CS60 Project 1 2017 Fall

Due Monday, September 18 at 10:30pm for CS60 Section 4502

Due Tuesday, September 19 at 10:30pm for CS60 Section 4127

Copy this Word file from **\\acshare\BusData**\ROGLER\_HAROLD\CS60 Database Concepts and Applications\CS60 Projects folder, rename the file to have form CS60\_1\_SectionNumber\_Lastname\_Firstname.docx, edit the footer, and edit other parts to answer the eight questions below. After completing the project, copy and paste your file to **\\zeus\Data**\ROGLER\_HAROLD\CS60 Database Concepts and Applications\SectionNumber as described in the syllabus. Copying and pasting your file to Zeus must take place from SMC, not across the internet.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Project\_  Code | Project\_Manager | Manager\_Phone | Manager\_Address | Project\_Bid\_Price |
| 21 | Holly Ba Parker | 904-111-1111 | 3334 Venice, Ste. 10, Gainesville, FL 37123 | $16,000,000 |
| 22 | Jane Dorts Grant | 615-222-2222 | 218 Clark Blvd., Venice, TN 36362 | $12,000,000 |
| 23 | George Grant Dorts | 615-333-3333 | 124 Nashville Dr., Lee, TN 29185 | $32,000,000 |
| 24 | Holly Parker | 904-111-1111 | 3334 Venice Blvd., Gainesville, FL 37123 | $21,000,000 |
| 25 | George Grant Dorts | 615-333-3333 | 124 Nashville Dr., Lee, TN 29185 | $10,000,000 |
| 26 | Holly Ba Ba Parker | 904-111-1111 | 3334 Venice St., Gainesville, FL 37123 | $25,000,000 |
| 27 | William Ko Jo Moore | 904-444-4444 | 216 Santa Monica St., Stetson, FL 30155 | $56,000,000 |
| 28 | Frank Smith | 904-555-5555 | 1234 Main St., Santa Monica, CA 90405 | $100,000 |

1. How many records (rows of raw data) does the above table store, and how many fields (columns or attributes) are in each record?

8 rows, 5 columns

2. What problem would you encounter if you wanted to list the records in order of the manager’s last name, or if you sometimes wanted to omit the first name or middle name in a display or printout? This design fault is referred to as a **composite attribute**. Show the table structure of an altered table that will correct this problem? Show all columns and rows of raw data in this revised table.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Project\_  Code | Project\_Manager  Last Name | Project\_Manager  Middle Name | Project\_Manager  First Name | Manager\_Phone | Manager\_Address | Project\_Bid\_Price |
| 21 | Parker | Ba | Holly | 904-111-1111 | 3334 Venice, Ste. 10, Gainesville, FL 37123 | $16,000,000 |
| 22 | Grant | Dorts | Jane | 615-222-2222 | 218 Clark Blvd., Venice, TN 36362 | $12,000,000 |
| 23 | Dorts | Grant | George | 615-333-3333 | 124 Nashville Dr., Lee, TN 29185 | $32,000,000 |
| 24 | Parker |  | Holly | 904-111-1111 | 3334 Venice Blvd., Gainesville, FL 37123 | $21,000,000 |
| 25 | Dorts | Grant | George | 615-333-3333 | 124 Nashville Dr., Lee, TN 29185 | $10,000,000 |
| 26 | Parker | Ba Ba | Holly | 904-111-1111 | 3334 Venice St., Gainesville, FL 37123 | $25,000,000 |
| 27 | Moore | Ko Jo | William | 904-444-4444 | 216 Santa Monica St., Stetson, FL 30155 | $56,000,000 |
| 28 | Smith |  | Frank | 904-555-5555 | 1234 Main St., Santa Monica, CA 90405 | $100,000 |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Project\_  Code | Project\_Manager  Last Name | Project\_Manager  Middle Name | Project\_Manager  First Name | Manager\_Phone | Street\_Address | Street\_Name | Street\_Type | Unit | City | State | Zip\_Code | Project\_Bid\_Price |
| 21 | Parker | Ba | Holly | 904-111-1111 | 3334 | Venice | Street | 10 | Gainesville | FL | 37123 | $16,000,000 |
| 22 | Grant | Dorts | Jane | 615-222-2222 | 218 | Clark | Boulevard | null | Venice | TN | 36362 | $12,000,000 |
| 23 | Dorts | Grant | George | 615-333-3333 | 124 | Nashville | Drive | null | Lee | TN | 29185 | $32,000,000 |
| 24 | Parker |  | Holly | 904-111-1111 | 3334 | Venice | Boulevard | null | Gainsville | FL | 37123 | $21,000,000 |
| 25 | Dorts | Grant | George | 615-333-3333 | 124 | Nashville | Drive | null | Lee | FL | 29185 | $10,000,000 |
| 26 | Parker | Ba Ba | Holly | 904-111-1111 | 3334 | Venice | Street | null | Gainsville | FL | 37123 | $25,000,000 |
| 27 | Moore | Ko Jo | William | 904-444-4444 | 216 | Santa Monica | Street | null | Stetson | FL | 30155 | $56,000,000 |
| 28 | Smith |  | Frank | 904-555-5555 | 1234 | Main | Street | null | Santa Monica | CA | 90405 | $100,000 |

3. What problem would you encounter if you wanted to list the records in order of the street address, city, state, or zip, or area code? Building upon the improvements that you’ve already made, show the table structure of an altered table that also corrects this problem? Show all columns and rows in this revised table, including the new ones from Step 2.

4. What data redundancies do you detect; i.e., what unnecessary repetitions are occurring? How could these redundancies lead to update anomalies, delete anomalies, or insert anomalies?

One data repetition that I am seeing is the project manager name. It is causing names to be input incorrectly. This is making the data less valid.

The user names are input differently which brings up the question, ‘are there that many people who have slightly similar names? ’

5. Using two relational tables, PROJECT and MANAGER, eliminate the redundancies you identified in Problem 4. Create a ManagerID column in both tables so you can link the two tables with the ManagerID being the primary key in MANAGER and a foreign key in PROJECT. Identify the primary key in each table. With words, show how the two tables join together by a foreign key that references a primary key. A format that would be useful is

Tablename.Columnname references Tablename.Columnname.

*Foreign Key Primary Key*

In this problem, show the column names across the top of each table and the rows of raw data below the column names. The columns must correct all faults (composite attributes and redundancies) that you saw above.

PROJECT.ManagerID references MANAGER\_ManagerID.

*Foreign Key Primary Key*

6. Create the **relational schema** to show the two tables and their columns, primary keys, foreign key, a line that shows how the two tables join, and the symbols 1 and ∞ (for *many*). As shown in the template on the following page that you can edit, a relational schema has a rectangle for each table and includes the table name, but lists the column names one-by-one after the tablename in the rectangle. A relational schema is shown in CS60 Chapter 02, page 50. A relational schema uses the infinity symbol (∞) for *Many.* The columns must correct the faults you saw above.

Manager

Project

|  |
| --- |
| **ManagerID** |
| Manager\_LastName |
| Manager\_FirstName |
| Manager\_Phone |
| Manger\_City |
|  |

1

|  |
| --- |
| **Project\_Code** |
| Project\_Name |
| Project\_Region |
| Project\_Phase |
| Project\_Team  ∞ |
| Project\_Bugget |
| MangerID |

A new table for questions 7 and 8:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Project\_  Number | Project\_  Name | Employee\_  Number | Employee\_  Name | Job\_  Code | Job\_Charge\_  Hour | Project\_  Hours | Employee\_  Phone |
| 1 | Hurricane | 101 | John D. Newson | EE | $85.00 | 13.3 | 653-234-3245 |
| 1 | Hurricane | 105 | David E. Schwann | CT | $60.00 | 16.2 | 653-234-1123 |
| 1 | Hurricane | 110 | Anne R. Ramoras | CT | $60.00 | 14.3 | 615-233-5568 |
| 2 | Coast | 101 | John D. Newson | EE | $85.00 | 19.8 | 653-234-3245 |
| 2 | Coast | 108 | June H. Settlemeir | EE | $85.00 | 17.5 | 905-554-7812 |
| 3 | Satellite | 110 | Anne R. Ramoras | CT | $60.00 | 11.6 | 615-233-5568 |
| 3 | Satellite | 105 | David E. Schwann | CT | $60.00 | 23.4 | 653-234-1123 |
| 3 | Satellite | 123 | Mary D. Chen | EE | $85.00 | 19.1 | 615-233-5432 |
| 3 | Satellite | 112 | Allecia R. Smith | BE | $85.00 | 20.7 | 615-678-6879 |

7. Based on the table above, identify pairs of columns that for the same value in one column, the 2nd column also has the same value. Such columns are **dependent** upon each other, or one column **determines** the other. You could write this functional relationship as

Column2 = function(Column1)

Employee\_Number = function(Employee\_Name)

Employee\_Name = function(Employee\_Number)

Job\_Code = function(Employee\_Number)

Project\_Number = function(Employee\_Number)

Job\_Charge\_Hour = function(Job\_Code)

Unlike mathematical functions such as y = x2 and functions that are plotted or graphed as y = f(x), this function is a tabular function with data stored in a table.

8. These dependencies lead to what redundancies in the table (what data is being stored redundantly)? Do you see any relationship between the pairs of columns that you identified in Question 7 and the occurrence of redundancies?

This one table would have to have a main table topic (view/structure). The data in this table should be describing some type of view or structuring the data in some logical way. I would say that the project takes precedence here. This data should favor viewing project data. There are some redundancies in the Project\_Number and Project\_Name. We see those records appear multiple times. We could have project numbers show up once. Then have a column named project team with Employee\_ID in a single cell. That data type would be an array.

∞

|  |  |  |
| --- | --- | --- |
| Project\_  Number | Project\_  Name | Employee\_  Team (Array of foreign keys) |
| 1 | Hurricane | 101, 105, 110 |
| 2 | Coast | 101, 108 |
| 3 | Satellite | 110, 105, 123, 112 |

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|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Project\_  Name | Employee\_  Number | Employee\_  Name | Job\_  Code | Job\_Charge\_  Hour | Project\_  Hours | Employee\_  Phone |
| Hurricane | 101 | John D. Newson | EE | $85.00 | 13.3 | 653-234-3245 |
| Hurricane | 105 | David E. Schwann | CT | $60.00 | 16.2 | 653-234-1123 |
| Hurricane | 110 | Anne R. Ramoras | CT | $60.00 | 14.3 | 615-233-5568 |
| Coast | 101 | John D. Newson | EE | $85.00 | 19.8 | 653-234-3245 |
| Coast | 108 | June H. Settlemeir | EE | $85.00 | 17.5 | 905-554-7812 |
| Satellite | 110 | Anne R. Ramoras | CT | $60.00 | 11.6 | 615-233-5568 |
| Satellite | 105 | David E. Schwann | CT | $60.00 | 23.4 | 653-234-1123 |
| Satellite | 123 | Mary D. Chen | EE | $85.00 | 19.1 | 615-233-5432 |
| Satellite | 112 | Allecia R. Smith | BE | $85.00 | 20.7 | 615-678-6879 |