Assignment 5 Theory Summer 2018

***J. Packy Laverty***

***laverty@rmu.edu***

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**Enter your Name Here 🡺**

# Assignment 5 – Introduction

**Assignment 5 is organized into two documents: Assignment 5 – Theory and Assignment 5 - Hands-on.**

**Assignment 5 Theory will be allocated 30% of the assignment points**

**Assignment 5 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.

## 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.**

**Do not use GOOGLE DOCS or Open Office DOCX files at any time. If you use any other Word Processor you will be assigned ZERO credit.**

**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>

NEVER STORE ANY DOCUMENTS ON THE DESKTOP OF VMWARE VIRTUAL COMPUTER. You will lose your document. It is preferable to store your documents on RMU Drive U: If necessary you can email the document to yourself.

## 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 2016.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.

## 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.***

## Academic Integrity and Plagiarism

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.

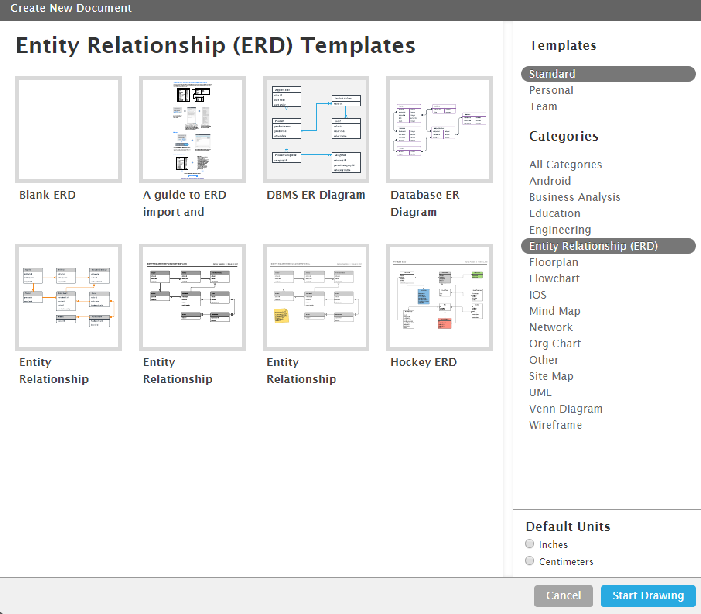
**It is recommended that you use Table of Contents at the beginning of the tutorial to review and navigate to the concept presented in the review question. Students will find that using the document FIND tool or searching GOOGLE may also be valuable for researching the review question answer.**

# Preparing an ERD Diagram for the PSP Case

## RMU Access to LucidChart

In the past students had created ERD Diagrams using Visio, which may be accessed on RMU VMware View. However, Visio had eliminated ERD diagrams. RMU has provided students and faculty with access to Lucid Charts.. You can access Lucidchart and the ERD tool by:

* Opening Google Drive (drive.google.com) and logging into your RMU account
* In the top left click New and then click More at the bottom of the drop down
* You should see LucidChart diagrams as an option, click that and allow LucidChart to load in a new tab
* Once LucidChart loads, you should see the Create a New Document Dialog with some Templates to choose from. One of the categories of templates is Entity Relationship (ERD).



Files created by Lucidchart are stored in Google Drive and can be shared with others just like any other file on Google Drive.

Video - LucidChart Full Tutorial 2014 - https://www.youtube.com/watch?v=6sm60O4kLDs

Video - Entity Relationship Diagram (ERD) Tutorial - Part 1 - https://www.youtube.com/watch?v=QpdhBUYk7Kk

Video - Entity Relationship Diagram (ERD) Tutorial - Part 2 - https://www.youtube.com/watch?v=-CuY5ADwn24

Video - Creating an ERD with LucidChart - https://www.youtube.com/watch?v=9L0CMnDGuLg

Video - DB2: ERD student registration system in LucidChart - <https://www.youtube.com/watch?v=X8OzjPkvUyE>

## ERD Videos and SQL Developer Data Modeler

**Oracle SQL Developer Data Modeler 4.0 (4.0.0.825) EA3 download - http://www.oracle.com/technetwork/developer-tools/datamodeler/downloads/datamodeler-4ea-downloads-1988443.html**

**Video - Creating Logical models using SQL Developer Data Modeler - https://www.youtube.com/watch?v=y49cOg8oj7o**

**Video - Introduction to SQL Developer Data Modeler - https://www.youtube.com/watch?v=wsVh1zLmQb0**

**Video -SQL Developer ER diagram - https://www.youtube.com/watch?v=f80xWJYKJFQ**

**Video - creating a logical model in Oracle SQL data modeler -** [**https://www.youtube.com/watch?v=yu2Yr\_GFC1E**](https://www.youtube.com/watch?v=yu2Yr_GFC1E)

**Video- Entity Relationship Modeling to Relational Modeling**

[**http://www.youtube.com/watch?v=qRqzmAwmJwY&feature=channel**](http://www.youtube.com/watch?v=qRqzmAwmJwY&feature=channel)

**Video - Data Modeling - ERD Diagrams**

[**http://www.youtube.com/watch?v=WSNqcYqByFk&feature=channel**](http://www.youtube.com/watch?v=WSNqcYqByFk&feature=channel)

## Bachman Diagrams versus ERD Diagrams.

While a Bachman Diagram was presented in your database design hand out it is NOT a substitute for a properly prepared ERD diagram. Bachman Diagrams are a historically popular pencil-and-paper tool used to display the structure, primary keys and indexes of a normalized database design. It is more concerned with the relationships between tables than the details of non-key fields.

Bachman Diagram relationship lines connect columns between tables, not tables. The ERD diagram also uses a relationship line, but it interconnects entities (tables) not columns. Therefore, a Bachman Diagram relationship line should connect the Customer Number of the Customer table to the Customer Number of the Invoice Table when using a Bachman diagram. The Bachman Diagram should NOT use the relationship line to connect the Customer Table to the Invoice Table.

Both the Bachman Diagram and ERD Relationship line provide a future tool for coding SQL Join statements. A Join interconnects multiple tables based on the relationship of columns between the tables. By itself the Bachman or ERD relationship has no significance to the physical implementation of the database. A join is the method to put the stored data retrieved from tables of a normalized database back together to provide meaningful information. Normalized storage reduces data redundancy, but it makes it much more difficult for a user to understand.

The Bachman and ERD relationship line is almost identical in purpose to the Microsoft Access Relationship line. When using the Microsoft Access Query Wizard a user may create complicated joins without knowledge of the structure of the database. To establish this user-friendly environment, a relationship line must be created before the Query tool can create a Join. In Access, the relationship line represents the "directions" on how to join. In Bachman, an interfile relationship line is simply a plan to code a join, not a "How To". If you are to design a database schema to support the storage of information necessary for various documents and reports, the rules for normalization will create many tables. While the objectives of normalization are to minimize data duplication and to prevent data anomalies, a normalized database schema seems complicated to a normal user. The relationship lines are important because it represents plan to put the separated tables logically back together (a join) to display meaningful data to the everyday user.

The Bachman Diagram was a high level data modeling tool. It was not concerned with details of all attributes, nor could handle issues such as foreign keys. The ERD diagram could easily be used a high level tool as well as a very detailed tool. In fact, Oracle has an ERD tool that can generate rather complete SQL Script with most of the Create Tables, Constraints, Sequences, Indexes, and PL/SQL triggers. In this class, we want to learn how to use the ERD diagram to add detail to the Bachman Diagram. Understand that both the Bachman diagram and the ERD diagram does the same job.

One problem with learning the ERD diagram is that there are so many diagramming and notation variations, e.g., Chen, ISO, Bachman, UML and Crow's foot. The ISO (min,max) and Crow's foot notation are easier to understand and either should be used for this assignment.

## Tables and Columns of the PSP Case that should be used for the ERD Diagram

**The details of the following PSP tables and columns will be used to develop your ERD Diagram**

**CUSTOMER**

**CUSTOMER NAME**

**CUSTOMER NUMBER**

**CUSTOMER TYPE**

**Notes: CUSTOMER TYPE must be 'B','C','S' (where B means Blanket, C means Contract, S means Standard)**

**DRAWING**

**DRAWING NUMBER**

**DRAWING PREFIX**

**CUSTOMER NUMBER**

**CUSTOMER PART NUMBER**

**OPTION**

**OPTION NUMBER**

**OPTION TYPE**

**OPTION DESCRIPITON**

**OPTION UNIT COST**

**OPTION UNIT PRICE**

**OPTION PRECENTAGE**

**DRAWING OPTION**

**DRAWING NUMBER**

**OPTION NUMBER**

**UNITS-OF-OPTION**

**PRICE LIST**

**OD**

**WALL**

**LENGH**

**TYPE**

**PRICE 0 TO 5**

**RAW MATERIAL**

**RAW MATERIAL ID**

**RAW MATERIAL TYPE**

**CURRENT UNIT COST**

**TUBULAR INVENTORY**

**RAW MATERIAL ID**

**OD**

**WALL**

**LENGH**

**CURRENT UNIT COST**

**CURRENT COST PER FOOT**

**MINIMUM DROP LENGTH**

**SUPPLIES INVENTORY**

**RAW MATERIAL ID**

**CURRENT UNIT COST**

**REORDER POINT**

**SAFETY STOCK**

**RAW MATERIAL REQUIREMENTS**

**PACKLIST NUMBER**

**RAW MATERIAL ID**

**SCHEDULED SHIP DATE**

**UNITS REQUIRED**

**VENDOR**

**VENDOR NUMBER**

**VENDOR NAME**

**LABOR OPERATION**

**OPERATION NUMBER**

**OPERATION DESCRIPTION**

**SCHEDULE CATAGORY**

**PACKLIST**

**PACKLIST NUMBER**

**DRAWING NUMBER**

**CUSTOMER NUMBER**

**CUSTOMER PART NUMBER**

**CUSTOMER PURCHASE ORDER NUMBER**

**ORDER BY**

**DATE ORDERED**

**SCHEDULED SHIP DATE**

**ORGIINAL SHIP DATE**

**ACTUAL SHIPPED DATE**

**ORDER ACKNOWLEDGENT DATE**

**UNITS**

**PRICE PER UNIT**

**GROUP BY**

**QUANTITY SHIPPED**

**JOBCOST**

**JOBCOST REFERENCE NUMBER**

**PACKLIST NUMBER**

**TRANSACTION DATE**

**TRANSACTION CODE**

**TRANSACTION CROSS REFERENCE**

**CLOCK NUMBER**

**JOBCOST UNITS**

**COST PER UNIT**

**Notes: TRANSACTION CODE must be "R", "S", "D", "L", "O", "C", "U", where**

**"R" means Raw Materials,"S" means Supplies,"D" means Drops, "L" means Regular Labor,"O" means Overtime Labor,"C" means Outside Contract,"U" means Undefined**

## Requirement 1. Use an ERD Tool.

You may use Visio (available through VMware View), Oracle SQL Modeler, or any other ERD modeling tool.

## Requirement 2. Create the PSP Entities using an ERD Tool

Create an entity for each of the 13 PSP tables.

## Requirement 3. Create the PSP Columns, Primary and Foreign Keys, Check Constraints and Indexes using an ERD tool

1. Create the columns for each entity. An advantage of an ERD diagram as compared to a Bachman diagram is that it can diagram and document detailed properties of all key and non-key columns (ERD attributes) very well. Use the columns properties to assign appropriate data types.

2. Place all parent tables to the top-margin of the page. A parent table is the "one "table of a "one-to-many" relationship.

3. Use the PSP case study table details to identify a **primary key** for each entity or table. The columns will be marked with a PK.

Review Assignment 3 discussion on "Normalizing a Data Base.

For example, a **primary key column or field is used to uniquely identify a given entity.**

A Foreign Key constraint is a based on a two common columns of an interfile relationship.

To determine an interfile relation use the sample PSP tables and columns simply connect the two columns with the same name, e.g., customer account, drawing number, etc. If a customer must exist before a new drawing is inserted into the drawing table, then the account number of the drawing table would be a foreign key, connected the account number of the customer table (the parent table).

4. Use the PSP case study table details to identify any appropriate **foreign keys** for each entity appropriate column. The column will be marked with an FK.

A Foreign Key constraint is a based on a relationship between two common columns of two different entities. To determine an interfile relation use the sample PSP tables and columns simply connect the two columns with the same name, e.g., customer account, drawing number, etc.

If a customer must exist before a new drawing is inserted into the drawing table, then the account number of the drawing table would be a foreign key column, connected the account number of the customer table (the parent table).

5. Use the PSP case study table details to identify any **check constraints** for each entity appropriate column.

A check constraint enforces a list of values that may be stored in a particular column. While an ERD does use a special symbol to specify check constraint, the restricted list of values will be specifies in the properties of the entity column.

6. Use the PSP case study table details to identify any appropriate indexes for each entity appropriate column. The use of an index is optional, but will increase performance for lookups, dynamic ordering or grouping. The column will be marked with an I.

7. Clearly identify all composite keys, e.g., I1, I2, etc.

## Requirement 4. Create the PSP Relationships illustrating Multiplicity and Cardinality using an ERD Tool

**Ensure that all relationship lines are clearly marked** with (Min, Max) or Crow's feet notation on both sides to document the multiplicity of the relationship.

**How many relationship lines should you have?** To start, there will be a relationship line between all tables that contain the primary key of another table. For example: if the student number is the primary key of the student table then all other tables that have the attribute student number should have a relationship to the student table.

Sometimes not all relationships are that easy to identify. A transaction or activity journal table like JOBCOST creates some problems. For example, transaction cross reference may be a raw material id, a labor operation, or even a contractor invoice. In the Trust department case presented in class, there was a transaction type attribute and a cross reference attribute listed. A cross reference attribute is generally a conditional relationship – kind of a hidden relationship.

Some tables may not have any relationships with any other table. These are frequently called service tables.

## Requirement 5. Document the PSP ERD Diagram

While not required to display your ERD using a portrait orientation, a landscape orientation diagram may be better.

Using a snipping tool Insert your final ERD Diagram below 🡺