# Module 2: Conceptual Modeling Topic 1: Learning how to use MS Visio

# Objectives

In this chapter, students will learn:

• How to use MS Visio as a tool to design the conceptual data model.

"The key of successful conceptual modeling is translating various business rules into conceptual data model components or Entity Relationship Diagram (ERD). You won't be able to learn it all at once, so just **learn it a little at a time**".

### **1. Drawing Entities**

As the first step, you will conceptually model the CUSTOMER entity that you already logically and physically implemented in the previous lab exercise.

(1) Open your MS Visio program.

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(2) Select the "Database Model Diagram" template (double click).



(3) Drag and drop the entity shape to the right side panel



(4) Name the entity as "CUSTOMER"

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(5) Add the following attributes with data types



(6) Set the CUS\_CODE as an identifier (i.e., primary key, PK)



(7) Similarly, create the AGENT entity with the following attributes. Note that AGENT\_CODE is the PK of this entity.

AGENT					
PK	AGENT CODE				
	AGENT_LNAME AGENT_FNAME AGENT_INITIAL AGENT_AREACODE AGENT_PHONE				

	CUSTOMER
РК	CUS CODE
	CUS_LNAME CUS_FNAME CUS_INITIAL CUS_ARACODE CUS_PHONE

### 2. Drawing Relationships

(1) The business rules may be written as follows:

- One agent can have many customers.
- Each customer has only one agent.

Given these business rules, you can conclude that there is a 1:M relationship between AGENT and CUSTOMER.

(2) Changing the Document Options

To use the Crow's feet notation we need to change the Database Document Options as shown below.



(3) Drag and drop the Relations shape to the right side of the panel.



(4) Connect each side of relation to the entity. You should drag the relationship shape on the center of the entity at which the border of the entity becomes red colored.



## (5) Name the relationship



#### NOTE: Foreign Key (FK)

- You may notice that in the CUSTOMER entity, AGENT\_CODE (that is PK of AGENT entity) is automatically added as a foreign key (i.e., FK1)
- The tables implemented in the database (after going through the logical and physical modeling) are illustrated below. You are not required to implement these tables.

Table nar	ne: AGEN	T (first six	attribute	s)			Databas	e name: Ch02	InsureCo
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50	01 Alby	Alex	В	71	3	228-1249			
50	02 Hahn	Leah	F	61	5	882-1244			
50	03 Okon	John	Т	61	5	123-5589			
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Table nar CUS_CODE 10010	me: CUST( CUS_LNAME Ramas	DMER CUS_FNAME Alfred	CUS_INITIAL	CUS_AREACO	DE CUS_PHONE 844-2573	CUS_INSURE_TYPE	CUS_INSURE_AMT	CUS_RENEW_DATE 05-Apr-2008	AGENT_CODE
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Given the data in the two tables, you can see that an AGENT – through AGENT\_CODE -- can occur many times in the CUSTOMER table. But each customer has only one agent. AGENT\_CODE is sufficient information in the CUSTOMER table to trace back other agent information in the AGENT table. Therefore, AGENT\_CODE is called a foreign key that link two different tables. We will learn about FK in detail later in the course.

# 3. Practices

(1) Draw the following ERD (that we used in class) using MS Visio.



(2) Using MS Visio, draw the conceptual data model (ERD) from the following narratives (business rules). You may ignore attributes of the entity but should clearly identify the relationships between entities.

- COURSE generates CLASS. One course can generate many classes. Each class is generated by one course.
- CLASS is referenced in ENROLL. One class can be referenced in enrollment many times. Each individual enrollment references one class. Note that the ENROLL entity is also related to STUDENT. Each entry in the ENROLL entity references one student and the class for which that student has enrolled. A student cannot enroll in the same class more than once. If a student enrolls in four classes, that student will appear in the ENROLL entity four times, each time for a different class.
- STUDENT is shown in ENROLL. One student can be shown in enrollment many times. (In database design terms, "many" simply means "*more than once*.") Each individual enrollment entry shows one student.

#### 4. Exercise:

- Create the ERD based on the following business rules of the DealCo company.
- You need to copy and paste the ERDs in a word document and save it as "M2T1\_lastname.docx" (e.g., M2T1\_cha.docx). Then, upload this to MyClasses (under the Assignment menu).
  - One region can be the location for many stores. Each store is located in only one region. Therefore, the relationship between REGION and STORE is 1:M.
  - Each store employs one or more employees. Each employee is employed by one store. (In this case, we are assuming that the business rule specifies that an employee cannot work in more than one store at a time.) Therefore, the relationship between STORE and EMPLOYEE is 1:M.
  - A job such as accountant or sales representative -- can be assigned to many employees. (For example, one would reasonably assume that a store can have more than one sales representative. Therefore, the job title "Sales Representative" can be assigned to more than one employee at a time.) Each employee can have only one job assignment. (In this case, we are assuming that the business rule specifies that an employee cannot have more than one job assignment at a time.) Therefore, the relationship between JOB and EMPLOYEE is 1:M.