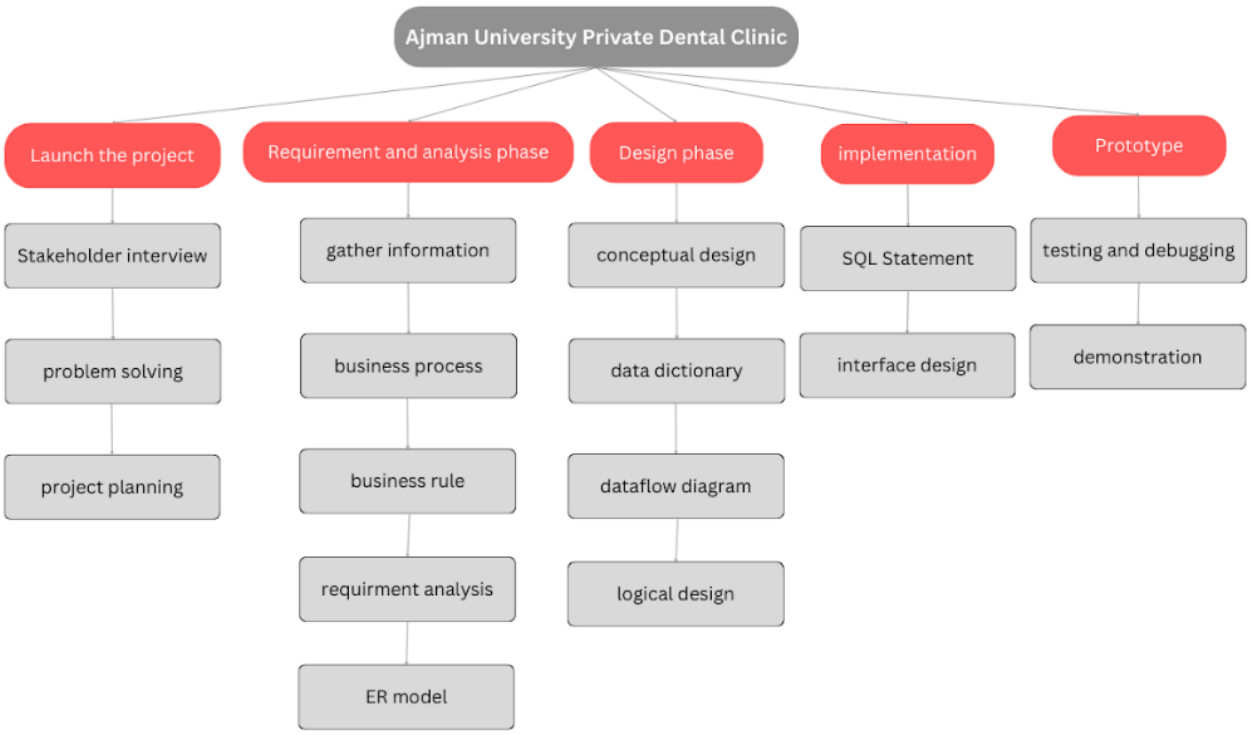




Role	Person in Charge	Responsibility
Client	Ajman University Private Dental Clinic	➢ Provide business information ➢ Request for changes ➢ Provide project budget
Advisor	Dr. Noor Hidayah Binti Zakaria	➢ Review the progress of the project ➢ Provide advice and point out what can be improved
Project Manager	Ahmed Zaki	➢ Plan the project

		➢ Monitor the project work ➢ Manage the tasks for each member
Director of Finances	Abdulrahman Daney	➢ Provide business information ➢ Manage Budget and Fincances
Analyst	Devinda Weerasinghe	➢ Project Analysis ➢ Data Management
Designer	Adam Amer	➢ Preparing or modifying designs for the development of the project
Developer	Sohaib Belaroussi	➢ Develop Data ➢ Test Data ➢ Fix Bugs

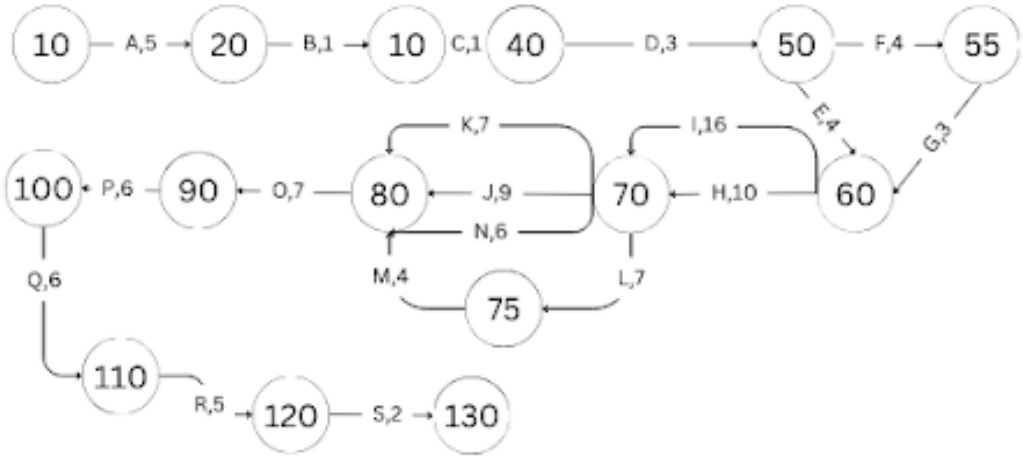
WBS (Work Breakdown Structure):



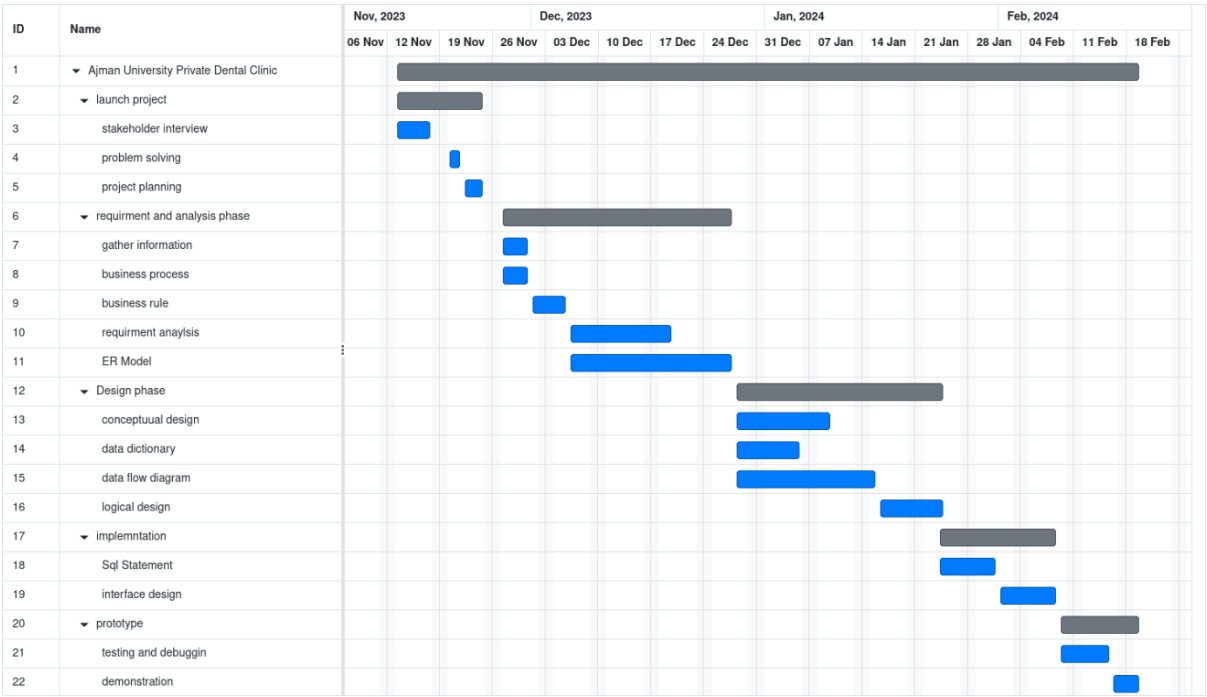
PERT Chart:

Activity	*Task Name*	*Predecessor*	*Duration (days)*
A	*Stakeholder Interview*	*NONE*	*5*
B	*Define Problem*	*A*	*1*
C	*Proposed Solution*	*B*	*1*
D	*Project Planning*	*C*	*3*
E	*Gather Information*	*D*	*4*
F	*Business process*	*D*	*4*
G	*Business Rule*	*F*	*3*
H	*Requirement Analysis*	*E, G*	*10*
I	*Entity-relational Model*	*E, G*	*16*
J	*Conceptual Design*	*H, I*	*9*
K	*Data Dictionary*	*H, I*	*7*
L	*Logical Data Flow Diagram*	*H, I*	*7*
M	*Process Specification*	*L*	*4*
N	*Physical Data Flow Diagram*	*L*	*6*
O	*Logical Design*	*J, K, M, N*	*7*
P	*SQL Statement*	*O*	*6*

	Interface Design	***P***	***6***
R	***Testing and debugging***	***Q***	***5***
S	***Demonstration prototype***	***R***	***2***



GANTT Chart:



8. *Requirement Analysis (Based on AS – IS analysis):*

Current business process (scenarios, workflow)

Operational Challenges:

I. Pandemic-Induced Disruptions:

- During the COVID-19 pandemic, the clinic faced unprecedented challenges related to patient management. Manual, paper-based systems proved inadequate in handling the sudden need for contactless interactions and efficient data management.

- **Patient Tracking:** Tracking patients became a critical issue as the clinic struggled to keep up with the dynamic situation. Manual records led to delays in identifying potential exposure risks and contact tracing.

- **Scheduling Modifications:** The pandemic necessitated rapid changes in appointment schedules. Manual scheduling processes struggled to adapt, leading to confusion, missed appointments, and suboptimal resource utilization.

- **Information Accessibility:** The need for quick access to accurate information became paramount. Paper-based systems hindered the timely retrieval of patient data, affecting the clinic's ability to make informed decisions and provide efficient care.

II. Payment Processing Woes:

- **Financial Hardship:** The clinic faced financial challenges due to delayed reimbursements caused by antiquated billing and payment practices. This not only strained the clinic's resources but also impacted the timely delivery of quality healthcare.

- **Administrative Challenges:** Outdated billing practices led to administrative difficulties, diverting resources from patient care to managing billing-related issues.

- **Patient Demands:** Patients, in response to changing financial landscapes, began demanding more accessible payment choices. The existing system's rigidity in payment options underscored the need for a flexible and patient-centered billing strategy.

Current Business Process:

I. Patient Management Scenarios:

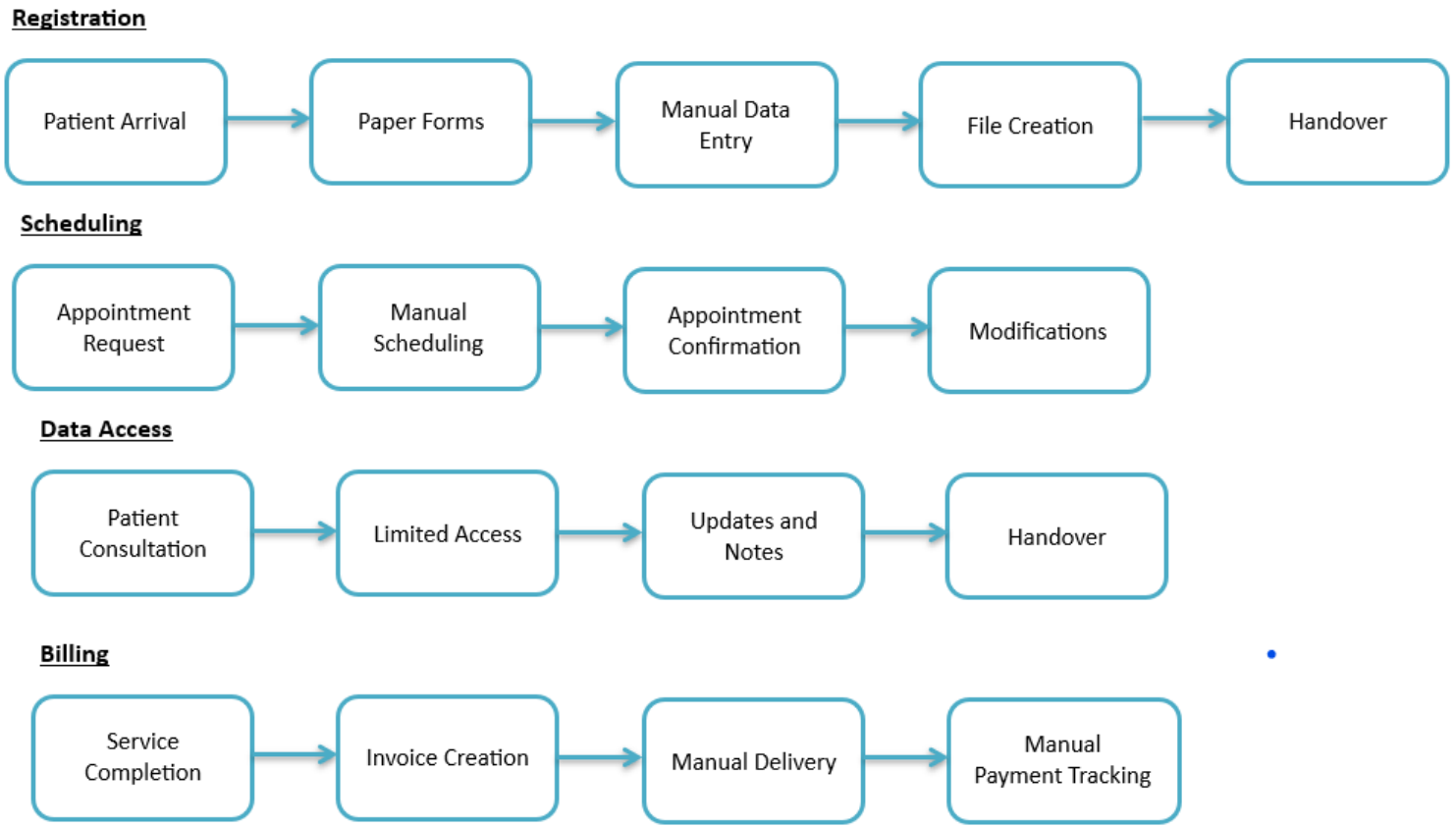
- **Registration:** Patients currently undergo a manual registration process, involving paper forms and manual data entry. This not only introduces errors but also consumes valuable time, leading to delays in patient care.

- **Scheduling:** Scheduling modifications are a cumbersome process. The manual system struggles to adapt to sudden changes, leading to inefficiencies, patient dissatisfaction, and staff frustration.

- **Data Access:** Healthcare providers face challenges in accessing patient information promptly. This impacts the efficiency of consultations and may lead to suboptimal patient outcomes.

- **Billing:** Billing processes rely on outdated methods, including manual invoicing and legacy software. This contributes to delays in reimbursement and increases the risk of billing errors.

II. Workflow:


Registration
Patient Arrival
Paper Forms
Manual Data Entry
File Creation
Handover
Scheduling
Appointment Request
Manual Scheduling
Appointment Confirmation
Modifications
Data Access
Patient Consultation
Limited Access
Updates and Notes
Handover
Billing
Service Completion
Invoice Creation
Manual Delivery
Manual Payment Tracking

9. *Transaction requirement (data entry, data update/delete, data queries):*

Transaction Requirements for the Updated System at Ajman University Private Dental Clinic:

9.1 Data Entry Transactions:

a. Patient Registration:

- Data Entry: Capture patient demographic information (name, age, gender, contact details).
- Data Update/Delete: Allow for updates in case of changes in patient information or deletion in case of duplicate entries.

b. Medical History Entry:

- Data Entry: Input and update patient medical history, including pre-existing conditions, allergies, and medications.

- Data Update/Delete: Allow for modifications and deletions in medical history records.

c. Appointment Scheduling:

- Data Entry: Schedule appointments for patients, including date, time, and healthcare provider.

- Data Update/Delete: Enable rescheduling or cancellation of appointments.

d. Billing Information:

- Data Entry: Input billing details, including services provided, costs, and payment information.
- Data Update/Delete: Allow for corrections in billing information and deletion of incorrect entries.

e. Treatment Plans:

- Data Entry: Enter details of treatment plans prescribed by healthcare providers.
- Data Update/Delete: Allow for adjustments to treatment plans or removal if no longer applicable.

9.2 Data Update/Delete Transactions:

a. Patient Information Update:

Data Update: Modify patient demographic information (e.g., change of address or phone number).

b. Medical Records Update:

Data Update: Update patient medical records with new information or changes in health status.

c. Appointment Rescheduling/Cancellation:

Data Update: Allow for rescheduling or cancellation of appointments by patients or clinic staff.

d. Billing Corrections:

Data Update: Permit corrections to billing information, such as adjustments to charges or payment details.

e. Treatment Plan Adjustments:

Data Update: Modify treatment plans based on changes in patient condition or healthcare provider decisions.

9.3 Data Queries Transactions:

a. Patient Data Retrieval:

Data Query: Retrieve patient demographic information, medical history, and treatment details.

b. Appointment Information Query:

Data Query: Retrieve details of scheduled appointments, including date, time, and healthcare provider.

c. Billing Information Query:

Data Query: Retrieve billing details, including services rendered, costs, and payment status.

d. Medical Records Query:

Data Query: Retrieve specific medical records based on patient identifiers or conditions.

e. Treatment Plan Query:

Data Query: Access and review current treatment plans for patients.

f. Data Analysis Queries:

Data Query: Utilize data analytics tools to run queries for insights into patient trends, resource allocation, and treatment outcomes.

These transaction requirements ensure the smooth functioning of the updated system, allowing for efficient data entry, updates, deletions, and queries to support comprehensive healthcare management at Ajman University Private Dental Clinic.

10. Benefit and Summary of Proposed System:

I. **Efficiency and Accuracy:**

Less time and effort are expended on manual chores when administrative operations are automated.

Removing paper-based methods improves data accuracy by lowering handwriting and data duplication errors.

II. Improved Medical Attention:

By using data analytics technologies, the clinic is better equipped to recognise treatment trends, make well-informed decisions, and allocate resources optimally for better patient care.

Improved data accuracy and streamlined procedures lead to more effective and individualized healthcare treatments.

III. Accessibility and the Experience of Patients:

By putting in place a patient portal, you may easily access services like secure communication, appointment scheduling, and access to medical records.

The patient experience is improved overall by flexible payment and billing alternatives that meet the needs of contemporary patients.

IV. Executive Effectiveness:

Staff members can concentrate more on patient care when administrative duties like billing and appointment scheduling are automated.

Process simplification leads to better workflow and more economical use of resources.

V. Ability to Adjust to New Difficulties:

The clinic is positioned to handle upcoming healthcare challenges with agility and resilience thanks to the system's forward-thinking strategy and integration of cutting-edge technologies.

VI. Data Safety and Adherence:

Ensuring the confidentiality and integrity of patient information through robust data security measures fosters confidence among patients.

Legal and ethical risks are reduced by maintaining compliance with healthcare legislation.

VII. Constant Enhancement:

Continuous improvement to suit the changing needs of the clinic is made possible via feedback systems, regular system performance evaluations, and ongoing monitoring.

11.Summary:

The suggested system aims to completely overhaul the healthcare administration of the Ajman University Private Dental Clinic. Through the utilization of cutting-edge technology, the clinic hopes to eliminate manual procedures, tackle present issues, and get ready for unforeseen circumstances in the future.

The system has many capabilities, such as a patient portal, improved administrative procedures, data analytics tools, and Electronic Health Records (EHR). Enhancing patient experience, guaranteeing staff efficiency, and empowering data-driven decision-making are the main goals.

The boundaries of the database application are defined by the project scope, which also specifies what will be included and excluded. The data enter, update/delete, and query transactions required to fulfill the clinic's operating needs are outlined in the transaction requirements.

All things considered, the suggested approach has the potential to establish new benchmarks for healthcare providers and position Ajman University Private Dental Clinic as a leader in innovation and superiority in healthcare management.