

**CALIFORNIA STATE UNIVERSITY, SACRAMENTO**  
College of Business Administration

## MIS 150 - Database Systems for Business

## Homework 3 - Data Normalization and ERD

Points: 35

Due: Part 1, Monday, Nov. 14  
Part2, Wednesday, Nov. 16

Developing a logical database design for a relational database begins with defining the logical conceptual data models for each user or user groups. This mainly involves examining their tasks and applications, and determining their data needs. Activities focus on identifying entity types, their attributes, attribute domains, both the candidate and primary keys, and the relationship types specific to a task or application. Upon completion, all functionally similar logical conceptual data models are merged to form a local logical data model. During this step, the analyst produces a (local)logical data model, and examines its validity and robustness through normalization, ERDs and simulated transaction processing. These activities help ensure the design can support current applications and (to some degree) accommodate future changes.

The objective of this assignment is to better familiarize you with designing and validating a logical data model. The two parts involve (1) creating a normalized logical data model, and (2) graphically depicting the entity types and their relationships through an ERD.

Part 1 (20 points)

Using the attached sample travel itinerary (Figure 1), develop a normalized (i.e., 3NF) logical data model. Use only the elements shown on the summary (i.e., do not add any attributes beyond those appearing on the document). **Begin by showing the unnormalized relation. For each normal form** (i.e., 1NF through 3NF), be sure to identify the relations (i.e., entity types), their candidate and primary keys, and attributes. Please use descriptive and consistent names throughout your model. Follow the notation used in the textbook and your class notes:

*relation-name* (key, attribute\_1, ..., attribute\_n)

For example, *invoices*(invoice\_number, invoice\_date, delivery\_date, customer\_account).

Be careful to show your work and present it in an organized and readable manner. Points cannot be awarded for assumed work or steps.

**Hint.** Organize your unnormalized and normal form relations in Word. This will allow you to *cut-and-past*. *Work smarter, not harder!*

**Part 2** (15 points)

Following the logical data model you developed for part 1, draw an ERD showing: (1) all entity types, (2) all attributes and keys, (3) relationship types, and (4) cardinality (minimum and maximum). Be sure to note the keys (pk) and foreign keys (fk). As in the case of part 1, please use descriptive and consistent names throughout your diagram.

Be careful to present your work in an organized, readable and understandable manner. Points cannot be awarded for assumed work or steps.

**Hint.** Power Point offers a simple and easy way for drawing your ERD if you do not have Visio available to you.

**Tangibles**

Submit printouts of your logical data model and ERD. Your assignment should be software generated (i.e., no hand-drawn diagrams will be accepted). Place your assignment tangibles in a manila envelope. Be sure your name appears on all printouts.

As stated in the course syllabus, late assignments will NOT be accepted.

**Note.** The answers to Part 1 will be discussed in Monday's class. Once discussion begins, NO assignments will be accepted (for obvious reasons).

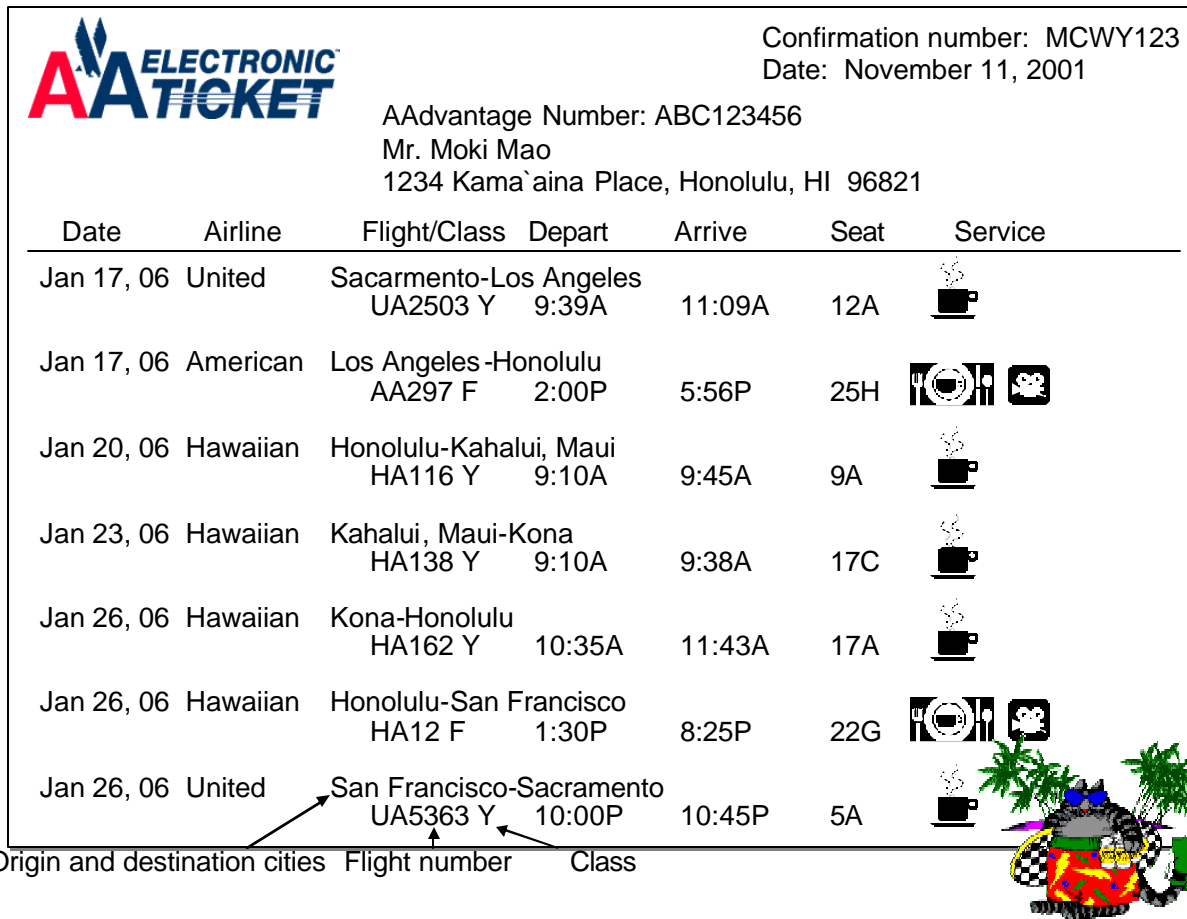




Figure 1. Travel itinerary

Explanation

Term/Symbol	Description
Confirmation number	Unique itinerary identifier for American Airlines
AAAdvantage number	Unique customer identifier for American Airlines frequent flier program
Flight number	Unique identifier across <u>all</u> airlines (i.e., industry wide). However, flights can occur several times over a week and month. Thus, they are not unique across all itineraries. To simplify matters, you may <ul style="list-style-type: none"> <li>• <u>Disregard</u> intermediate stops (e.g., New York-Los Angeles-Honolulu),</li> <li>• Assume a flight number will appear only once on an itinerary.</li> </ul>
Airline code	The 2-alphabetic characters of the flight number. For example, “UA” in “UA2503” (Sacramento-Los Angeles) and “AA” in “AA297” (Los Angeles-Honolulu) are the airline codes for United and American, respectively.
Class	The cabin class on the aircraft (i.e., first class, business class, economy).
	Beverage service. Treat as a single service item with meal service. For example, “in-flight service” could have a domain of “B” (beverage), “M” (meal), or “N” (none).

	Meal service. Treat as a single service item with beverage service
	Movie service. Treat as a Boolean variable, true (yes) or false (no).