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CS 3200

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1. For the relation represented by all of the columns in the CSV file, define all functional dependencies and list them.

Relation: R(iid, date, airline, flightNumber, dep.airport, incidentType, severity, delay, num.injuries, reported.by, aircraft)

- iid → date, airline, flightNumber, dep.airport, incidentType, severity, delay, num.injuries, reported.by, aircraft
- (date, airline, flightNumber) -> dep.airport, aircraft

2. Using the functional dependencies and the rules of normalization, decompose the relational from the CSV into several relations that all satisfy 3NF; give the relations reasonable names.

Airline:

- Attributes: airlineCode (Primary Key)

Airport:

- Attributes: depAirport (PK)

Aircraft:

- Attributes: aircraftName (PK)

IncidentType:

- Attributes: incidentName (PK)

Severity:

- Attributes: severityType (PK)

Reporter:

- Attributes: reporterName (PK)

Flight:

- Attributes: airlineCode, flightNumber, date, depAirport, aircraftName
- Primary Key: (airlineCode, flightNumber, date)
- Foreign Keys:
    - airlineCode → Airline(airlineCode)
    - depAirport → Airport(depAirport)
    - aircraftName → Aircraft(aircraftName)

Incident:

- Attributes: iid, airlineCode, flightNumber, date, incidentName, severityType, delay, numInjuries, reporterName
- Primary Key: iid
- Foreign Keys:
    - (airlineCode, flightNumber, date) → Flight(airlineCode, flightNumber, date)
    - incidentName → IncidentType(incidentName)
    - severityType → Severity(severityType)
    - reporterName → Reporter(reporterName)

3. For the relations resulting from the normalization, create an ERD in the IE (Crow's Feet) notation. Add all attributes, attribute name, primary and foreign keys, data types, and entity descriptions. You may use any modeling tool of your choosing, e.g., LucidChart or Mermaid. Embed the ERD into a document. Save the document containing your database design as a PDF.

Represents each
airline with an
incident

Airline

PK	airlineCode	text

Represents each flight with an incident

Flight

PK/FK	airlineCode	text
PK	flightNumber	integer
PK	date	text
FK	depAirport	text
FK	aircraftName	text

Represents each
airport with an
incident

Airport

PK	depAirport	text

Represents each
aircraft with an
incident

Aircraft

PK	aircraftName	text

Represents each incident

Incident

PK	iid	text
FK	airlineCode	text
FK	flightNumber	integer
FK	date	text
FK	incidentName	text
FK	severityType	text
	delay	integer
	numInjuries	integer
FK	reporterName	text

Represents each
type of incident

IncidentType

PK	incidentName	text

Represents each
severity type of an
incident

Severity

PK	severityType	text

Represents each
role who reported
an incident

Reporter

PK	reporterName	text