QUDUS

Design a database system for Qudus project

Introduction To Database Systems Course

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INTRODUCTION TO DATABASE SYSTEMS

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Qudus Database

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Problem Statement:

Given the sanctity of our home -and the ongoing instability, even constant danger, along with daily projects aimed at erasing our history, architecture, and heritage- this project aspires to create a space that safeguards ancient artifacts, showcases contemporary art crafted by young Palestinian artists, and offers visitors a technology-driven, interactive experience that ensures the meaning, beauty, and legacy remain with them.

This fusion of authenticity, tradition, and innovation -bridging ancestors with future generations- makes "Qudus" a living archive of the Islamic identity of Al-Aqsa Mosque and the Palestinian identity of Jerusalem. It is always accessible, and its impact is felt everywhere.

Requirements:

Functional:

- Artefact & Artwork Management (add, edit, categories, and link items to exhibitions and artists, …).
- Create and manage exhibitions (start/end dates, items, staff, …).
- Manage staff roles (guide, designer, admin, …).
- Visitor Management (register visitor entries and collect feedback, …).
- 3D Printing Service and Sales Tracking (support custom designs, track print status, and link sales to visitors, …).
- Reporting & Analytics.

Non-Functional:

- The interface should be intuitive for staff and visitors—if needed.
- The system should handle multiple concurrent users smoothly.
- Should support future expansion (e.g., more exhibits, services).
- Protect items and visitor data.
- Restrict access to admin functions.
- The system should be accessible during museum hours with minimal downtime.
- Easy to update the database schema and add new features.

ER Diagram: <u>Draw.io</u>
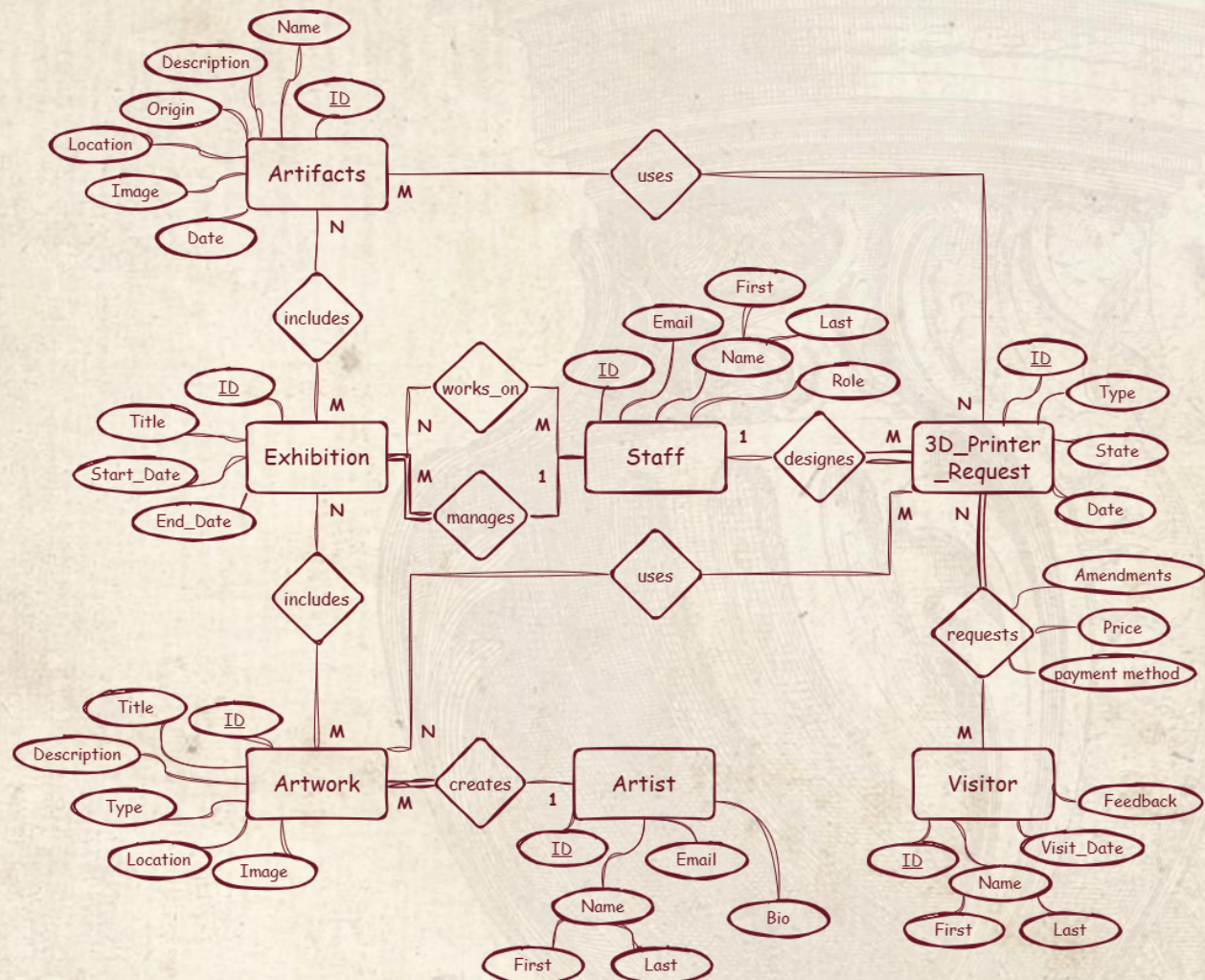
Relational Schema:

Artifacts (ID PK, Name, Description, Origin, Location, Image, Date)

Exhibition (ID PK, Title, Start_Date, End_Date, Manager_ID FK)

Artwork (ID PK, Title, Description, Type, Location, Image, Artist_ID)

Artist (ID PK, First_Name, Last_Name, Email, Bio)

Staff (ID PK, First_Name, Last_Name, Email, Role)

Visitor (ID PK, First_Name, Last_Name, Visit_Date, Feedback)

3D_Printer_Request (ID PK, Type, State, Date, Designer_ID FK)

Exhibition_Artifact (Exhibition_ID FK, Artifact_ID FK)

Exhibition_Artwork (Exhibition_ID FK, Artwork_ID FK)

Exhibition_Staff (Exhibition_ID FK, Staff_ID FK)

Request_Artifact (Request_ID FK, Artifact_ID FK)

Request_Artwork (Request_ID FK, Artwork_ID FK)

Visitor_Request (Visitor_ID FK, Request_ID FK, Price, Payment method, Amendments)

Challenges:

- Frequent power cuts due to control of infrastructure by the occupation, which threatens system availability and disrupts services like 3D printing and visitor registration.
- Military roadblocks and incursions into the museum block staff and visitor access to the museum, limiting access to and use of the system and affecting data validity.
- Security constraints and cultural oppression can lead to cancellations of exhibitions or hinder the importation of technical equipment required, limiting system expansion.
- Unstable internet connectivity because of imposed restrictions, affecting real-time database accessibility.
- Cyber threats in a politically unstable environment, requiring aggressive visitor and artifact data protection.

Conclusion:

Qudus Database project offers a comprehensive digital solution for the safeguarding and promotion of Jerusalem's cultural and historical heritage. Through its integration of artifact and artwork management, interactive exhibitions, visitor interaction, and 3D printing services, the system not only protects heritage but also makes it accessible and interactive for the future generation. Finally, this project unites tradition with innovation, creating a living archive that maintains the history of Al-Aqsa Mosque and Palestinian heritage in a modern, sustainable form.

Imaginary images of the idea: