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**Misr University for Science & Technology**

**College of Information Technology  
Information Systems Department**

**IS312 (Intro. to Database)  
Project Title: Airline Booking System(P.No.#8)**

**Team Members**

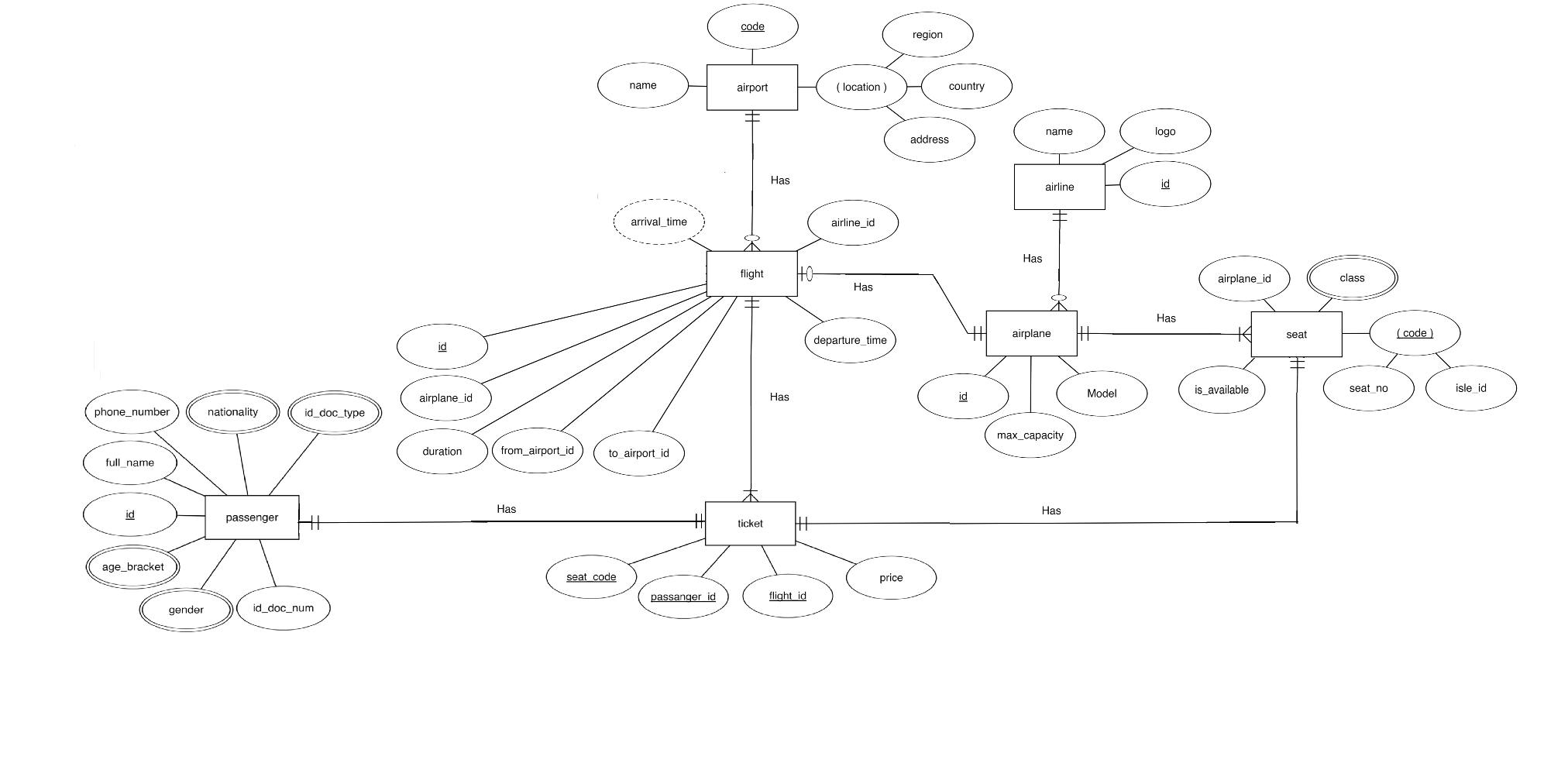
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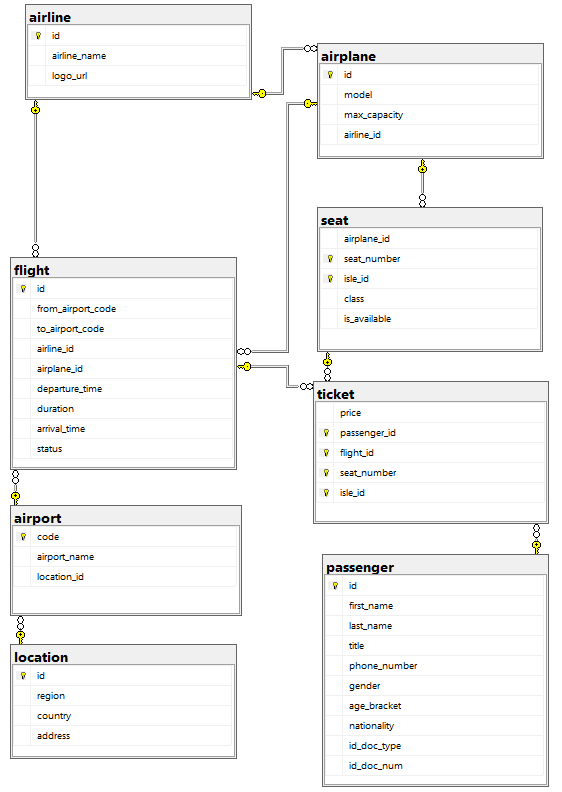
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**Spring/2025**

**Phase (I): Database Design   
a) ER Diagram**



 **Phase (I): Database Design  
b) Schema**

**Phase (II): Database Implementation**

**1- Create Database**

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| **SQL Statement** |
| CREATE DATABASE airline\_reservation\_system; |

**2- USE Database**

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| **SQL Statement** |
| USE airline\_reservation\_system; |

**3- Create tables: (For Each Entity)**

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| **SQL Statements** |
| CREATE TABLE passenger (  id INT IDENTITY(1,1) PRIMARY KEY,  first\_name VARCHAR(30) NOT NULL,  last\_name VARCHAR(30) NOT NULL,  title VARCHAR(30) NOT NULL,  phone\_number VARCHAR(15) NOT NULL  CHECK (  phone\_number NOT LIKE '%[^0-9]%'  AND LEN(phone\_number) BETWEEN 7 AND 15  ),  gender VARCHAR(9) CHECK (gender IN ('Male', 'Female')) NOT NULL, -- enum (multivalued)  age\_bracket VARCHAR(6) CHECK (age\_bracket IN ('Infant', 'Child', 'Adult')) NOT NULL,  nationality VARCHAR(30) NOT NULL,  id\_doc\_type VARCHAR(20) CHECK (id\_doc\_type IN ('Driver License', 'Passport', 'National ID')) NOT NULL,  id\_doc\_num SMALLINT NOT NULL,);  CREATE TABLE location( --composite attr8 in erd  id INT IDENTITY(1,1) PRIMARY KEY,  region VARCHAR(30) NOT NULL,  country VARCHAR(30) NOT NULL,  location\_address VARCHAR(255)  );  CREATE TABLE airport (  code CHAR(3) PRIMARY KEY,  airport\_name VARCHAR(60) NOT NULL,  location\_id INT NOT NULL,  FOREIGN KEY (location\_id) REFERENCES location(id)  );  CREATE TABLE airline (  id INT IDENTITY(1,1) PRIMARY KEY,  airline\_name VARCHAR(40) NOT NULL,  logo\_url VARCHAR(512)  );  CREATE TABLE airplane (  id INT IDENTITY(1,1) PRIMARY KEY,  model VARCHAR(40),  max\_capacity INT NOT NULL,  airline\_id INT NOT NULL,  FOREIGN KEY (airline\_id) REFERENCES airline(id)  );  CREATE TABLE seat (  airplane\_id INT NOT NULL,  seat\_number INT NOT NULL,  isle\_id CHAR(1) NOT NULL,  class VARCHAR(10) CHECK (class IN ('Economy', 'Business')),  is\_available BIT NOT NULL DEFAULT 1, -- 1 = available, 0 = not available  PRIMARY KEY (seat\_number, isle\_id),  FOREIGN KEY (airplane\_id) REFERENCES airplane(id)  );  CREATE TABLE flight (  id INT IDENTITY(1,1) PRIMARY KEY,  from\_airport\_code CHAR(3) NOT NULL,  to\_airport\_code CHAR(3) NOT NULL,  airline\_id INT NOT NULL,  airplane\_id INT NOT NULL,  departure\_time DATETIME NOT NULL,  duration INT NOT NULL, -- in minutes  arrival\_time AS DATEADD(MINUTE, duration, departure\_time) PERSISTED,  status VARCHAR(10) CHECK (status IN ('On Time', 'Delayed', 'Cancelled')),  FOREIGN KEY (from\_airport\_code) REFERENCES airport(code),  FOREIGN KEY (to\_airport\_code) REFERENCES airport(code),  FOREIGN KEY (airline\_id) REFERENCES airline(id),  FOREIGN KEY (airplane\_id) REFERENCES airplane(id)  );  CREATE TABLE ticket (  price SMALLINT NOT NULL,  passenger\_id INT NOT NULL,  flight\_id INT NOT NULL,  seat\_number INT NOT NULL,  isle\_id CHAR(1) NOT NULL,  FOREIGN KEY (seat\_number, isle\_id) REFERENCES seat(seat\_number, isle\_id),  FOREIGN KEY (passenger\_id) REFERENCES passenger(id),  FOREIGN KEY (flight\_id) REFERENCES flight(id),  PRIMARY KEY (seat\_number, isle\_id, passenger\_id, flight\_id)  ); |

**4- Data Insertion:- (at least 3 records for each table)**

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| **SQL Statements** |
| INSERT INTO location (region, country, location\_address) VALUES  ('Cairo', 'Egypt', 'Oruba Road, Heliopolis'),  ('New York', 'USA', 'Jamaica, NY 11430'),  ('New York', 'USA', '9400 Ditmars Blvd, East Elmhurst, NY 11369'),  ('Los Angeles', 'USA', '1 World Way, Los Angeles, CA 90045'),  ('Chicago', 'USA', '10000 W O''Hare Ave, Chicago, IL 60666'),  ('San Francisco', 'USA', 'San Francisco, CA 94128'),  ('Miami', 'USA', '2100 NW 42nd Ave, Miami, FL 33142'),  ('London', 'UK', 'Longford TW6'),  ('Paris', 'France', '95700 Roissy-en-France'),  ('Tokyo', 'Japan', 'Narita, Chiba 282-0004'),  ('Dubai', 'UAE', 'Dubai, UAE'),  ('Sydney', 'Australia', 'Mascot NSW 2020, Australia'),  ('Singapore', 'Singapore', 'Airport Boulevard, Singapore 819643'),  ('Toronto', 'Canada', '6301 Silver Dart Drive, Mississauga');  INSERT INTO airport (code, airport\_name, location\_id) VALUES  ('CAI', 'Cairo International Airport', (SELECT id FROM location WHERE location\_address = 'Oruba Road, Heliopolis')),  ('JFK', 'John F. Kennedy International Airport', (SELECT id FROM location WHERE location\_address = 'Jamaica, NY 11430')),  ('LGA', 'LaGuardia Airport', (SELECT id FROM location WHERE location\_address = '9400 Ditmars Blvd, East Elmhurst, NY 11369')),  ('LAX', 'Los Angeles International Airport', (SELECT id FROM location WHERE location\_address = '1 World Way, Los Angeles, CA 90045')),  ('ORD', 'O''Hare International Airport', (SELECT id FROM location WHERE location\_address = '10000 W O''Hare Ave, Chicago, IL 60666')),  ('SFO', 'San Francisco International Airport', (SELECT id FROM location WHERE location\_address = 'San Francisco, CA 94128')),  ('MIA', 'Miami International Airport', (SELECT id FROM location WHERE location\_address = '2100 NW 42nd Ave, Miami, FL 33142')),  ('LHR', 'Heathrow Airport', (SELECT id FROM location WHERE location\_address = 'Longford TW6')),  ('CDG', 'Charles de Gaulle Airport', (SELECT id FROM location WHERE location\_address = '95700 Roissy-en-France')),  ('NRT', 'Narita International Airport', (SELECT id FROM location WHERE location\_address = 'Narita, Chiba 282-0004')),  ('DXB', 'Dubai International Airport', (SELECT id FROM location WHERE location\_address = 'Dubai, UAE')),  ('SYD', 'Sydney Kingsford Smith Airport', (SELECT id FROM location WHERE location\_address = 'Mascot NSW 2020, Australia')),  ('SIN', 'Singapore Changi Airport', (SELECT id FROM location WHERE location\_address = 'Airport Boulevard, Singapore 819643')),  ('YYZ', 'Toronto Pearson International Airport', (SELECT id FROM location WHERE location\_address = '6301 Silver Dart Drive, Mississauga'));  INSERT INTO airline (airline\_name, logo\_url) VALUES  ('SkyJet', 'https://example.com/logo/skyjet.png'),  ('CloudAir', 'https://example.com/logo/cloudair.png'),  ('GlobalFly', 'https://example.com/logo/globalfly.png');  INSERT INTO airplane (model, max\_capacity, airline\_id) VALUES  ('Boeing 737', 180, 1),  ('Airbus A380', 500, 2),  ('Boeing 777', 300, 3);  INSERT INTO seat (airplane\_id, seat\_number, isle\_id, class, is\_available) VALUES  (1, 1, 'A', 'Economy', 1),  (1, 2, 'B', 'Economy', 1),  (1, 3, 'C', 'Business', 1),  (1, 4, 'D', 'Economy', 1);  INSERT INTO passenger (first\_name, last\_name, phone\_number, gender, age\_bracket, nationality) VALUES  ('Alice', 'Johnson', '1234567890', 'Female', 'Adult', NULL),  ('Bob', 'Smith', '2345678901', 'Male', 'Adult', NULL),  ('Cecilia', 'Tanaka', '3456789012', 'Female', 'Adult', 'Japan'),  ('David', 'Nguyen', '4567890123', 'Male', 'Child', 'Vietnam'),  ('Elena', 'Garcia', '5678901234', 'Female', 'Adult', 'Brazil'),  ('Farouk', 'Hassan', '6789012345', 'Male', 'Adult', NULL),  ('Grace', 'Lee', '7890123456', 'Female', 'Infant', 'South Korea'),  ('James', 'Brown', '8901234567', 'Male', 'Adult', 'UK'),  ('jane', 'austin', '19071734214', 'Female', 'Adult', 'USA'),  ('jacob', 'smith', '8201564667', 'Male', 'Adult', 'South Africa');  INSERT INTO flight (from\_airport\_code, to\_airport\_code, airline\_id, airplane\_id, departure\_time, duration, status) VALUES  ('JFK', 'LHR', 1, 1, '2025-04-15 08:00:00', 420, 'On Time'),  ('LHR', 'CAI', 2, 2, '2025-04-16 09:30:00', 720, 'Delayed'),  ('DXB', 'YYZ', 3, 3, '2025-04-17 23:00:00', 960, 'Cancelled'),  ('SFO', 'JFK', 1, 1, '2025-04-18 06:00:00', 840, 'On Time'),  ('NRT', 'DXB', 2, 2, '2025-04-19 21:00:00', 540, 'On Time');  INSERT INTO ticket (passenger\_id, flight\_id, seat\_number, isle\_id) VALUES  (1, 1, 1, 'A'),  (2, 1, 2, 'B'),  (3, 2, 3, 'C'),  (4, 2, 4, 'D'); |

**5- UPDATE**

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| **SQL Statement** |
| UPDATE flight  SET status = 'Cancelled'  WHERE id = 2; |

**6- DELETE**

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| **SQL Statement** |
| DELETE FROM passanger  WHERE name = 'Alice' AND last\_name = 'Johnson'; |

**7- Select statements (Only 7 Statements and their output)  
  
7.1) Using LIKE Operator**

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| **SQL Statement** |
| SELEECT \* from passenger  WHERE first\_name LiKE 'J\_%'; |
| **Output (Screen Shot)** |
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**7.2) Using IN Operator**

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| **SQL Statement** |
| SELECT \* from passenger  WHERE id IN (1, 5); |
| **Output (Screen Shot)** |
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**7.3) Using Between Operator**

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| **SQL Statement** |
| SELECT \* FROM flight  WHERE departure\_time BETWEEN '2025-04-17 23:00:00' AND '2025-04-19 21:00:00'; |
| **Output (Screen Shot)** |
|  |

**7.4) Using IS NULL Operator**

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| **SQL Statement** |
| SELECT \* FROM passenger  WHERE nationality IS NULL; |
| **Output (Screen Shot)** |
|  |

**7.5) Using IS NOT NULL Operator**

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| --- |
| **SQL Statement** |
| SELECT \* FROM passenger  WHERE nationality IS NOT NULL; |
| **Output (Screen Shot)** |
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**7.6) Using Distinct Keyword**

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| **SQL Statement** |
| SELECT DISTINCT class from seat; |
| **Output (Screen Shot)** |
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**7.7) Using TOP Clause**

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| **SQL Statement** |
| SELECT TOP 2 \*  FROM flight; |
| **Output (Screen Shot)** |
|  |

**8- Data Sorting**

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| **SQL Statement** |
| SELECT \* FROM passenger  ORDER BY first\_name DESC, last\_name; |
| **Output (Screen Shot)** |
|  |

**9- Data Grouping**

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| **SQL Statement** |
| SELECT age\_bracket, COUNT(\*) AS number\_of\_passengers  FROM passenger  GROUP BY age\_bracket; |
| **Output (Screen Shot)** |
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**10- Creating Index**

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| **SQL Statement** |
| **CREATE INDEX idx\_airport**  **ON airport (code, airport\_name);** |

**11- Creating View**

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| **SQL Statement** |
| CREATE VIEW Traveller AS  SELECT id, first\_name, last\_name , title  FROM passenger  WHERE first\_name IS NOT NULL; |

**12- Creating Sub-Query**

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| **SQL Statement** |
| SELECT first\_name, last\_name, phone\_number  FROM passenger  WHERE id IN (  SELECT passenger\_id  FROM ticket  WHERE flight\_id IN (  SELECT id  FROM flight  WHERE from\_airport\_code = 'JFK' AND to\_airport\_code = 'LHR'  )  ); |

**Phase (III): GUI  
  
Form (I) Screen Shot  
  
  
  
  
  
  
  
  
  
  
Form (II) Screen Shot  
  
  
  
  
  
  
  
  
  
  
  
  
Form (III) Screen Shot**