

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

MIS 150 – Database Systems for Business

**Database Design and Implementation Project**

Points: 100

Due Date: Monday, December 12  
*No later than 5:00 p.m.*

The objective of the group project is to better familiarize you with the practical application of the design and implementation concepts we have discussed in class throughout the semester. The assignment involves developing and documenting the logical and physical database design, and implementing the design in Oracle9i. Selected reports will be generated with Oracle's Report Builder and Graphics Builder (optional).

### **Database Design**

Following the database design methodology presented in your textbook and using the sample order form (J&ROrderForm.pdf) and online catalog pages (www.jr.com), develop the logical and physical database designs for the J&R.com catalog. Although in practice the logical database design would normally support several of the organization's functions, you may restrict your designs to the information provided to you. However, they should be flexible to accommodate change and/or expansion (e.g., accounting related functions).

#### Logical Database Design

Analyze the order form and catalog pages (www.jr.com), and create a logical database design. The design should include (but not be limited to) the following items in the context of the first three steps of the design methodology:

- Entity types and their attributes
- Candidate and primary keys
- Normalized data model (unnormalized to 3NF and if applicable BCNF) with descriptions of each normal form, particularly how each was derived (i.e., unnormalized relation, 1NF, 2NF, 3NF relations)
- ERD of the normalized data model showing entity types, their attributes, keys and foreign keys, relationship types, and cardinality
- Integrity constraints (see week12.ppt)
- Applicable business rules

**Note.** You can assume that when an order is received an order number and the current date are assigned to it. Since this is strictly an e-commerce retail operation (i.e., no bricks and mortar sales), all customers are identified by their e-mail addresses.

#### Physical Design



Following your global logical design, develop the physical database design. The design should include (but not be limited to) the following items:

- Denormalized data model with an explanation for denormalization.
- Identify the anomalies resulting from denormalization, explain their effects and impact, and suggest ways in which their impact can be reduced
- If you did not denormalize the logical design, provide an explanation covering the reasons for leaving the design intact. Identify and discuss the tradeoffs and advantages (i.e., normalization vs. denormalization).
- Base relations and integrity rules designed for an Oracle9i database installation

## Implementation and Application

The second part of this project exposes you to Oracle9i, Report Builder and Graphics Builder (optional).

### Build and Implement the Database

Following your physical design, build your tables in Oracle9i. Each table should contain at least (i.e., a minimum of) 12 rows; draw your data from the online catalog pages ([www.jr.com](http://www.jr.com)).

**Note.** To reduce the burden of entering data into the tables via the SQL insert command, create control files and submit them to SQL Loader. Follow the class notes for creating a control file (week05.ppt). Also, once the data has been loaded into the tables, create a backup copy through the export utility, EXP. (If you are working in the TAH-1006 lab, you will need to do this as the nothing can be saved to the hard drives.)

**Hint.** Use a brief yet distinctive title that includes keywords for your item descriptions (e.g., solar atomic clock, precision wake atomic alarm clock, desk top atomic clock). The keywords can later be used to support character match queries using the SQL LIKE option with wildcards.

### Implement an Application

Create three reports (or more) that allow the user to selectively view information regarding the status of a particular group of items (i.e., merchandise). The queries driving the reports should be based on one or more of the following:

- Selects, project and joins using group (group by, having), sort (order by), aggregate (sum, average, count, minimum, maximum), and/or pattern match (like) functions
- Subquery
- Host variable(s)
- Dynamic SQL query

A graph can be used to either replace or supplement a (i.e., one) report. Be sure to follow the guidelines in homework 4 to ensure the *right* graph is used to display the *right* information.



## Groups

Group membership is the responsibility of the individual. Groups can be composed of one to four persons. Under no circumstance should a group exceed four. To ensure fairness in grading, a peer evaluation component will be required of everyone participating in a group of 3 to 4 persons, and can be used to adjust an individual's grade upward or downward. The peer evaluation form will be posted as a separate document on a later date.

### Learning Objectives of the Group

Group activities offer several invaluable professional development experiences. During this assignment, please be aware of the following cognitive activities you will be exposed to and develop yourself to become a better professional person:

- The *art* of listening (i.e., listening to what others have to say)
- Negotiation, persuasion, tolerance and humility (i.e., resolving differences and accepting the outcomes in a professional manner)
- Time management and coordination (i.e., working together through the assignment of tasks)
- Creative thought activity through parallel human processing (i.e., developing synergies through meaningful interactions among all group members)
- Leadership (i.e., taking responsibility for your actions and those of the group, promoting meaningful actions, setting an example for work actions and quality, bringing out the best among all group members)

## Tangibles

Submit the following items:

- An organized binder containing your logical and physical database designs, including all associated items discussed in the preceding paragraphs.
- A 3½-inch diskette or CD with your exported Oracle9i tables (and views if applicable), and Reports (RDF) (and Graphics) files. Export your tables using the EXP command in a DOS window (refer to the Introduction to Oracle9i Camtasia video).
- Please be aware that all tables can be exported into a single file. If there are any constraints between the tables, be sure to export them in the correct sequence so the constraints can be implemented when the tables are imported.

## Disclaimer

It is not the intent of the instructor to promote J&R.com merchandise or to suggest any affiliation with J&R.com. The catalog was only selected because it was readily available, and contains material supportive of the practical application of the database concepts discussed in class and presented in the textbook.

