Learning Outcomes:

- Apply redundancy control in designing a database.
- Demonstrate a database solution using an appropriate tool based on a case study.

Case Study:

Malaysia Airlines Reservation System

There are four different airlines company in Malaysia: *Echo Airline* (EA1709), *Spark Airways* (SA1865), *Peak Airways* (PA2098), *Core Airways* (CA8760). Their flights involve the following six (6) states: Perak, Negeri Sembilan, Pahang, Sabah, Sarawak, Wilayah Persekutuan Kuala Lumpur. In each of the six (6) states, there is a (single) booking office. You are requested by the airlines company to design a central air-reservation database to be used by all booking offices.

Flight has flight number, number of total seats in business class, number of total seats in economy class, date of departure, time of departure (in local time, and time is always in hours and minutes), date of arrival, time of arrival (in local time), origin state and destination state.

For each flight travel, the flight must be piloted by two pilots (captain and co-captain) and maximum of 3 flight attendants. A pilot may fly one or more flights. Pilot has staff number, staff first name, staff last name, age, year of experience, position, flying hours, and salary. To be a senior pilot, he/she need to have 20,000 flying hours. Flight attendant has unique id, full name, position, salary, phone number, and address. Address has street, city, province or state, postal code, and country.

The customers may come from any state, not just the six (6) above, and from any city in Malaysia. Customer has first and last name, mailing address, zero or more house phone numbers, and zero or more email addresses. Mailing address has street, city, province or state, postal code, and country. A customer may book one or more flights in each booking. The email address is unique for each customer. But the first and last names do not have to be unique.

Booking has a unique booking number, booking state (which state the booking was made from), booking date, flight number, number of seats booked for each flight, total charges for each flight and booking total.

Coursework Details:

1. In this assignment, you are required to design, implement, and document a database system for *Malaysia Airlines Reservation System.*

2. Create the following queries using Data Manipulation Language (DML) – Each student must be able to explain the queries and justify the approach taken.

Student 1

1. Display the average of salary for pilots who have reached or exceeded *20,000* flying hours.
2. List the first name, last name, age, and experience of pilots who have piloted the flight for *Spark Airways.*
3. Find the Airline with the most number of flights.

Student 2

1. Display customer's first name and last name who have made more than two bookings.
2. List flight attendant's full name and position who have worked in the same flight as a pilot named '*Mikael Tinnason*'.
3. List all customers who did not live in any of the airline offices located. Please display the customer first name, last name, and customer's state.

Student 3

1. Display the flight with the most number of seats for business class.
2. List all customer's first name and last name who did not place any booking. Sort the records by customer id in descending order.
3. Show the AirlineID, AirlineName and the total number of flights for each Airline

Student 4

1. Find the highest salary of flight attendants.
2. List the name and the position of flight attendants whose salary is neither *2,800* nor *3,500*.
3. Display customer's first name and last name who have made the most number of booking.

3. Deliverables:

Part	Component
1	a) Database and Database Management System • Discuss the disadvantages of file-based system, relate your discussion to the case study • Discuss the advantages of Database and DBMS, relate your discussion to the case study
1	b) Business Rules & Normalization • Based on the case study, write a list of a complete business rules • Provide an example of UNF and perform normalization up to 3NF clearly showing all the steps with explanation
1	c) Entity Relationship Diagram • Design the database using chen's or crow's foot notation, draw the ERD with any suitable tools such as Visio. All entities, attributes, relationship, and constraints should be shown.
2	d) Database Schema • Re-submit the Entity Relationship Diagram, you may make changes to the ERD submitted in Part 1 • Generate the database diagram from the DBMS
2	e) SQL-Data Definition Language (DDL) • Create all tables with suitable data types • Insert 5-10 rows of data into each table • Screen shot all tables with its data • Screen shot all query statements
2	f) SQL-Data Manipulation Language (DML) • Write SQL statements to answer question (2) above • Screen shot all query statements together with its executed result

General Requirements:

In this assignment you are required to:

- Work in a group of 3-4 members.
- Design and implement a solution to a business problem.
- Implement the solution using any Enterprise DBMS.
- Document the solution as set out in the assignment requirements.
- Submit the document online according to the date and time given below.
- Submit a Workload Matrix given by lecturer through MS TEAMS.
- Each group member is required to participate in all tasks / discussions together.
- Presentation schedules will be published at a later date through MS TEAMS.

Note: It is acceptable for discrete activities of this assignment to be undertaken by individual group members. However, it is essential that all group members understand the presentation in its entirety. At the end of the demonstration your group will be asked a series of questions to explore your understanding and analysis of the given problem. Responses to these questions such as "I don't know because I didn't work on that part of the assignment" are not acceptable and will result in a penalty for either the entire group or specific individual(s).

Part	Assessment Criteria:	Marks Allocation	Online Submission Date
1	**Group Component (40%)** a) Database and Database Management System b) Business Rules & Normalization c) Entity Relationship Diagram	 8% 12% 20%	**Week 8** **23 October 2022** **11.59pm**
2	**Group Component (18%)** d) Database Schema **Individual Component (42%)** e) SQL-Data Definition Language (DDL) f) SQL-Data Manipulation Language (DML)	 18% 12% 30%	**Week 12** **20 November 2022** **11.59pm**