

IS 475/675 – HW #1

Answer the questions below. Bring two paper copies of your homework answers to class – one to turn in for grading and one to use for notes during class. You will turn in the grading copy at the beginning of class and then use the other copy as a reference during class. This assignment should be turned in on paper.

1. Refer to the data model for the Pine Valley Furniture Company in your Modern Database Management text. That data model is Figure 2-22 on pg. 96 of the 10th edition of the text and pg. 94 of the 11th edition of the text. If you don't have your book yet, the data model is available on the link "Pine Valley Data Model" in the same cell on the schedule where you found this assignment. Answer the questions below about that data model.
 - a. Identify a strong entity on the data model. Provide one reason why you think it is a strong entity.
 - b. Identify a weak entity on the data model. Provide one reason why you think it is a weak entity.
 - c. What is the purpose of the Works In entity?
 - d. The Works In entity has two binary relationships – one with the WORK CENTER entity and one with the EMPLOYEE entity. Look at the cardinalities of those two relationships and explain in words the meaning of those two binary relationships.
 - e. What would be an appropriate primary key for the Works In entity? Explain why you chose that primary key for the Works In entity.
 - f. The Works In entity has no attributes on the data model. Name at least one non-key attribute that you believe might be stored in that entity.
 - g. Make up three sample rows of data each for the WORK CENTER, EMPLOYEE and Works In entities. If you don't understand what I mean by "sample data," refer to the first week exercise, questions 8, 9, 10 that we completed in class. If you weren't in class, then look at figure 1-16 of your text.
2. Use the business rules below to identify and write all attributes, relationships and cardinalities between the entities shown on the next page. Decide which attributes should be primary keys and foreign keys for each entity and put those in the diagram. Remember to include relationship verbs for all relationships. The application is for a charter airline company that flies planes for clients. The database will be owned by the charter airline company. There are no regularly scheduled flights; all flights occur when a charter client schedules and purchases a given flight. If you need to make assumptions about business rules other than the ones provided below, be sure to write those assumptions on your answer.
 - An aircraft is uniquely identified by an AircraftID. For each aircraft, the database should keep track of the type of plane it is and the quantity of seats.
 - A client is uniquely identified by a ClientID. For each client, the database should keep track of the client name and phone number.
 - A pilot is uniquely identified by a PilotID. The database should keep track of the name and phone number for each pilot.
 - One instance of a flight is assigned to only one aircraft, one pilot and one client. An aircraft could potentially be used on multiple flights. A client could potentially contract with the charter airline company for multiple flights.
 - For each flight, the charter airline company wants to store the start date and time of the flight, the aircraftID for the flight, the pilotID, and the clientID for the flight. You need to determine which attribute(s) should compose the primary key for the flight entity.

Aircraft	

Client	

Flight	

Pilot	

3. Create a logical ERD for each of the problems below using the crow'sfoot notation discussed in class. Be sure that each entity is a box with the name of the entity at the top of the box, the primary key attribute or attributes in the middle of the box, and the non-primary key attributes in the bottom of the box. Lines should separate each part of the entity box. Each entity must have a primary key defined. A primary key may consist of one or more attributes.

The final ERD submitted for grading should not include any M:N relationships and all attributes should be placed within an entity. Each relationship should have at least one relationship verb or verb phrase. Please include all required foreign keys and denote the foreign key(s) with the notation (FK) on the ERD.

Do not use Visio for this assignment, but please make sure the ERDs are readable. I recommend using a ruler/straight-edge for the entities and relationships. For the first problem – problem (a) - I provide some sample data to help you understand the type of data that would be stored in the database. I recommend that you do the same thing for the other two problems. It is always easier to figure out how you are going to store the data once you know what types of data will be stored. You do not have to turn in sample data – the only required deliverable is one ERD per problem.

a. A college course is taught by many instructors, and an instructor may teach many courses. An instructor teaches a section of a course. A course may have one or more scheduled sections, or may not have a scheduled section. Attributes of COURSE include courseID, coursename, and credits. A courseID is a unique value for a given course. Attributes of a SECTION of a course include courseID, sectionID, semesternumber, year, and instructorID. A given section of a course is taught by only one instructor. An INSTRUCTOR is identified by an instructorID. Additional information we want to store about an instructor includes the lastname, firstname, and officenumber. We want to store the quantity of students registered for a course. Sample data for this application system is provided below.

CourseID	Course Name	Credits	SectionID	Semester	Year	Instructor ID	Last Name	First Name	Office	# Students Registered
IS201	Computer Applications	3	1	SP	2015	4902	Smith	James	AB222	41
IS201	Computer Applications	3	2	SP	2015	4902	Smith	James	AB222	41
IS201	Computer Applications	3	3	SP	2015	6531	Ng	Ngyuen	AB231	43
IS201	Computer Applications	3	1	SU	2015	4902	Smith	James	AB222	12
IS201	Computer Applications	3	2	SU	2015	4902	Smith	James	AB222	14
IS475	Database Design	3	1	FA	2014	7811	Edberg	Dana	AB314	52
IS201	Computer Applications	3	4	FA	2014	7811	Edberg	Dana	AB314	42
IS482	Data Resource Mgmt	3	1	SP	2015	7811	Edberg	Dana	AB314	23

b. A corporation owns a series of shopping malls. A shopping mall has one or more stores; a shopping mall isn't a shopping mall unless there is at least one store at the mall. Each shopping mall has similar stores (examples are: Footlocker, Walking Company, Jones New York, Abercrombie and Fitch) but each store is physically different at each mall. Each shopping mall is identified by a MallID. For each shopping mall, we want to keep track of the name of the mall, the address, zip code, and main telephone number. A shopping mall can have multiple stores, a store can be in multiple shopping malls. Each store is identified by a StoreID. For each store, we want to keep track of the name of the store and a long description of the type of the store. The corporation needs to associate a specific instance of a store with a shopping mall. For a specific instance of a store at a given shopping mall, the corporation wants to keep track of the date the store opened at the mall, the name of the manager for the store, and the telephone number for that specific instance of a store in that mall. If you were viewing the data for this application in a spreadsheet format, it would look like the data shown below:

MallID	Mall Name	Mall Address	Mall Zip Code	Mall Telephone #	StoreID	Store Name	Store Description	Date Opened	Manager Name	Store Phone
123	Gilroy Outlets	123 Garlic Street, Gilroy, CA	90456	800-233-4929	1793	Jones New York	Women's professional attire, mid-range	9/12/1997	Joanne Brown	560-493-4403
123	Gilroy Outlets	123 Garlic Street, Gilroy, CA	90456	800-233-4929	5644	FootLocker	Athletic Shoes, Men, Women, Family	8/16/2010	Bill Targenson	560-495-3939
123	Gilroy Outlets	123 Garlic Street, Gilroy, CA	90456	800-233-4929	6781	New York and Company	Women's casual attire, bargain	3/15/2014	Ahmad Cedersill	560-667-3341
677	Sacramento Outlets	8922 Oak Street, Roseville, CA	93201	450-223-9392	1793	Jones New York	Women's professional attire, mid-range	9/16/2014	Willie Masters	890-451-5861