Assignment 4 – Theory   
Summer 2018

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**Enter your Name Here 🡺 Puja Ghosh**

# 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%.

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## 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.

## Requests to Clear Previously Assignments for Re-Submission

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** | Drawing that will be send by a customer which provides as a graphical detail that is to be priced quoted and produced. | Unique customer’s part number. |
| **Packing List** | Packing list number is assigned after customer’s purchase order number is received. | Unique packing list number |
| **Order Acknowledgement** | Order acknowledgement document is generated after the packing list are properly entered into the customized system database. | Customer purchase order and PSP’s packing list number. |
| **Drawing Option** | Drawing options are necessary if any customer’s part drawing needs any modification, and, to prepare standard price quote. | PSP will use a Option price list for this extra manufacturing requirement. |
| **Customer Type** | Contractors(charged with premium price,Standard customers(list price),blanket customer(standard discount from price list) | Modified price quote,standard price plus or minus drawing option. |
| **Group By** | Group by discount is placed when a customer order multiple part order which can be produced by using the same set up. | Making several units , one single unit by group by. |
| **Job Cost** | Job cost depends on the total budgeted hours that it takes. | Packing list number on the acknowledgement paper. |
| **10% Rule** | If the packing list has been shipped before the order complete or some produced unit has been discarded because of the quality control check, remaining part will be recognized as a back order. 10% rule applied if the order is for example 90 units, 100 units are scheduled for production even though it needs 90units in the original. | Back order list. |
| **Drops** | Left over raw materials from an order.  Summer 2018 |  |
| **Labor Operation** | Labor operations describes the type of labor operation which is performed. | Assigned a unique number. |
| **Schedule Category** | Schedule category is the number between 1 to 16 assigned to a job progress. | 1 to 16 number |
| **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** | Store customer’s drawing |
| **3** | Look up standard price |
| **4** | Calculate adjusted |
| **5** | Assign customer type |
| **6** | Calculate quantity discount |
| **7** | Send price quote |
| **8** | Process customer purchase order |
| **9** | Schedule packing list |
| **10** | Store packing list |
| **11** | Prepare order acknowledgement |
| **12** | Process order acknowledgement |
| **13** | Store raw material cost |
| **14** | Store time card |

**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** | CUSTOMER SHIPPING ADDRESS TABLE,DRAWING TABLE |  |
| **DRAWING** | **DRAWING NUMBER** | DRAWING OPTION TABLE,RAW MATERIAL REQUIREMENTS TABLE,PACKING TABLE |  |
| **PACKING LIST** | **PACKLIST NUMBER** | RAW MATERIAL REQUIREMENTS TABLE,JOBCOST TABLE |  |
| **EMPLOYEE** | **CLOCK NUMBER** | JOBCOST TABLE,TIME CARD TABLE |  |
| **RAW MATERIALS** | **RAW MATERIAL ID** | TUBULAR TABLE,SUPPLIES TABLE,RAW MATERIAL REQUIREMENTS TABLE,RAW MATERIAL FIFO TABLE,RAW MATERILA DROP INVENTORY,INVENTORY VENDOR |  |
| **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** | 1:1 |  |
| **TIMECLOCK** | **EMPLOYEE** | 1:N | An employee has different time clock numbers and a time clock number has one employee. |
| **EMPLOYEE** | **LABOR OPERATIONS** |  |  |
| **JOB COST** | **DRAWING** |  |  |
| **JOB COST** | **PACKLIST** |  |  |
| **CUSTOMER** | **PACKLIST** | 1:1 | Each customer has a packlist number and a packilist number assigned to a customer. |
| **CUSTOMER** | **CUSTOMER SHIPPING ADDRESS** | 1:1 | Every customer has one shipping address and a shipping address assigned to a customer. |
| **DRAWING** | **DRAWING OPTION** | N:M | A drawing has many option and each option has been used by many options. |
| **OPTION** | **PACKLIST** |  |  |
| **EMPLOYEE** | **PACKLIST** |  |  |
| **EMPLOYEE** | **JOB COST** |  |  |
| **RAW MATERIALS** | **JOB COST** |  |  |
| **DRAWING** | **JOB COST** |  |  |
| **CUSTOMER** | **JOB COST** |  |  |

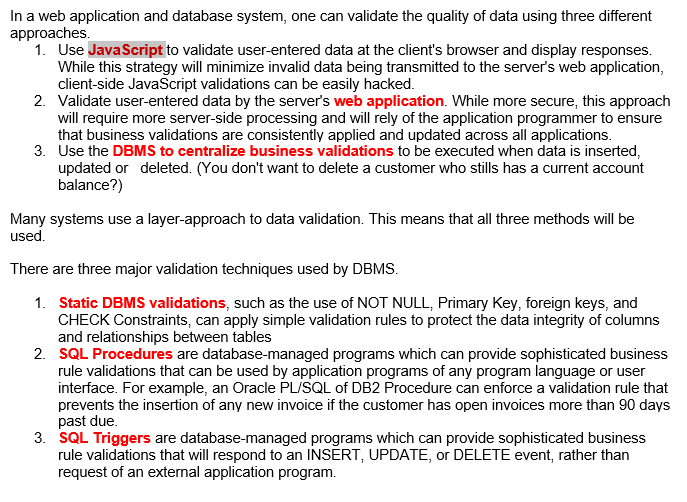
## 6. Why can't the Customer's Part Number be used as a Primary Key or unique identifier?

Answer =>

Customer’s part Number canot be used as primary key or unique identifier because two or more customers have same part time. PSP cannot use the customer purchase order number to identify a job. Two different customers may use same purchase order number. A customer may order two different parts on the same purchase order. A customer may order one item that is to be shipped on two different days, e.g., June 15 and August 30th. Therefore, the customer purchase order may be stored as one or more PSP packing lists.

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** | **Check constraint column CUSTOMER TYPE** | **'B','C','S'** |
| **DRAWING** | **DRAWING PREFIX** |  |
| **PACKLIST** | **NONE** |  |
| **OPTION** | **OPTION TYPE** | % OR $ |
| **PRICELIST** | **TYPE** | One of the categories of drawing prefixes |
| **EMPLOYEE** | **BONUS CHARGE** | “Y” or “N” |
| **JOB COST** | **TRANSACTION CODE** | “R” , “S”, “D”, “L”, “O”, “C”, “U” |
| **TIME CLOCK** | **SHIFT NUMBER, HOURS, MINUTES** | SHIFT NUMBER(1,2 OR 3), HOURS(1 TO 24),MINUTES (0,15, 30 OR 45) |
| **RAW MATERIALS** | **RAW MATERIAL TYPE** | **"T","S" or "O"** |
| **LABOR OPERATION** | **SCHEDULE CATAGORY** | 0 thru 20 |

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 =>

JavaScript are used to validate user-entered data at the client’s browser and display responses. This strategy minimizes invalid data transmission to the server’s web application.

Through server’s web application user-entered data can be validated. This approach needs more server-side processing and rely of the application programmer to ensure that business validations are consistently applied updated across all application.

Using DBMS to centralize business validations to be executed when data is inserted, updated or deleted.

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

Although JavaScript strategy minimizes invalid data transmission to the server’s web application, client-side JavaScript validations can easily be hacked.

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

Need more server-side processing and business validations needs to be applied and updated constantly across all applications.

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

DBMS can apply data validations rules to protect the data integrity of columns and relationships between tables.

SQL procedures can be used by any application programs of any program language or user interface.

Database management program can provide sophisticated business rule validations.

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

Static DBMS validations like NOT NULL, Primary key, foreign key and CHECK constraints can apply simple validation rules to protect the data integrity of columns and relationship between tables.

SQL Procedures are database managed programs which can provide sophisticated business rule validations that can be used by application programs of any program language or user interface.

SQL triggers will respond to an INSERT, UPDATE or DELETE event, rather than request of an external application program.

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

SQL procedures and SQL TRIGGERS are database-managed programs which can provide sophisticated business rule validations and Static DBMS,simply validations rules lsuch as the use of NOT NULL, Primary key, and CHECK Constraint.

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

SQL procedures that can be used by application programs of any program language or user interface. Triggers much responds to the internal event like INSERT,UPDATE or DELETE , rather than request of an external application program.

## 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** |  |