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

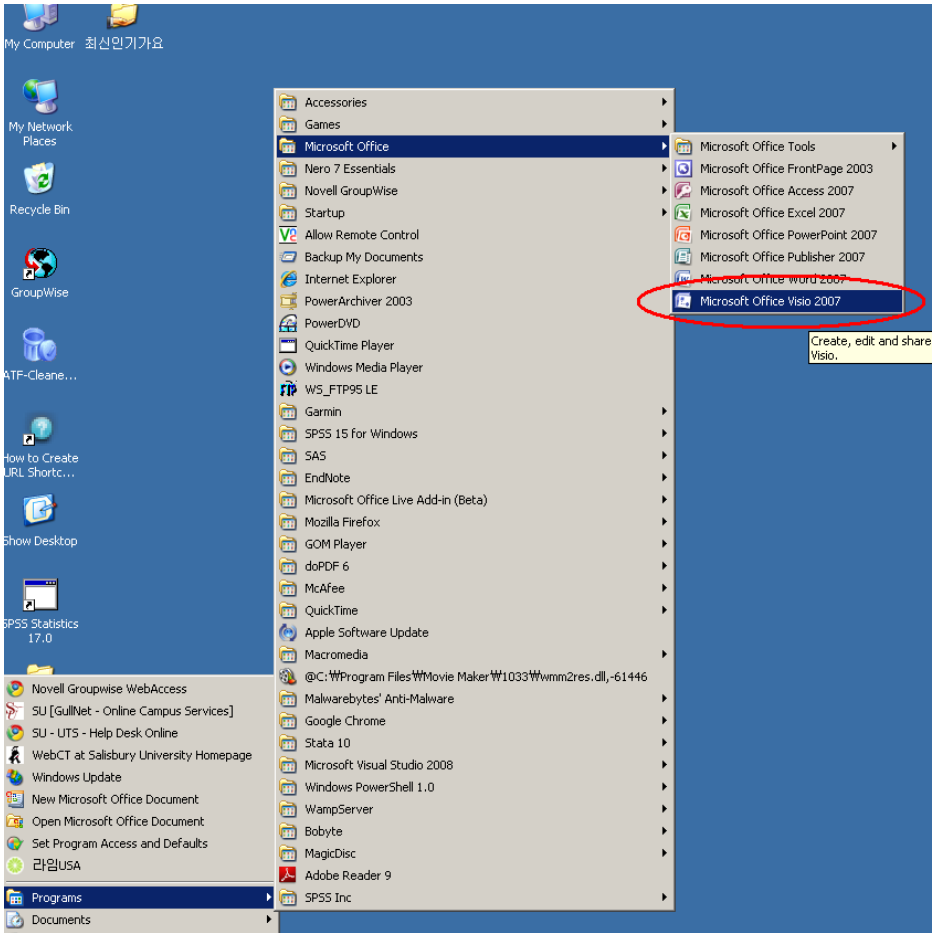
Objectives
In this chapter, students will learn:

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

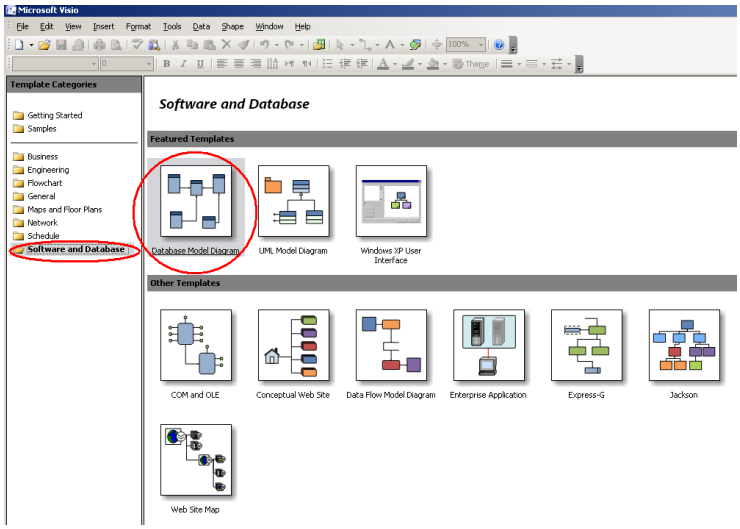
"The key of successful conceptual modeling is translating various business rules into conceptual data model components or Entity Relationship Diagram (ERD). You won't be able to learn it all at once, so just ***learn it a little at a time"****.*

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.

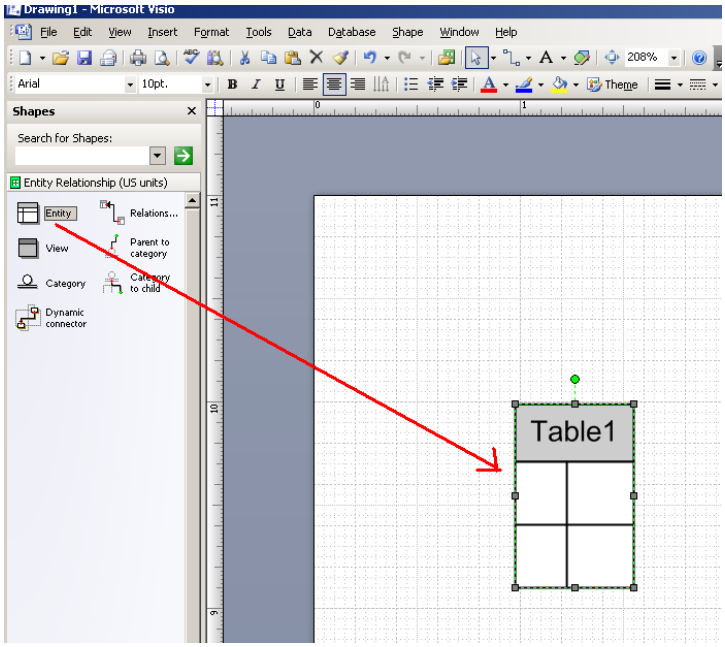
(1) Open your MS Visio program.



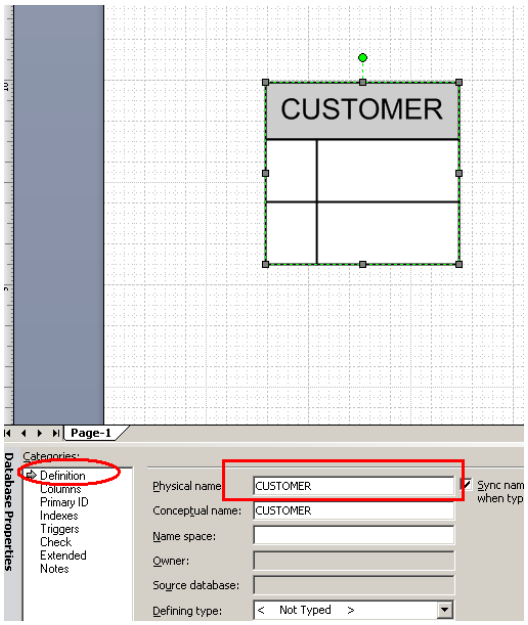
(2) Select the “Database Model Diagram” template (double click).



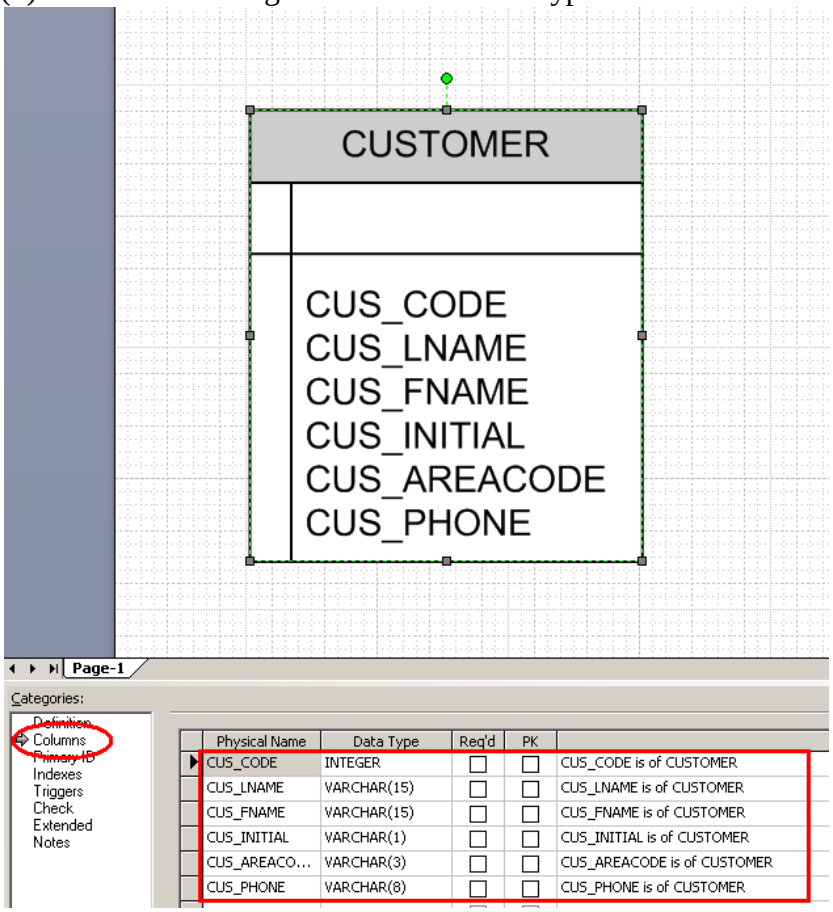
(3) Drag and drop the entity shape to the right side panel



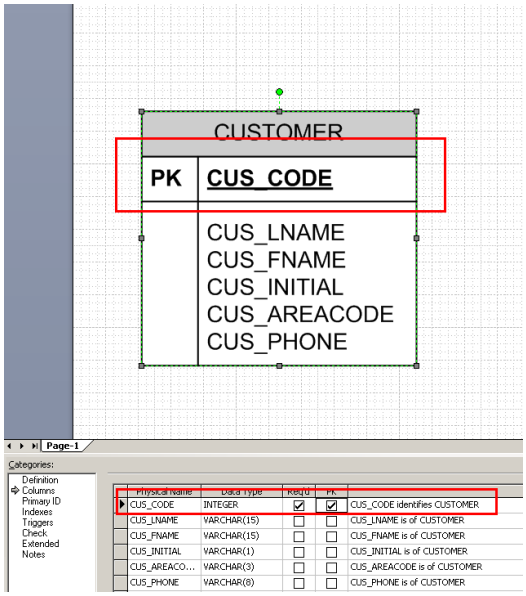
(4) Name the entity as “CUSTOMER”



(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	
PK	**CUS_CODE**
	CUS_LNAME CUS_FNAME CUS_INITIAL CUS_ARACODE CUS_PHONE

2. Drawing Relationships

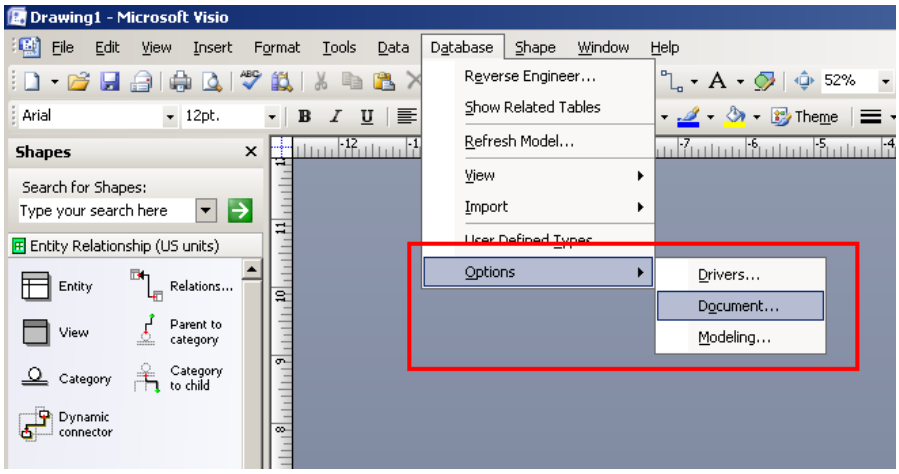
(1) The business rules may be written as follows:

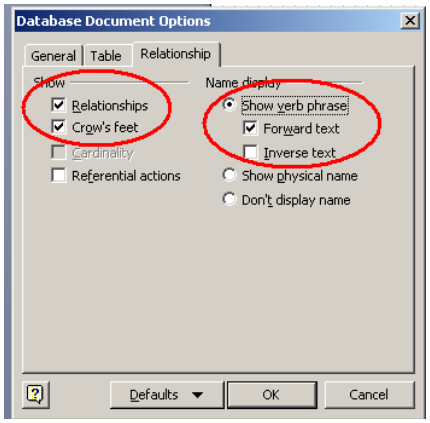
- One agent can have many customers.
- Each customer has only one agent.

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

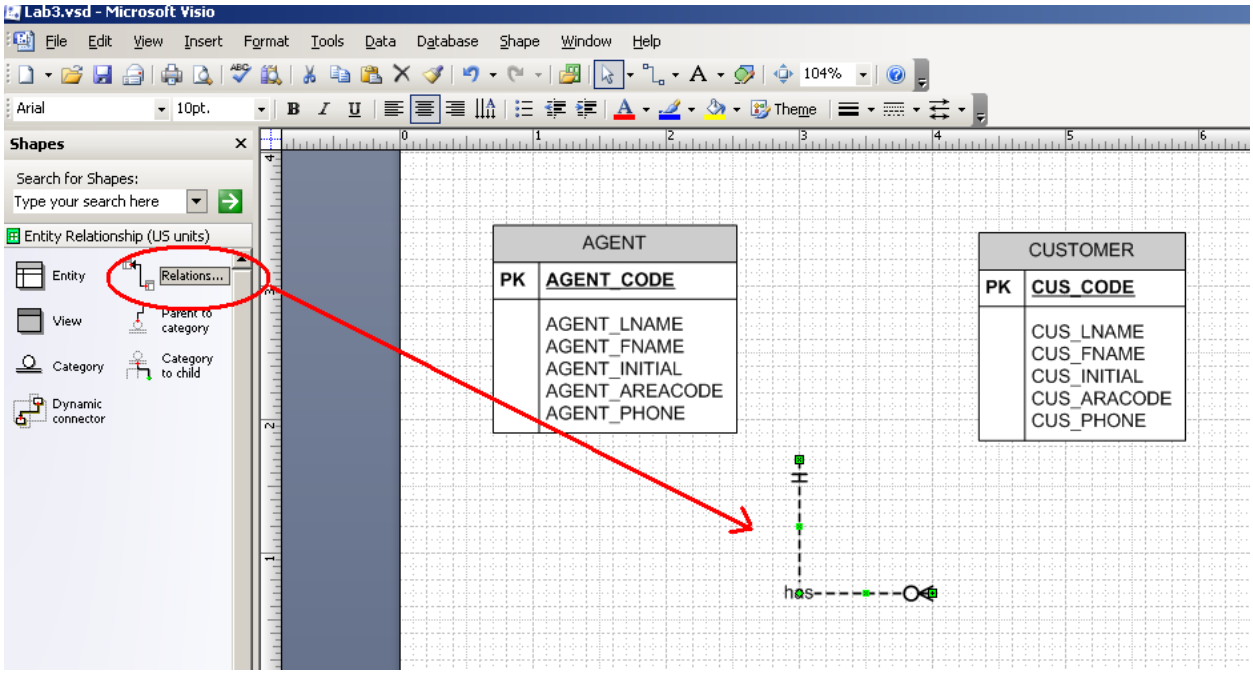
(2) Changing the Document Options

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

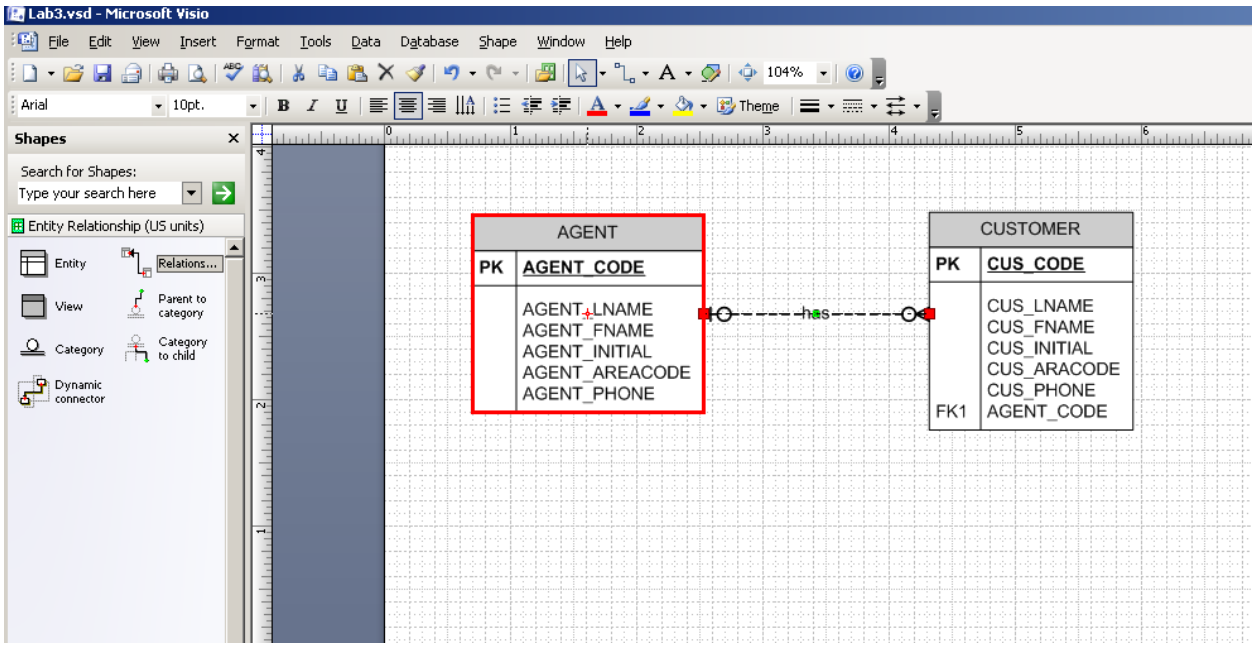




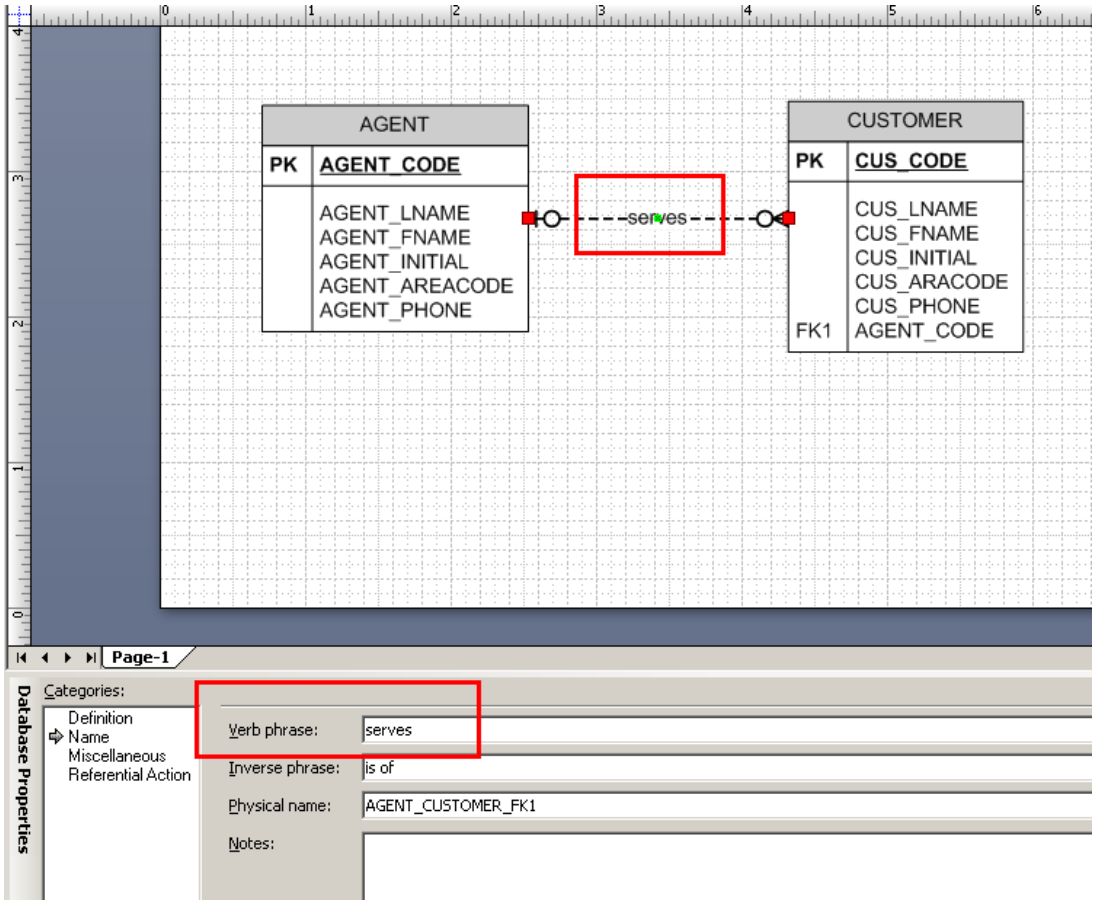
(3) Drag and drop the Relations shape to the right side of the panel.



(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 name: AGENT (first six attributes)

Database name: Ch02_InsureCo

AGENT_CODE	AGENT_LNAME	AGENT_FNAME	AGENT_INITIAL	AGENT_AREACODE	AGENT_PHONE
501	Alby	Alex	B	713	228-1249
502	Hahn	Leah	F	615	882-1244
503	Okon	John	T	615	123-5589

Link through AGENT_CODE

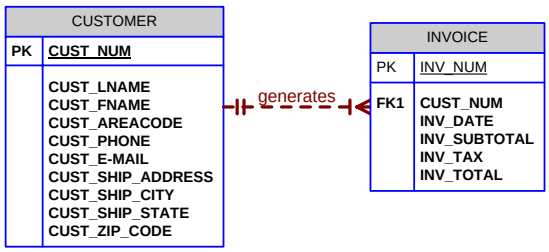
Table name: CUSTOMER

CUS_CODE	CUS_LNAME	CUS_FNAME	CUS_INITIAL	CUS_AREACODE	CUS_PHONE	CUS_INSURE_TYPE	CUS_INSURE_AMT	CUS_RENEW_DATE	AGENT_CODE
10010	Ramas	Alfred	A	615	844-2573	T1	100.00	05-Apr-2008	502
10011	Dunne	Leona	K	713	894-1238	T1	250.00	16-Jun-2008	501
10012	Smith	Kathy	W	615	894-2285	S2	150.00	29-Jan-2009	502
10013	Olowski	Paul	F	615	894-2180	S1	300.00	14-Oct-2008	502
10014	Orlando	Myron		615	222-1672	T1	100.00	28-Dec-2008	501
10015	O'Brian	Amy	B	713	442-3381	T2	850.00	22-Sep-2008	503
10016	Brown	James	G	615	297-1228	S1	120.00	25-Mar-2009	502
10017	Williams	George		615	290-2556	S1	250.00	17-Jul-2008	503
10018	Farriss	Anne	G	713	382-7185	T2	100.00	03-Dec-2008	501
10019	Smith	Olette	K	615	297-3809	S2	500.00	14-Mar-2009	503

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.