Dire Dawa University

Institute of Technology(DDUIOT)

School of computing

Department of Information Technology

Course Name: Fundamentals of Database Systems

Course Code: ITec2071

Project on Conceptual Database Design using ER-Modeling

Project Title(Organization Name):- (Ethiopian Airlines) DATABASE
                                    In   Dire Dawa

Target Group and Prepared By: 2016 E.C 2nd year 1st semester IT students

 Group Members Name   ID numbers

1. NATNAEL GETACHEW   ....➤DDU1501522

2. BETELHEM KASSAHUN   ....➤DDU1500955

3. MEKDES DEMISSE ....➤DDU1501411

4. EYOB TESFAYE METAFERIYA   ....➤DDU1501114

5. MARTA DEREJE   ....➤DDU1501391

6. Eliyas Yilfu   …………………………………………………➤DDU40830

Submitted to: Instructor Seid M.

Project Submission date: 09/09/16E.C at 4:00 LT (Morning)

INTRODUCTION

As we try to inform about our organization name in the cover page of this document we already select the organization name Ethiopian Airlines Database in Dire Dawa to do our project and also we would like to inform that we asked the ETHIOPIAN AIRLINES office to give us some information about their organization working flow which is located at kezira in DireDawa City and they gave us their organization reservation structure. This project was done by three supporters. The first one is our instructor he told and guide us the way to do the project , The second one is The Area manager of Dire Dawa he had played a significant role for our project by giving the information what we need and finally our team cooperation the team has a great contribution to do this project.

1. Select one organization in Dire Dawa University (Either Colleges, Administration Offices) or Dire Dawa City Offices, which helps to show your conceptual database design, then ask the whole process and write one details descriptions about the selected organization.

Case Study: Ethiopian Airlines in Dire Dawa

Background:
Ethiopian Airlines' reservation system, as a leading airline, aims to develop an advanced reservation system to streamline operations and enhance the customer experience. This system will empower users to effortlessly search, book, and manage flights, while providing administrators with efficient tools for managing flights, tickets, and airline details.
Customers are individuals utilizing the reservation system to book flights. They provide essential details such as customerID, username, password, name, contact information, and address.
Tickets tracks the status of each ticket, whether it's booked, cancelled, or pending. Attributes include status and ticket ID.
Flight Representing individual flights operated by the airline, this it contains details such as flight number, arrival and departure times, price, destination, and departure location, class, Air-craft type and duration.
Airline represents the airlines operating the flights, including attributes such as airline name and airlineID.
Administrator Staff members responsible for managing the airline and its operations. They have Adid,usernames and passwords for system access.
Customers can make payments for multiple tickets, and each ticket can have multiple payments. For instance,

Mr.yonas books two tickets for a flight to AddisAbaba and makes separate payments for each ticket.
Ticket statuses are associated with specific flights, indicating whether a seat is booked, cancelled, or pending. For example, "Booked" status for Flight 123 from AddisAbaba to DireDawa.
Administrators schedule flights based on demand and availability. For instance, Administrator A schedules Flight 456 from DireDawa to AddisAbaba.
Flight belongs to Airline
Flights are operated by airlines, and an airline can have multiple flights. For example, Flight 789 is operated by "Area Manager."
Administrators can modify airline details such as username A password or other information.

2. Identify the organization entities, attributes and the relationships from your above description.

Entities:

- Customer
- Ticket
- Flight
- Airline
- Administrator

Attributes:

- Customer:- customerID, username, password, name, contact information, phone number and address.
- Ticket:- Tikect status (booked, cancelled, or pending)and ticket ID.
- Flight:- flight number, arrival and departure times, price,

destination, departure location,class, Air-craft type and duration.

- Airline:- airline name and AirlineID.
- Administrator:- AdID ,usernames and passwords.

In our case, we have cu-id, ticketID, flight number , adid and airlineID are primary keys for the relations customer, ticket , flight , administrator and Airline respectively.
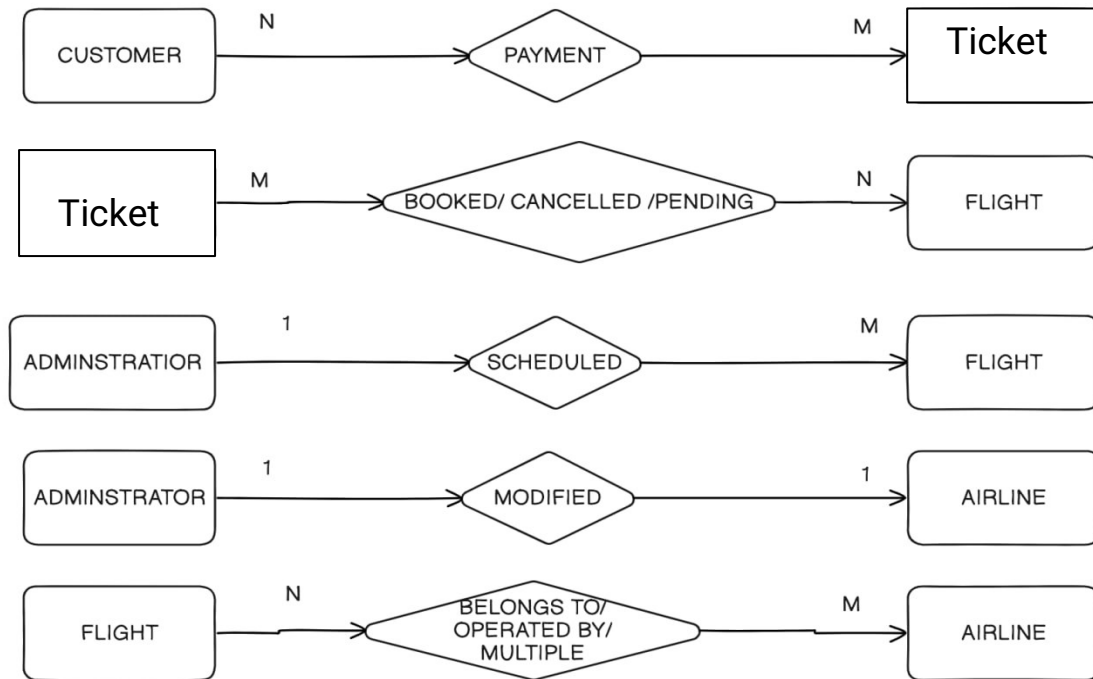
Relationships:

- Customer payment Ticket (Many-to-Many):
Customers can make payments for multiple tickets, and each ticket can have multiple payments.
- Ticket booked Flight (Many-to-Many):
Ticket statuses are associated with specific flights, indicating whether a seat is booked, cancelled, or pending.
- Flight is scheduled by Administrator (many-to-one):
Administrators schedule flights based on demand and availability.

Flight belongs to Airline (Many-to-Many):
Flights are operated by airlines, and an airline can have multiple flights.

- Administrator modified Airline (one-to-one):
Administrators can modify airline details such as name, or other information.

Now, By using the above information we can draw the ER diagram. Each entity will be represented as a rectangle, with attributes listed inside, and relationships will be depicted using lines connecting the entities. The ER

diagram will represents the relationships between entities and their attributes as follows.

Fig 1.1 Cardinality-Ratio for Ethiopian Airlines Reservation system Dire Dawa.

3. Draw an entity relationship diagram which showing the items identified. Based on the above information the ER-model of a Ethiopian Airlines Reservation system in Dire Dawa will looks like as follows:
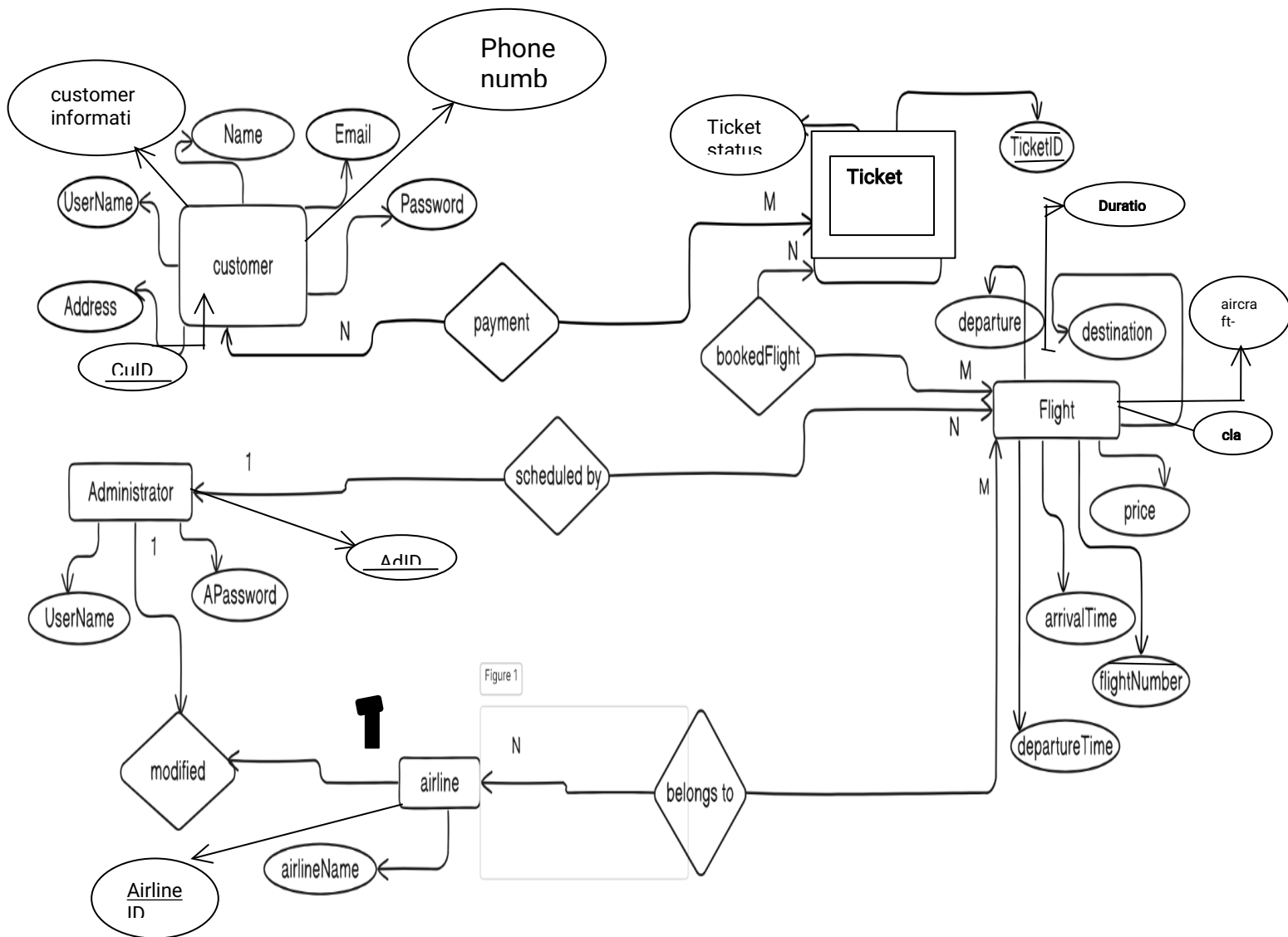
Fig 1.2 ER-DIAGRAM OF Ethiopian Airlines Reservation system Dire Dawa

4. Convert the organization ER diagram to Relational Schemas.

ER diagrams can be mapped to relational schema, that it is possible to create relational schema using ER diagram. We can not import all the ER constraints into relational model, but an approximate schema can be generated.
There are several processes and algorithms available to convert ER Diagrams into Relational Schema. Some of them are automated and some of them are manual. We may focus here on the mapping diagram contents to relational basics.

ER diagrams mainly comprise of :–
- Entity and its attributes.
- Relationship, which is association among entities.

Step 1: Mapping of Strong Entity Types the following are strong entities.
- Customer
- Flight
- Airline
- Administrator

Step 2: Mapping of Weak Entity Types
In our case, we have only 1 weak entity called ticket which putted in double rectangle.

Step 3: Mapping of Binary 1:1 Relationship Types
In our case, we have 1:1 Relationship
Administrator modified Airline

Step 4: Mapping of Binary 1:N Relationship Types
In our case, we have 1:N Relationship
Administrator schedules many flights

Step 5: Mapping of Binary M:N Relationships Types
In our case, we have the following M:N Relationships
- Flight belongs to Airline (Many-to-Many)
- Customer payment Ticket (Many-to-Many)
- Ticket booked Flight (Many-to-Many)
- Flight is scheduled by Administrator (Many-to-one)

Step 6: Mapping of Multi-valued Attributes

Multi-valued attributes are attributes that can have multiple values for a single entity. In our case, the following entities have multi-valued attributes: Multi-valued attributes are attributes that can have multiple values for a single entity. In your case, the following entities have multi-valued attributes:

- Customer:
    Customer information (can have multiple phone numbers and email addresses)
   - Address (can have multiple addresses)
 - Flight:
    Destination (can have multiple destinations for connecting flights)
   - Departure location (can have multiple departure locations for connecting flights) and Air-craft type.

The other entities (Ticket, Airline, and Administrator) do not have multi-valued attributes.

Therefore, finally we will end up with the following schema for Airlines database .

Customer

CuID	username	password	Fname	Lname	Email	Phone number	Address

Ticket

TicketID	Pending status	Booked status	Cancelled status	CuID	Flight number

Flight

Flight number	Arrival time	Departure time	Flight time	Departure	Destination	price	class	Duration	Aircraft type	AdID

Administrator

AdID	User name	Password

Airline

AirlineID	Airline name	AdID
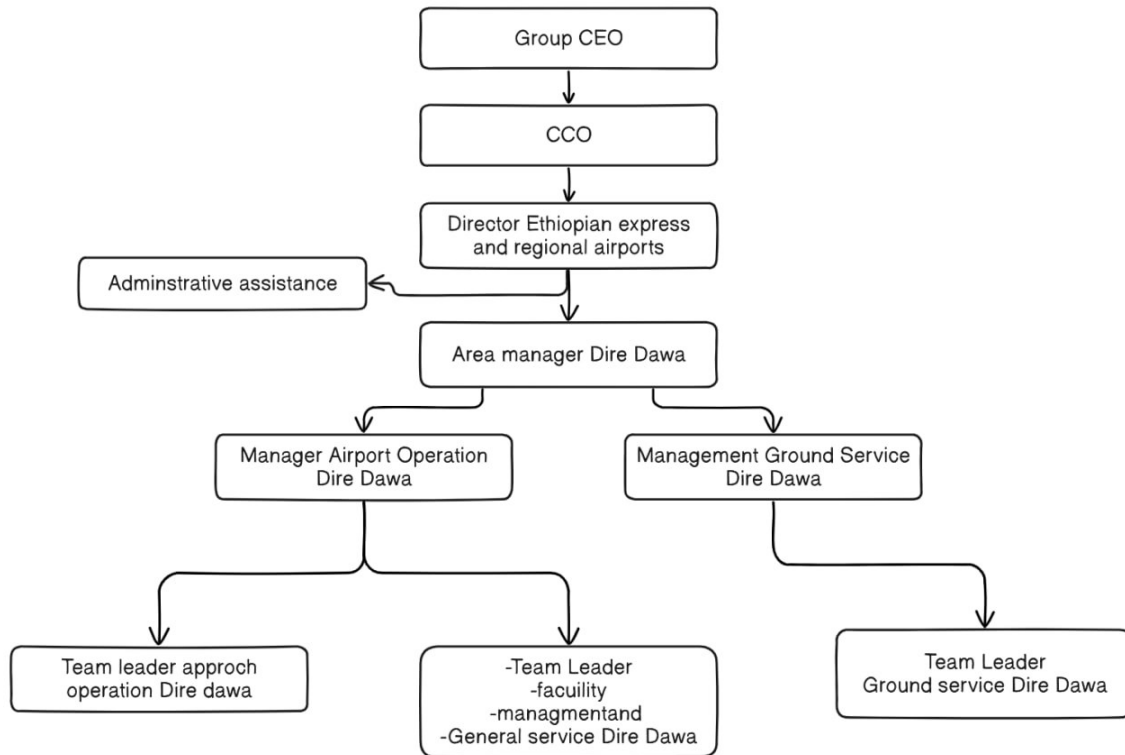
Fig 1.3 Structure (Flow) OF Ethiopian Airlines Reservation system with in Dire-Dawa .

General Description for structure of Airlines in Dire Dawa

Executive Team:
- Group CEO: The Group CEO is responsible for setting the overall strategy and direction of Ethiopian Airlines. They oversee all aspects of the airline's operations and ensure that the company achieves its financial and operational goals.
- Chief Commercial Officer (CCO): The CCO is in charge of the airline's commercial activities, including sales, marketing, and customer service. They work to maximize revenue and enhance the customer experience.

Airport Management:
- Director, Ethiopian Express and Regional Airports: This role oversees the operations of Ethiopian Express flights and regional airports. They ensure that flights run smoothly and safely in these areas.
- Area Manager, Dire Dawa: The Area Manager is responsible for managing all aspects of Ethiopian Airlines' operations in Dire Dawa, including flights, ground operations, and customer service.
- Manager, Airport Operation Dire Dawa: The Airport Operation Manager is responsible for the day-to-day operations at the airport in Dire Dawa, including coordinating ground staff, managing facilities, and ensuring compliance with safety regulations.
- Management Group Service Dire Dawa: This role involves overseeing various service functions at the Dire Dawa airport, such as passenger services, baggage handling, and security.
- Team Leader, Approach Operation Dire Dawa: The Approach Operation Team Leader is responsible for coordinating the approach and landing procedures for flights arriving at the Dire Dawa airport, ensuring safe and efficient operations.
- Team Leader, General Service Dire Dawa: The General Service Team Leader oversees general services at the Dire Dawa airport, such as maintenance, cleaning, and other support functions.

Administrative Support:
- Administrative Assistant: Provides administrative support to the executive team and other staff members, including scheduling meetings, handling correspondence, and managing office tasks.

Fundamentals of DB: IT Project

General Services:
- Team Leader, Faculty, Management, General Service Dire Dawa: This role oversees a team responsible for various general services at the Dire Dawa airport, including facilities management, catering, and transportation.
- Team Leader, Group Service Dire Dawa: The Group Service Team Leader manages group services at the Dire Dawa airport, including handling group bookings, coordinating special assistance for passengers, and managing airport lounges.