

**UNIVERSITI TUNKU ABDUL RAHMAN**

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**UCCD1203**

**DATABASE DEVELOPMENT AND APPLICATIONS**

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## LIST OF TABLES

|  |  |  |
| --- | --- | --- |
| **Table Number** | **Title** | **Page** |
| Table 1.1 | List of Entities and Attributes | 3-4 |
| Table 2.1 | Design View of Table Artifact | 12 |
| Table 2.2 | Datasheet View of Table Artifact | 13-14 |
| Table 2.3 | Design View of Table Collection | 14 |
| Table 2.4 | Datasheet View of Table Collection | 14 |
| Table 2.5 | Design View of Table Condition and Maintenance | 15 |
| Table 2.6 | Datasheet View of Table Condition and Maintenance | 15 |
| Table 2.7 | Design View of Table Staff | 16 |
| Table 2.8 | Datasheet View of Table Staff | 16 |
| Table 2.9 | Design View of Table Exhibition | 17 |
| Table 2.10 | Datasheet View of Table Exhibition | 17 |
| Table 2.11 | Design View of Table Storage | 17 |
| Table 2.12 | Datasheet View of Table Storage | 18 |
| Table 2.13 | Design View of Table Artifact Collection | 18 |
| Table 2.14 | Datasheet View of Table Artifact Collection | 18-19 |
| Table 2.15 | Design View of Table Artifact Exhibition | 19 |
| Table 2.16 | Datasheet View of Table Artifact Exhibition | 19 |
| Table 2.17 | Design View of Table Collection Management | 19-20 |
| Table 2.18 | Datasheet View of Table Collection Management | 20 |

## LIST OF FIGURES

|  |  |  |
| --- | --- | --- |
| **Figure Number** | **Title** | **Page** |
| Figure 1.1 | ERD Diagram for Museum Artifact Management System | 5 |
| Figure 1.2 | Relationship of Artifact and ArtifactCollection | 6 |
| Figure 1.3 | Relationship of ArtifactCollection and Collection | 6 |
| Figure 1.4 | Relationship of Artifact and ArtifactExhibition | 7 |
| Figure 1.5 | Relationship of ArtifactExhibition and Exhibition | 7 |
| Figure 1.6 | Relationship of Artifact and Condition and Maintenance | 8 |
| Figure 1.7 | Relationship of Maintenance and Staff | 8 |
| Figure 1.8 | Relationship of Artifact and Storage | 9 |
| Figure 1.9 | Relationship of Collection and Collection Management | 9 |
| Figure 1.10 | Relationship of Collection Management and Staff | 10 |
| Figure 1.11 | Relationship of Staff and Staff | 10 |
| Figure 2.1 | Main Menu Switchboard | 21 |
| Figure 2.2 | Forms Switchboard | 22 |
| Figure 2.3 | Reports Switchboard | 22 |
| Figure 3.1 | Searching Artifacts Collection of Renaissance Art Query | 24 |
| Figure 3.2 | Listing Out Maintenance Details Query | 25 |
| Figure 3.3 | Listing Out Artifacts Exhibition Information Query | 26 |
| Figure 3.4 | Artifacts Registration Form | 27 |
| Figure 3.5 | Update Artifacts Condition Form | 28 |
| Figure 3.6 | Artifacts Exhibition Form | 28 |
| Figure 3.7 | Artifacts Collection Grouping Report | 29 |
| Figure 3.8 | Artifacts Condition and Maintenance Summary | 30 |
| Figure 3.9 | Exhibition Participation Form | 31 |

**PROJECT BACKGROUND**

## Project Background

In this chapter, we present the overview of the project that we would like to develop, emphasize the purposes and objectives of conducting this project and mention about the target users, or end users that will utilize the management system. In this project, our primary focus is to create a museum artifact management system for organization of Heritage Museum houses. The reason why museum requires this system is due to the extensive and various of collection of artifacts in museum that consists of unique history and value. To record all the information of collection of artifacts, a database is crucial to be created to store all these information of artifacts into it, such as name, description and type. Besides, each of artifacts is managed by different museum staff, so it is also required to have a staff management database to arrange for the staff’s duty session, to ensure that all the artifacts are kept in a good condition. A collection of data of artifacts not only reduces wasting of time in searching the information of artifacts since the management system has included a lot of data queries languages that allow the users to select the specify information of artifacts, but also improve the consistency of all the data about the artifacts and also the management organization

The outline of the report includes Project Background, which briefly introduces the project planning, system overview, purpose and target user of the management system. Besides, this report is also included database design, which includes list of attributes and entities, entity relationship diagram, assumption and business rule. Thirdly, we create a database development, which consists of data dictionary and table records, and switchboard. Next, the database objects is also illustrated about the queries, forms and report that we utilize. Lastly, there has a conclusion that describe the weakness and future improvements of this system.

**1.1 System Overview**

This project is designed and developed for creating a Heritage Museum artifacts management system, to enable the museum management authorities to manage their collection of artifacts systematically. Firstly, before creating a database system, we will draw entity relationship diagram to identify all the relationships between the entity and capture all the information which must be recorded for all entities. Next, the tables will be created by using Microsoft Access to record the data of the artifacts and museum management. Then, the user can use the queries to find out the information. This system not only provides the details and origin data of the artifacts but also clarify all the maintenance record to Heritage Museum management, so that it can ensure all the artifacts have a maintenance in accurate time and efficient processes.

## 1.2 Project Objectives

1. To improve the safety and security of artifacts storing in museum.
2. To enhance the effectiveness and efficiency of searching and finding the artifacts
3. To clarify maintenance history and appointment of next maintenance of the artifacts

To centralize the human resources management for all the artifacts

1. To integrate all the useful and important information of all the artifacts

## 1.3 Target Database User

The targeted user for this database customers, staff and top management of Heritage Museum Houses. The system will display the historical data of the artifacts to the customers, to increase their understanding for the unique characteristics of the artifacts. Besides, the duty time of all the staff of Heritage Museum will be recorded by the system when clocking on the work, and the area that the staff should manage will also be display out in the system. Lastly, the system is significant for the top management to check the enrolment of the staff and the working time of them to pay for allowances. The system will also show the check in and check out record of the artifacts in Heritage Museum to top management group.

**CHAPTER 2: DATABASE DESIGN**

* 1. **List of Entities and Attributes**

|  |  |
| --- | --- |
| **Entity** | **Attributes** |
| Artifact | **ArtifactID (Primary Key)**  StrID (Foreign Key)  ArtName  ArtType  ArtOwner  AcquisitionDate  AcquisitioinMethod  Value |
| Collection | CollID (Primary Key)  ArtID (Foreign Key)  CuratorID (Foreign Key)  CollName |
| Condition and Maintenance | MainID (Primary Key)  ArtID (Foreign Key)  StaffID (Foreign Key)  MainDate  MainType |
| Staff Management | CuratorID (PrimaryKey)  StaffID (Primary Key, Foreign Key)  SupervisorID (Foreign Key)  FirstName  LastName  Position  Department  ContactInfo  HireDate |
| Exhibitions | ExhID (Primary Key)  ExhName  ExhStartDate  ExhEndDate |
| Storage | StrID (Primary Key)  StrCapacity  Type |
| ArtCollection | ArtID (Primary Key, Foreign Key)  CollID (Primary Key, Foreign Key)  ArtCondition |
| ArtifactExhibition | ExhID (Primary Key)  ArtID (Primary Key, Foreign Key)  NumParticipate  Duration |
| CollectionManagement | Coll\_SID (Primary Key)  StaffId (Foreign Key)  CollId (Foreign Key)  HourPerWeek  Coll\_SDay |

**Table 1.1 List of Entities and Attributes**

**2.2 Entity Relationship Diagram (ERD)**

**A diagram of a computer

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**Figure 1.1 ERD Diagram for Museum Artifact Management System**

The Entity-Relationship Diagram is essential when creating a museum artifact management system. The ERD facilities a more seamless transition from design to implementation by visual outlining the database structure and linkages, hence identifying and addressing potential design problems early on. This proactive strategy improves data integrity, expedites development, and support operational requirements, all of which contribute to improved performance overall.

**2.3 Assumption and Business Rule**

**2.3.1 Artifact and ArtifactCollection** 

**A black text on a white grid

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**Figure 1.2 Relationship of Artifact and ArtifactCollection**

**(a) List of Assumption**

* An artifact can belong to multiple collections.
* ArtCollection acts as an associative entity to manage artifacts that logically belong to multiple collections.

**(b) Business Rule**

* Each artifact can belong to one-to-many collections via the ArtCollection table.
* Each record in the ArtCollection table must be linked to exactly one artifact and exactly one collection.

**2.3.2 ArtifactCollection and Collection**

**A black text on a white grid

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**Figure 1.3 Relationship of ArtifactCollection and Collection**

**(a) List of Assumption**

* Each collection can contain multiple artifacts through the ArtCollection table.
* ArtCollection acts as an associative entity to manage collections that include multiple artifacts.

**(b) Business Rule**

* A collection must be assigned to at least one curator.
* A curator can manage multiple collections.

**2.3.3 Artifact and ArtifactExhibition**

**A grid with text and numbers

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**Figure 1.4 Relationship of Artifact and ArtifactExhibition**

**(a) List of Assumption**

* Each artifact can be linked to multiple exhibitions through the ArtifactExhibition table.
* ArtifactExhibition acts as an associative entity to manage artifacts that logically link to multiple exhibitions.

**(b) Business Rule**

* Each artifact can be linked to multiple artifact exhibitions.
* Each record in the ArtifactExhibition table must be linked to exactly one artifact and exactly one exhibition.

**2.3.4 ArtifactExhibition and Exhibition**

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**Figure 1.5 Relationship of ArtifactExhibition and Exhibition**

**(a) List of Assumption**

* ach exhibition can belong to multiple artifacts through the ArtifactExhibition table.
* ArtifactExhibition acts as an associative entity to manage exhibitions that include multiple artifacts.

**(b) Business Rule**

* Each exhibition can feature multiple artifacts.
* Each record in the ArtifactExhibition table must be linked to exactly one exhibition and exactly one artifact.

**2.3.5 Artifact and Condition and Maintenance**

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**Figure 1.6 Relationship of Artifact and Condition and Maintenance**

**(a) List of Assumption**

* Each Maintenance has a unique MainID (Maintenance ID).
* The Condition and Maintenance table records each maintenance event linked to a specific artifact, including date, type, and the responsible staff member.

**(b) Business Rule**

* An artifact can have zero or many associated maintenance records.
* Each Condition and Maintenance record is linked to one and only one artifact.

**2.3.6 Maintenance and Staff** 

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**Figure 1.7 Relationship of Maintenance and Staff**

**(a) List of Assumption**

* The table records which staff member did the maintenance for tracking and accountability.
* The table records which staff member did the maintenance for tracking and accountability.

**(b) Business Rule**

* Every maintenance record must be linked to exactly one staff member.
* A staff member can be responsible with multiple maintenance records.

**2.3.7 Artifact and Storage** 

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**Figure 1.8 Relationship of Artifact and Storage**

**(a) List of Assumption**

* Each artifact is kept in one storage place that fits its size and preservation needs.

**(b) Business Rule**

* Each artifact can be only stored in one storage location only.
* One storage can store many artifacts.

**2.3.8 Collection and Collection Management** 

**A close up of a graph

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**Figure 1.9 Relationship of Collection and Collection Management**

**(a) List of Assumption**

* Each collection (CollID) can have multiple staff members managing it (via CollectionManagement).
* Each staff member (StaffID) can manage multiple collections.

**(b) Business Rule**

* Every collection must have at least one staff member assigned in CollectionManagement.
* Each staff member in CollectionManagement manages only one collection.

**2.3.9 Collection Management and Staff** 

**A black and white text

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Figure 1.10** Relationship **of Collection Management and Staff**

**(a) List of Assumption**

* Each staff management can be assigned to manage multiple collections.

**(b) Business Rule**

* Each collection management can be linked to only one member of staff.
* Each staff management can be staff of multiple collections.

**A diagram of a staff

AI-generated content may be incorrect.2.3.10 Staff and Staff**

**Figure 1.11 Relationship of Staff and Staff**

**(a) List of Assumption**

* Department heads supervise all staff in their department.
* Each staff member (StaffID) reports to at most one supervisor.

**(b) Business Rule**

* Each staff member can have one and only one supervisor.
* Each supervisor can supervise multiple staff members.

**CHAPTER 3 DATABASE DEVELOPMENT**

**3.1 List of Table**

In our database, there are lots of tables such as Artifact, Collection, Condition and Maintenance, Staff, Exhibition, Storage, Artifact Collection, Artifact Exhibition and Collection Management. Each of the table stores crucial information about Museum Artifact Management System.

**3.1.1 Data Dictionary and Table Records**

a) Artifacts

|  |  |  |
| --- | --- | --- |
| **Field Name** | **Data Type** | **Description** |
| ArtID | Short Text | Artifacts ID(Primary Key) |
| StrID | Short Text | Storage ID |
| ArtName | Long Text | Artifacst Name |
| ArtType | Short Text | Type of Artifacts |
| ArtOwner | Long Text | Original Owner of Artifacts |
| AcquisitionDate | Date/Time | Acquisition Date of Artifacts |
| Value | Large Number | Price Value of Artifacts |
| AcquisitionMethod | Short Text | Acquisition Method of Artifacts |
| Table 2.1 Design View of Table Artifact | | |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ArtID** | **StrID** | **ArtName** | **ArtOwner** | **ArtType** | **AcquisitionDate** | **Value** | **AcquisitionMethod** |
| 101 | 301 | Mona Lisa | Leonardo da Vinci | Painting | 21/08/1911 | 860000000 | Purchase |
| 102 | 302 | Rosetta Stone | Ptolemaic Kingdom | Sculpture | 15/07/1802 | 10000000 | Confiscation |
| 103 | 303 | Dead Sea Scrolls (Ex1) | Qumran Community | Manuscript | 22/03/1947 | 2500000 | Excavation |
| 104 | 304 | Bust of Nefertiti | Thutmose (sculptor) | Sculpture | 06/12/1920 | 120000000 | Excavation |
| 105 | 305 | Terracotta Warrior | Qin Shi Huang's artisans | Sculpture | 29/03/1974 | 1,000,000,000 | Excavation |
| 106 | 306 | The Starry Night | Vincent van Gogh | Painting | 11/05/1941 | 150000000 | Purchase |
| 107 | 307 | The Thinker | Auguste Rodin | Sculpture | 18/11/1922 | 15000000 | Donation |
| 108 | 308 | Magna Carta (Ex1) | King John of England | Manuscript | 03/09/1947 | 30000000 | Loan |
| 109 | 309 | The Scream | Edvard Munch | Painting | 07/08/1994 | 120000000 | Theft recovery |
| 110 | 310 | Venus de Milo | Alexandros of Antioch | Sculpture | 08/04/1820 | 80000000 | Excavation |
| Table 2.2 Datasheet View of Table Artifact | | | | | | | |

b) Collection

|  |  |  |
| --- | --- | --- |
| **Field Name** | **Data Type** | **Description** |
| CollLD | Short Text | Collection ID |
| CollName | Short Text | Collection Name |
| CuratorID | Short Text | Curator ID of Museum |
| Table 2.3 Design View of Table Collection | | |

|  |  |  |
| --- | --- | --- |
| **CollID** | **CollName** | **CuratorID** |
| 401 | Renaissance Art | 501 |
| 402 | Egyptian Treasures | 502 |
| 403 | Biblical Artifacts | 503 |
| 404 | Asian Ceramics | 504 |
| 405 | Medieval Arms & Armor | 505 |
| 406 | Modernist Masterpieces | 506 |
| 407 | Oceanic Art | 507 |
| 408 | Pre-Columbian Gold | 508 |
| 409 | Arctic Exploration | 509 |
| 410 | Digital Art Archive | 510 |
| Table 2.4 Datasheet View of Table Collection | | |

c) Condition and Maintenance

|  |  |  |
| --- | --- | --- |
| **Field Name** | **Data Type** | **Description** |
| MainID | AutoNumber | Maintainence ID |
| ArtID | Short Text | Artifact ID |
| StaffID | Short Text | Staff ID |
| MainDate | Date/Time | Maintainence Date |
| MainType | Short Text | Maintainence Type |
| Table 2.5 Design View of Table Condition and Maintenance | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **MainID** | **ArtID** | **StaffID** | **MainDate** | **MainType** |
| 701 | 101 | 504 | 12/05/2023 | Cleaning |
| 702 | 102 | 505 | 03/11/2022 | Analysis |
| 703 | 103 | 506 | 18/01/2024 | Restoration |
| 704 | 104 | 507 | 22/08/2023 | Structural Repair |
| 705 | 105 | 508 | 09/02/2024 | Conservation |
| 706 | 106 | 504 | 15/10/2023 | Light Damage Repair |
| 707 | 107 | 509 | 05/12/2022 | Bronze Patination |
| 708 | 108 | 510 | 30/03/2024 | Environmental Seal |
| 709 | 109 | 507 | 19/07/2023 | Mold Remediation |
| 710 | 110 | 508 | 05/01/2024 | Laser Cleaning |
| Table 2.6 Datasheet View of Table Condition and Maintenance | | | | |

d) Staff

|  |  |  |
| --- | --- | --- |
| **Field Name** | **Data Type** | **Description** |
| StaffID | AutoNumber | Staff lD |
| FirstName | Short Text | First Name of Staff |
| LastName | Short Text | Last Name of Staff |
| Position | Short Text | Position of Staff |
| Department | Short Text | Staff Department |
| ContactInfo | Short Text | Contact Info of Staff |
| HireDate | Date/Time | Hire Date of Staff |
| SupervisorId | Short Text | Supervisor lD |
| CuratorID | Short Text | Curator lD |
| Table 2.7 Design View of Table Staff | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **StaffID** | **FirstName** | **LastName** | **Position** | **Department** | **ContactInfo** | **HireDate** | **SupervisorID** | **CuratorID** |
| 501 | Marie | Curie | Curator | European Art | (171)987-1908 | 6/1/2015 |  | 701 |
| 502 | Howard | Carter | Curator | Ancient Cultures | (443)795-4379 | 9/15/2008 | 601 |  |
| 503 | Florence | Nightingale | Archivist | Collections | (813)516-5235 | 3/22/2020 | 602 |  |
| 504 | Leonardo | da Vinci | Conservation Scientist | Art Preservation | (753)673-5477 | 11/5/2018 |  | 702 |
| 505 | Nikola | Tesla | Electrical Engineer | Facilities | (746)784-5876 | 7/14/2016 | 603 |  |
| 506 | Jane | Goodall | Primatology Curator | Natural History | (713)053-0895 | 4/30/2012 |  | 703 |
| 507 | Albert | Einstein | Physics Consultant | Science Wing | (645)608-0974 | 1/15/2021 | 604 |  |
| 508 | Frida | Kahlo | Art Educator | Public Programs | (524)620-0876 | 8/22/2019 |  | 704 |
| 509 | Charles | Darwin | Biology Researcher | Natural History | (345)867-8900 | 5/10/2017 |  | 705 |
| 510 | Ada | Lovelace | Digital Archivist | Technology | (746)978-0000 | 9/17/2020 | 605 |  |
| Table 3.4.2 Datasheet View of Table Staff | | | | | | | | |

e) Exhibition

|  |  |  |
| --- | --- | --- |
| **Field Name** | **Data Type** | **Description** |
| ExhID | AutoNumber | Exhibition Id |
| ExhName | Short Text | Exhibition Name |
| ExhStartDate | Date/Time | Exhibition Start Date |
| ExhEndDate | Date/Time | Exhibition End Date |
| ExhLocation | Short Text | Exhibition Location |
| Table 2.9 Design View of Table Exhibition | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **ExhID** | **ExhName** | **ExhStartDate** | **ExhEndDate** |
| 601 | Da Vinci: Genius Revealed | 01/09/2023 | 15/01/2024 |
| 602 | Pharaohs of the Nile | 10/03/2024 | 10/09/2024 |
| 603 | Sacred Texts | 05/01/2025 | 05/06/2025 |
| 604 | Modernist Visions | 20/06/2024 | 30/11/2024 |
| 605 | Arctic Explorations | 15/03/2025 | 20/08/2025 |
| 606 | The Silk Road | 10/11/2023 | 28/02/2024 |
| 607 | The Art of War | 12/10/2024 | 10/01/2025 |
| 608 | Digital Frontiers | 01/07/2025 | 15/12/2025 |
| 609 | Women in History | 05/04/2024 | 05/09/2024 |
| 610 | Cosmic Journeys | 10/09/2025 | 10/02/2026 |
| Table 2.10 Datasheet View of Table Exhibition | | | |

f) Storage

|  |  |  |
| --- | --- | --- |
| **Field Name** | **Data Type** | **Description** |
| StrID | AutoNumber | Storage lD |
| StrName | Short Text | Storage Name |
| StrCapacity | Number | Storage Capacity |
| StrType | Short Text | Storage Type |
| Table 2.11 Design View of Table Storage | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **StrID** | **StrName** | **StrCapacity** | **StrType** |
| 301 | Vault A-1 | 25 | Climate Chamber |
| 302 | Warehouse 3 | 200 | Warehouse |
| 303 | Dark Room 7 | 50 | Special |
| 304 | Ceramic Vault | 40 | Humidity-Controlled |
| 305 | Textile Storage | 35 | Low-Oxygen |
| 306 | Metalworks Room | 60 | Anti-Corrosion |
| 307 | Painting Archive | 30 | Light-Controlled |
| 308 | Organic Materials | 20 | Freezer |
| 309 | Digital Media | 15 | EMF-Shielded |
| 310 | Temporary Holding | 100 | Standard |
| Table 2.12 Datasheet View of Table Storage | | | |

g) Artifact Collection

|  |  |  |
| --- | --- | --- |
| **Field Name** | **Data Type** | **Description** |
| ArtID | AutoNUmber | Artifacts ID |
| CollLD | Number | Collection Id |
| ArtCondition | Short Text | Artifacts Condition |
| Table 2.13 Design View of Table Artifact Collection | | |

|  |  |  |
| --- | --- | --- |
| **ArtID** | **CollID** | **ArtCondition** |
| 101 | 401 | Excellent |
| 102 | 402 | Good |
| 103 | 403 | Fair |
| 104 | 408 | Excellent |
| 105 | 404 | Good |
| 106 | 407 | Excellent |
| 107 | 406 | Good |
| 108 | 405 | Fair |
| 109 | 409 | Excellent |
| 110 | 410 | Good |
| Table 2.14 Datasheet View of Table Artifact Collection | | |

h) Artifact Exhibition

|  |  |  |
| --- | --- | --- |
| **Field Name** | **Data Type** | **Description** |
| ExhID | AutoNumber | Exhibition ID |
| ArtId | Short Text | Artifacts ID |
| numParticipant | Number | Number of Participant |
| Duration | Number | Duration Of Exhibition |
| Table 2.15 Design View of Table Artifact Exhibition | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **ExhID** | **ArtID** | **numParticipant** | **Duration** |
| 601 | 101,106 | 125,000 | 4 |
| 602 | 102,104 | 89,000 | 6 |
| 603 | 103 | 54,000 | 5 |
| 604 | 105 | 67,500 | 5 |
| 605 | 107 | 87,000 | 5 |
| 606 | 108 | 102,300 | 3 |
| 607 | 109 | 45,000 | 3 |
| 608 | 110 | 98,000 | 5 |
| 609 | 104 | 78,200 | 5 |
| 610 | 105 | 54,000 | 5 |
| Table 2.16 Datasheet View of Table Artifact Exhibition | | | |

i) Collection Management

|  |  |  |
| --- | --- | --- |
| **Field Name** | **Data Type** | **Description** |
| Coll\_SID | AutoNumber | Collection Management ID |
| StaffID | Number | Staff ID |
| CollLD | Number | Collection ID |
| HourPerWeek | NUmber | Time of Staff Duty |
| Coll\_Sday | Long Text | Working Day of Staff |
| Table 2.17 Design View of Table Collection Management | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Coll\_SID** | **StaffID** | **CollID** | **HourPerWeek** | **Coll\_Sday** |
| 801 | 701 | 401 | 48 | MTWFSA |
| 802 | 701 | 402 | 40 | MTEFS |
| 803 | 702 | 403 | 40 | MTFSA |
| 804 | 702 | 404 | 40 | WEFSA |
| 805 | 703 | 405 | 40 | MTEFA |
| 806 | 703 | 406 | 40 | MWEFS |
| 807 | 704 | 407 | 40 | MWEFA |
| 808 | 704 | 408 | 40 | MTWSA |
| 809 | 705 | 409 | 40 | MWFSA |
| 810 | 705 | 410 | 40 | MTEFA |
| Table 2.18 Datasheet View of Table Collection Management | | | | |

3.2 Switchboard

In Microsoft Access, a switchboard is a simple menu that makes database navigation easier for users, especially those who are not familiar with Access's technical interface. Rather than searching the database window directly, it acts as a centralized control panel that enables users to easily carry out normal operations such as opening forms, running reports, running queries, or quitting the application through user-friendly buttons or links.

Switchboards have several significant benefits especially in enhancing usability and simplifying user databases. The user-friendly interface has reduced the risk of accidentally modifying the data in shared or multi-user environments. On the other hand, it will hide the complex database objects like tables and queries.

Additionally, switchboard can allow users to change and customize their functionality and layout to meet the specific workflow. Because it makes regularly used elements easily accessible to users, this flexibility increases productivity and efficiency. And flexibility lets users concentrate more on their work instead of the complexity of getting to the buttons.

Switchboard is a useful and reliability tools in our daily life. In this project, we use the switchboard to make the Museum Artifact staff members easy to navigate. We have provided several options for staff to navigate in the switchboard menu like table, query, form and report.

A close-up of a menu

AI-generated content may be incorrect.

**Figure 2.1 Main Menu of switchboard**

A close-up of a form

AI-generated content may be incorrect.

**Figure 2.2 Forms switchboard**

A close-up of a report

AI-generated content may be incorrect.

**Figure 2.3 Forms switchboard**

**CHAPTER 4: DATABASE OBJECTS**

**Database Objects**

Database object is a logical structure for storing, managing and presenting application or user-specific data in a database. Based on the database management system (DBMS), there are many different types of database objects that includes tablespace, tables, indexes, views synonyms, stored procedures and user-defined functions. The database objects are permanent because they remain in their original form if they are not explicitly update or delete. Furthermore, databases objects in relational databases are usually created and edited by SQL language to obtain the data that we want to create, alter and drop. In our projects, we provide three type of database objects, which are queries, forms and reports

## 4.1 Queries

Queries are used for accessing the data or send a request for data from a relational database. The format of request is always determined by the query language supported by the database, such as Structured Query Language (SQL) as it will provide pre-defined standardized code to give the instructions that database can understand, and the database will retrieve information and generate appropriate that user want to select or search.

**4.1.1 Query 1**

Explanation:

The query 1 is named “Searching Artifacts Collection of Renaissance Art Query”. The function of this query is used to retrieve information of Artifacts which belongs to “Renaissance Art” collection. The data that provide in this query are artifact ID, artifacts name, artifacts type, collection ID, collection name and curator ID. If the user want to search the artifacts with different type of collection group, the user can also alter criteria part of query based on the collection ID and collection name that they want to search or search it by using SQL. This query is vital to reduce the time of finding respective collection of artifacts manually on the tables since it can be search out directly by using the query system and it can prevent the loss of collection data.

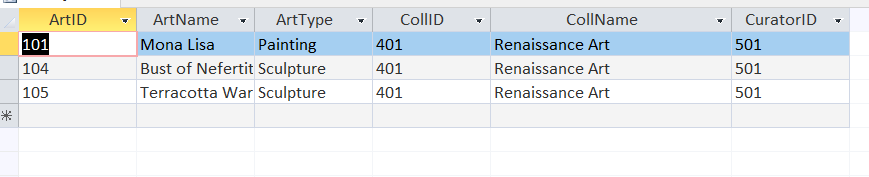
SQL command (for list of “Renaissance Art” Collection):

SELECT ArtID, ArtNasme, ArtType, CollID, CollName, Curator ID

FROM ArtCollection, Artifacts, Collection

WHERE CollName = “Renaissance Art“

Sample query 1:



**Figure 3.1 Searching Artifacts Collection of Renaissance Art Query**

**4.1.2 Query 2**

Explanation:

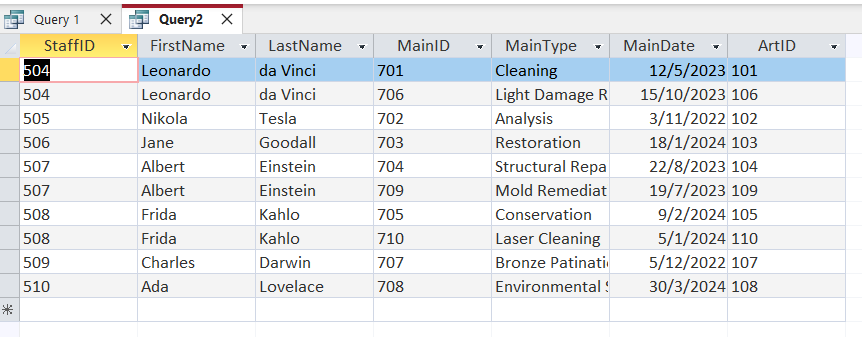
The query 2 is named “Listing Out Maintenance Details Query”. The function of this query is used to list out all the information related to a maintenance record of each artifact. Therefore, this query is convenient to the museum staff to implement a maintenance process in particular time as they can always check the maintenance date for reminder. This query includes details such as Staff ID, Staff Name, Maintenance ID, Maintenance Type, Maintenance Date, Artifacts ID.

SQL command:

SELECT StaffID, FirstName, LastName, MainID, MainType, MainDate, ArtifactsID

FROM Staff Management NATURAL Condition and Management

Sample query 2:



**Figure 3.2 Listing Out Maintenance Details Query**

**4.1.3 Query 3**

The query 3 is named “Listing Out Artifacts Exhibition Information query”. The function of this query is used to list out all artifacts exhibition record. By using this query, the staff management is able to check the schedule of exhibition and estimate the time of preparation for the event and arrange the staff working time during the exhibition. This query includes information such as Artifact ID, Artifacts Name, Exhibition ID, Storage ID, Storage Name, duration and number of participants.

SQL Command:

SELECT ArtID, ArtName, ExhID,, LastName, MainID, MainType, MainDate, ArtifactsID, StrID, StrName, Duration, NumParticipant

FROM Storage NATURAL JOIN Artifacts

FROM Artifacts NATURAL JOIN ArtExhibition

Sample query 3:

A screenshot of a computer

AI-generated content may be incorrect.

## Figure 3.3 Listing Out Artifacts Exhibition Information query

## 4.2 Forms

Forms are used for interaction between users with data in a structured and user-friendly manner. They serve as a bridge between the user and the underlying database tables, enabling users to input, modify, view, and delete data without needing to interact directly with the raw database structure or query language. Forms are designed to simplify data entry and improve data accuracy and consistency. They typically consist of various fields, such as text boxes, drop-down menus, checkboxes, radio buttons, and other interactive elements that are linked to fields in one or more database tables. The following are the forms that we provide in database system.

**4.2.1 Form 1**

Explanation:

First form is artifact registration form, which is used to insert the artifacts information when new artifacts are acquired by Museum Management. In this form, the user requires to update artifacts ID, artifact name, artifact type. acquisition date of artifact, price value of artifact, original owner of artifact, acquisition method of artifact and storage ID. The form brings a lot of benefits to staff and top management of Museum as all the artifacts data can be updated to the system automatically by filling this form.

Sample form 1:

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AI-generated content may be incorrect.

**Figure 3.4 Artifacts Registration Form**

**4.2.2 Form 2**

Explanation:

Second form is updating artifact condition form, which can allow the respective staff used to update the condition of artifacts after conducting the maintenance process. This form is vital to track the working progress of staff by the top management by checking whether the respective staff of specify maintenance id updates the form successfully or not. The form includes details such as artifacts ID, artifacts name, maintenance ID, maintenance date, maintenance type and artifacts condition.

Sample form 2:

A screenshot of a computer

AI-generated content may be incorrect.

**Figure 3.5 Update Artifact Condition Form**

**4.2.3 Form 3**

Explanation:

Third form is artifacts exhibition form. This form is used to record the exhibition that will take place at Heritage Museum and list out all the exhibition details to ensure all the workers and staff of Heritage Museum to know all the information about the exhibition. This form consists of artifacts ID, artifacts name, artifacts type, price value of artifacts and artifacts exhibition details such as exhibition ID, exhibition name, exhibition start date, exhibition end date, exhibition location, duration of whole exhibition and number of participants of exhibition.

Sample form 3:

A screenshot of a computer

AI-generated content may be incorrect.

**Figure 3.6 Artifacts Exhibition Form**

## 4.3 Report

Reports are used for structured and formatted presentation of data retrieved from one or more database tables, queries, or views. It is designed to organize, summarize, and communicate specific information in a readable and often printable format. Reports are used to convey data insights, trends, and analysis results to users, decision-makers, or stakeholders in a clear and meaningful way. Reports do not store data themselves. Instead, they are dynamic documents generated from data stored in the underlying database.

**4.3.1 Report 1**

Explanation:

The first report is artifacts collection grouping report. This report will display the data of artifacts by grouping these artifacts based on their collection name. Therefore, the staff can quickly find what they need without having to search through individual items and enable them to retrieve and navigate the data easily. The forms will display collection name, collection ID, artifacts ID, artifacts name and artifacts type.

Sample report 1:

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AI-generated content may be incorrect.

**Figure 3.7 Artifacts Collection Grouping Report**

**4.3.2 Report 2**

Explanation:

The second report is artifacts condition and maintenance report. In cooperation with updating artifacts condition forms, this report helps to summarize the result of the form by grouping the artifacts information with artifacts type. Hence, the staff can conclude the outcome of maintenance and final condition of artifacts to decide the next maintenance date. The users can view the data such as artifacts type, artifacts ID, artifacts name, artifacts condition, maintenance Id, maintenance date and maintenance type.

Sample report 2:

A screenshot of a computer

AI-generated content may be incorrect.

**Figure 3.8 Artifacts Condition and Maintenance Summary**

**4.3.3 Report 3**

Explanation:

The third report is exhibition participation report. This report will show the exhibition details as the record of the exhibition that is organized by Heritage Museum in recent years and record the number of participant for each exhibition to enable them to do analysis about what type of artifacts that the customers is more interested. This report includes the information such as exhibition name, exhibition ID, exhibition start date, exhibition end date, exhibition location, number of participants and duration of exhibition.

Sample report 3:

**A screenshot of a computer

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**Figure 3.9 Exhibition Participation Report**

**CHAPTER 5 CONCLUSION**

**5.1 System Weaknesses**

Explanation:

There are some system weaknesses that are found in museum artifact management systems. Firstly, the weakness of the system found in the museum artifact management is **security vulnerabilities**. There are no role-based permissions on the system, that means some of the interns may accidentally modify the description or the value of an artifact as they also have the same rights as the original staff. If there is someone who has a mind to change the information about the artifact, it is very easy to reach it.

Furthermore, **operational inefficiency** is also one of the weaknesses of the museum artifact management system. It depends on the staff to manually update the information and the process. Those display priorities need to be adjusted by the staff manually when there are some new artifacts added in. Next is the exhibition conflict, some of the artifacts may be booked for display at the exhibition. The system may not detect the artifact appointments that have been booked by others and the system may also accept the second appointment. This will cause the artifact have double booking appointment at the same time.

Moreover, one of the weaknesses of the system is the **data integrity risks.** When the artifact has been deleted from the artifact collection table, the information about the artifact may not be deleted along with the deletion. It needs to be deleted separately to clearly remove the information of the artifact.

## 5.2 Future Improvements

Explanation:

There are some improvements that need to be made to the museum artifact management system. First and foremost, is **the right of** **employee in the museum**. The rights of the staff and the interns need to be separated. When they did not have the same right to manage the artifact, the risk of failure may be reduced. And it will reduce the amount of damage that has been done by those who want to do so.

Besides, the improvement of **conversation optimization** is also important in the future. Smart environmental monitoring plays a crucial role in protecting artifacts. It can sense the temperature of the artifact in real time and give a signal to the curator immediately if the artifact is in unsuitable temperatures. Also, it can give the curator a report of condition trend analysis of the relevant artifact. So, the curator can make sure the artifact keeps in good condition every time.

In addition, **ensure the data integrity** is indispensable for the growthand improvement of the museum artifact management system. When the artifacts are taken away from the museum, all the related information about the artifacts needs to be removed to avoid isolation of the data. More importantly, the **upgrade of the data storage capacity** can also avoid the loss of data. Large storage capacity can let curators easily store information about the new artifact without deleting the previous artifact to store it when facing the fact that data storage is not enough at the time.