Assignment 4 – Theory   
Summer 2018

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# Assignment 4 – Theory Introduction

First, read the PSP case several times. To make sure that you understand the concepts of case study answer the following questions. At the end of the end of the case document is a list of tables and columns which has been normalized for this case. In the hands-on portion of this assignment you will be directed to create tables, Primary and Foreign Keys, Check Constraints, and Indexes using Oracle. The following questions are designed to help you better understand the structure of the data base design. Please understand this structure since you will be required to create the database code your own SQL DDL statements. If you do not understand the business requirements or the conceptual design requirements you cannot code SQL.

## You Must Submit YOUR Answer in this Original Word Document to Blackboard

***This Assignment Word Document will contain hidden markers that may be used to detect plagiarism and provide an audit trail of those who may have modified the Word document.***  Many students in my classes work very hard to complete and learn from their assignments. It is not fair to those students who have professionally demonstrated their knowledge to receive the same grade as those who have plagiarized their assignments

**You MUST answer ALL requirement in this Word document and ONLY THIS Word Document. You MAY NOT use or edit any other word processor, except any version of Microsoft Word.**

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**If you do not have a copy of WORD**, you may use VMWARE VIEW (available from the RMU website) to access a virtual lab computer which contains any software needed for this course.

<http://www.rmu.edu/web/cms/departments-offices/administration-services/it/Pages/vmware-view.aspx>

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## You Must RENAME this Original Word Document to Include your LAST NAME

**YOU MUST enter your name in the beginning of this document as provided and "Save As" this document using a new name that starts with your LAST NAME, assignment number and semester, e.g., Jones Assignment 1 Summer 2018.docx**

If you do not rename your document your assignment will be penalized by 10%.

## NEVER submitted an Assignment as an Email Attachment

All assignments are to be submitted to the instructor by using the Assignment Link in the Blackboard system. Assignments submitted as an email attachment will NOT be graded. THE INSTRUCTOR NEVER ACCEPTS ANY ASSIGNMENT AS AN EMAIL ATTACHMENT FOR ANY REASON.

## ONLY Submit a FINAL Version of ALL Assignment

Never submit an incomplete assignment for grading. Only submit your final version of ALL assignment documents for grading. You can only submit an Assignment once.

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If you make an error submitting an assignment you must contact the instructor to clear your previous assignment submission. If you made an error on any assignment you may request that the previous assignment submission be cleared so that you may resubmit the assignment again. Please only submit a completed assignment.

## Submitting Late Assignments

While the assignments have a recommended due date, the instructor does not penalized your assignment grade if you are slightly late. Please do not send the instructor an email if you are going to submit your assignment late. The instructor is flexible and assumes you have a good excuse. But, after you are more than two weeks late the instructor does reserve to penalize the assignment or not accept the assignment if this late submission is unfair to other students enrolled in the course who had completed their assignments on time.

It has been the experience of the instructor that students who are excessively or consistently late asks a friend to provide them a copy of their assignment which will violate the RMU Academic Integrity Policy. (Please carefully read the next section!) ***If a friend asks you for a copy of your assignment "to get an idea what the instructor wants", you are risking a zero assignment grade, an F final grade, or a RMU Academic warning or suspension.***

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When an instructor has possession of an electronic document it is easy to detect plagiarism. Microsoft Word provides a variety of FREE anti-plagiarizing tools. The content of your submitted Assignment WORD document will be COMPARED to each other student who has submitted this assignment in the current class or any previous class as time permits. ***The content of each student's assignment may NOT be copied from any other current or past student enrolled in this class. Each assignment is to be prepared by ONE student. Assignments are NOT a group-prepared assignment.***

Some students may attempt to SAVE AS another student's completed assignment and rename it using their name. Some students may attempt to Cut-and-Paste answers from one student's assignment document to another student's assignment document. But as time permits, the forensic tools used to compare ALL student's assignments with other assignment will often detect anomalies which will provide absolute proof of plagiarism. ***On-ground tests may be used to compare the student’s knowledge to performance on assignments. All acts of plagiarism and forensic data will be submitted the RMU Academic Integrity Board to determine university-wide penalties, such as grade penalties, warnings, suspension, and change of a previous course grade for previous course students. All current and previous students involved in the plagiarism may be affected RMU Academic Integrity Board.***

***If a friend asks you for a copy of your assignment "to get an idea what the instructor wants", you are risking a zero assignment grade, an F final grade, or a RMU Academic warning or suspension. You are responsible to protect your assignment Word Document.***

***You, however, may discuss assignment requirements, provide research assistance, assist other students to debug programs or other hands-on-requirements, tutor students, or provide other advice that may assist the students in acquiring knowledge. But the actual preparation of an individual assignment must have been completely prepared by the student who submitted the assignment. Sections of the assignments may be copied from the internet as per the individual assignment's directions. Please contact the instructor if you need assistance interpreting this RMU Academic Integrity Policy. (Ref.16-1.)***

Many believe that if you a "stupid" enough provide another student, whom may compete with you for a future internship or career, a copy of your assignment, then you deserve the same penalty as the other student. If you are a "real" friend, tutor your friend.

***The instructor reserves the right to require face-to-face hands-on demonstrations or face-to-face tests to provide additional evidence to be submitted to the RMU Academic Integrity Board.***

## How to complete Content Questions

Review questions are also be provided at the end of the tutorial. The following is an example of a review question format. Since type the answer in provided grey or colored box.

1. What is the purpose of a partitioned data set? Answer:

Type in the answer to the question into the grey or colored box.

**It is recommended that you use Table of Contents at the beginning of the tutorial to review and navigate to the concept presented in the review question. Students will find that using the document FIND tool or searching GOOGLE may also be valuable for researching the review question answer.**

# Understanding the PSP Case

**Assignment 4 is organized into two documents: Assignment 4 – Theory and Assignment 4- Hands-on.**

**Assignment 4 – Theory will be allocated 30% of the assignment points**

**Assignment 4 – Hands-on will be allocated 70% of the Assignment points.**

First, read the PSP case several times. To make sure that you understand the concepts of case study answer the following questions. At the end of the end of the case document is a list of tables and columns which has been normalized for this case. In the hands-on portion of this assignment you will be directed to create tables, Primary and Foreign Keys, Check Constraints, and Indexes using Oracle. The following questions are designed to help you better understand the structure of the data base design. Please understand this structure since you will be required to create the database code your own SQL DDL statements. If you do not understand the business requirements or the conceptual design requirements you cannot code SQL.

## 1. Describe the industry that best represents PSP business requirements.

Answer =>

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## 2. Provide a detailed description of the following PSP data requirement concepts.

Please review both the case study and the table layout at the end of the document whenever appropriate. For example, what is the business purpose of a Packing List, 10% rule, or customer type.

|  |  |  |
| --- | --- | --- |
| **PSP Concept** | **Description of the Concept or Information (DATA) Stored in ONE Table Row** | **Unique Identifier (PK) for Table Row or N/A** |
| **Drawing** |  |  |
| **Packing List** |  |  |
| **Order Acknowledgement** |  |  |
| **Drawing Option** |  |  |
| **Customer Type** |  |  |
| **Group By** |  |  |
| **Job Cost** |  |  |
| **10% Rule** |  |  |
| **Drops** | Summer 2018 |  |
| **Labor Operation** |  |  |
| **Schedule Category** |  |  |
| **Time Clock** |  |  |
| **Employee** | Summer 2018 |  |

## 3. List the order of procedures and data storage requirements that is typical of a normal job flow at PSP

In simpler terminology, what comes first, what comes second, etc. Copy and Paste each of the following **14 requirements** to correctly arrange the sequence of processing. This is only one correct sequence.

**List of requirements (out of order): Process Order acknowledgement, Calculate Adjusted, Store Customer's Drawing, Store Customer Information, Assign Customer Type, Store Time Card, Schedule Packing List, Store Raw Material Cost, Prepare Order Acknowledgement, Store Packing List, Process Customer Purchase Order, Calculate Quantity Discount, Look up Standard Price, Send Price Quote.**

|  |  |
| --- | --- |
| **Sequence of Procedures and Data Storage Requirements** | **Process Requirement** |
| **1** | **Store Customer Information** |
| **2** |  |
| **3** |  |
| **4** |  |
| **5** |  |
| **6** |  |
| **7** |  |
| **8** |  |
| **9** |  |
| **10** |  |
| **11** |  |
| **12** |  |
| **13** |  |
| **14** |  |

**Why is the creation of a Customer Table and the storage of Customer Information the first priority? Answer: without the customer information PSP could not store the Customer's Drawing Information or be able to give a prices quote without the customer type.**

At the end of the PSP Case Study is normalized database design which lists tables, columns, primary keys, foreign keys, indexes and validation constraints used to store data that supports PSP business processing requirements, reports, documents, and analysis. During normalization data will be store into multiple tables to minimize duplication of store data. But, data from multiple tables must logical be combined to provide useful information to support a report or document design, or program specification.

To combine data from multiple tables one would use a SQL JOIN to merge the tables based on a common column. For example, the customer number column is the primary key of the customer table. The customer number is also stored in the drawing table; hence the customer number is a common column. When the customer and drawing tables are combined using the customer number using the following SQL command one can merge the data from both tables.

For example, the following SQL statement will display the drawing number that is associated with the customer part number.

SELECT CUSTOMER\_NUMBER, CUSTOMER\_NAME, DRAWING\_NUMBER, CUSTOMER\_PART\_NUMBER

FROM CUSTOMER, DRAWING

WHERE CUSTOMER.CUSTOMER\_NUMBER = DRAWING\_CUSTOMER

## 4. List all table names of a normalized database will be joined together using a common field to provide business information, reports or documents.

To find a relationship between tables, start with the primary key of a table and then find the column name in other tables. The primary key is always a good candidate for a table join.

|  |  |  |  |
| --- | --- | --- | --- |
| **Table Name** | **Common Field** | **Other Table(s) that will be joined to the Listed table** | **Examples of business information, reports or documents provided** |
| **CUSTOMER** | **CUSTOMER NUMBER** |  |  |
| **DRAWING** | **DRAWING NUMBER** |  |  |
| **PACKING LIST** | **PACKLIST NUMBER** |  |  |
| **EMPLOYEE** | **CLOCK NUMBER** |  |  |
| **RAW MATERIALS** | **RAW MATERIAL ID** |  |  |
| **JOB COST** | **JOBCOST REFERENCE NUMBER** |  |  |

**Two benefits of data normalization are 1) reduce the redundancy of stored data, and 2) improve transactional performance. When Humpty Dumpy felled off the wall, no one could recognize Humpty Dumpy since he was broken into many pieces. Poor Humpty Dumpy had the kings' men to put him back together again.**

**In databases, we use the SQL JOIN command to put the table together again to create meaningful business information reports and documents. For example, if you were creating business invoice what information should be included? Read the case and do a little research, e.g., What Information Should My Invoices Include? ttps://www.score.org/resource/what-information-should-my-invoices-include. What information should in included in a Job costing report to determine if we can make money manufacturing a particular customer part, Review tables in the case study and then join them,**

## 5. List the types of relationships between sets of tables and any referential or participation constraints.

To find a relationship between tables, start with the primary key of a table and then find the column name in other tables. The primary key of a parent table or foreign key of a child table is always a good indicator of a relationship. But you need to look at the procedural rules of business requirements to understand all possible relationships.

Two tables are listed for each possible relationship. The English description of the relationships, constraints and participation are IMPORTANT to this requirement since most of the direct relationships will be 1:N or no relationship. A conceptual requirement of a Foreign key means that a child table MUST have at least one parent record. The concept of participation indicates the maximum number of parent rows are possible given the business requirements of the case study.

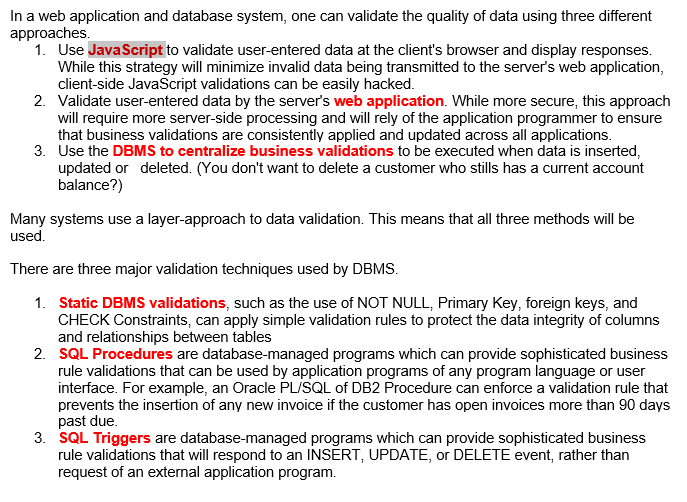
|  |  |  |  |
| --- | --- | --- | --- |
| **Table Name** | **Table Name** | **Type of direct relationship**  **(1:1, 1:N, N:M, None)** | **English description of the relationship and Foreign Keys (Referential integrity) and Participation** |
| **CUSTOMER** | **DRAWING** | 1:N | A customer may have many drawings. A Drawing must be assigned to a customer (Foreign Key) and a Drawing may only be assigned to one customer (participation) |
| **DRAWING** | **TIME CLOCK** | There is no direct relationship between a drawing and a time clock (no common column) | A drawing has no relationship with a time clock row. A packing list may have a relationship with a time clock |
| **DRAWING** | **PACKLIST** |  |  |
| **TIMECLOCK** | **EMPLOYEE** |  |  |
| **EMPLOYEE** | **LABOR OPERATIONS** |  |  |
| **JOB COST** | **DRAWING** |  |  |
| **JOB COST** | **PACKLIST** |  |  |
| **CUSTOMER** | **PACKLIST** |  |  |
| **CUSTOMER** | **CUSTOMER SHIPPING ADDRESS** |  |  |
| **DRAWING** | **DRAWING OPTION** |  |  |
| **OPTION** | **PACKLIST** |  |  |
| **EMPLOYEE** | **PACKLIST** |  |  |
| **EMPLOYEE** | **JOB COST** |  |  |
| **RAW MATERIALS** | **JOB COST** |  |  |
| **DRAWING** | **JOB COST** |  |  |
| **CUSTOMER** | **JOB COST** |  |  |

## 6. Why can't the Customer's Part Number be used as a Primary Key or unique identifier?

Answer =>

Review your previous assignment Normalization primary key examples.

## 7. Check Constraint Analysis



The business requirements determine if there will be a restriction on the values stored in a particular column. List the Check Constraint columns or none as appropriate. Cut-and-paste the limited values from the case.

|  |  |  |
| --- | --- | --- |
| **Table Name** | **Check Constraint Column(s) or none** | **Limited values** |
| **CUSTOMER** |  |  |
| **DRAWING** |  |  |
| **PACKLIST** |  |  |
| **OPTION** |  |  |
| **PRICELIST** |  |  |
| **EMPLOYEE** |  |  |
| **JOB COST** |  |  |
| **TIME CLOCK** |  |  |
| **RAW MATERIALS** |  |  |
| **LABOR OPERATION** |  |  |

1. List and explain three methods used to validate user or system entered data to ensure valid data in a web application and database system. Answer =>

2. What is the shortcomings of using JavaScript to validate user-entered data in a web application and database system? Answer =>

3. What is the shortcomings of web application validation strategies to validate user-entered data in a web application and database system? Answer =>

4. What is advantages using DBMS validation strategies to validate user-entered data? Answer =>

5. List and Explain three validation methods used by a DBMS to validate user-entered data? Answer =>

6. What are the advantages of dynamic SQL Procedure or Trigger validations as compare to DBMS static validations? Answer =>

7. What are the differences between a dynamic SQL Procedure and Trigger validation? Answer =>

## 8. 1:1 Relationship.

Using the 1:1 relationships between RAW MATERIALS, TUBULAR INVENTORY, AND SUPPLIES describe the special type of 1:1 relationship that was used in the conceptual design. Hint: Refer to the normalization examples from a previous assignment. Answer =>

## 9. N:M Relationship.

The relationship between DRAWINGS AND OPTIONS is an example of a N:M relationship. That means that a drawing may have many options and option may be used by multiple drawings. Notice there is no requirement for a drawing to have an option, nor is there a requirement that an option MUST is assigned to a drawing. Relational databases cannot implement a N:M relationship. How did the conceptual design provided to you solve the problem of a conceptual N:M relationship using the tables listed. Be specific. Hint: Refer to the normalization examples from a previous assignment. Answer =>

## 10. Index Analysis

**There are three reasons (benefits) why one would implement a table index to improve the database performance: 1) Increase performance or response time using a column other than a Primary Key (Where clause), 2) Dynamic Ordering (Order By clause), and 3) Grouping or Categorical Analysis (Group BY using a composite index).**

On the other hand, a conceptual designer may cite the benefit of an index, but the benefits did not costs of providing the index, e.g., extra storage space, slower performance on updates, insertion and deletions, etc.,

Given the columns for each table proposed for an index cite a SPECIFIC performance EXAMPLE using the following tables and columns. The plus sign means a composite index of multiple columns. Hint: Refer to the normalization examples from a previous assignment.

|  |  |  |
| --- | --- | --- |
| **Table Name** | **Proposed COLUMNs of an Index** | **Performance benefit EXAMPLE of EACH the Proposed Index** |
| **CUSTOMER** | **1. CUSTOMER NAME** |  |
| **DRAWING** | **1. CUSTOMER NUMBER + CUSTOMER PART NUMBER**  **2. CUSTOMER PART NUMBER**  **Summer 2018** |  |
| **PACKLIST** | **1. DRAWING NUMBER**  **2. CUSTOMER PURCHASE ORDER NUMBER**  **3. SCHEDULED SHIP DATE** |  |
| **EMPLOYEE** | **1. SOCIAL SECURITY NUMBER**  **2. EMPLOYEE LAST NAME** |  |
| **JOB COST** | **1. PACKLIST NUMBER + TRANSACTION DATE** |  |
| **TIME CARD** | **1. PACKLIST NUMBER + OPERATION NUMBER + TIME CARD DATE**  **2. TRANSACTION DATE** |  |