**ISS4014 – Database Systems and Web Integration**

**Chapter 04 – Activities and Homework**

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| **Name:** | Logan Strong |
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**Chapter 04 REVIEW (5 points)**

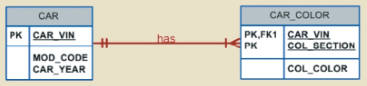
1. (1pt) What two conditions must be met before an entity can be classified as a weak **entity**? Give an example of a weak entity.

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| **Page #s**  **In Book** | **Using Book Language** | **In your own words** |
| 125 | 1. The entity is existence-dependent; it cannot exist without the entity with which it has a relationship. 2. The entity has a primary key that is partially or totally derived from the parent entity in the relationship. | A weak entity is one that cannot exist without the other entity it is related to.  Has a primary key that is partially or entirely inherited from the parent entity. |

1. (1pt) What is a strong (or identifying) **relationship**, and how is it depicted in a Crow’s Foot ERD?

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| **Page #s**  **In Book** | **Using Book Language** | **In your own words** |
| 123 | Exists when the primary key of the related entity contains a primary key component of the parent entity. | When two relational entities contain a primary key from one another |

1. (1pt) Write a relational schema for each table in the figure below:



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| **Entity** | **Relational Schema (see page 115 for format)** |
| CAR | CAR\_VIN, MOD\_CODE, CAR\_YEAR |
| CAR\_COLOR | CAR\_VIN, COL\_SECTION, COL\_COLOR |

1. (2pts) Write the business rules for the ERD in the figure below (be sure to identify both directions of the rule):

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| **ERD** | **Business Rules** |
|  | A publisher publishes many books, a book is published by only one publisher.  An author writes many books, a book only has one author.  An author signs many contracts, a contract is only signed by one author.  A publisher submits many contracts, a contract is submitted by only one author. |

**Chapter 04 PROBLEMS (25 points)**

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| For the following ERD problems:   * Make sure to include attributes that are specified in the instructions and/or business rules. * Remember to identify the Primary Keys (PKs) and Foreign Keys (FKs), where applicable. * If no attributes beyond the Key attributes are specified, add at least 2 more attributes which seem reasonable to the entity. * Remember to show the appropriate cardinalities using crow’s foot notations and the type of relationship (identifying or non-identifying). * ERDs should be well-formed, with entities and relationships clearly visible with minimal crossing lines. |

1. (8 pts) Use the following business rules to create a Crow’s Foot ERD (using Visio or MySQL Workbench Designer).

Read them and then **a)** understand how many entities there are, **b)** how each entity relates to other entity/ies, **c)** what rules exist for how they relate to each other, **d)** draw the ERD with the appropriate connectivities and cardinalities. Be sure to identify the correct relationship type, identify all primary and foreign keys, and use the correct crow’s foot symbols.

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| **ACME is a national retail store that sells clothing.**   * A department employs one or more employees, but each employee is employed by one and only one department. * A division operates many departments, but each department is operated by one and only one division. * An employee may be assigned many projects, and a project must have at least one employee assigned to it and may have many more employees assigned to it. (***Hint****: since this is a* ***M:N*** *relationship, remember that you must do some extra steps when designing your ERD.*) * Each department must have one and only one employee that manages it. Each employee that is a department manager can only manage one department (Not all employees are managers). * Each division must have one and only one employee running it. Each employee that runs a division can only run one division (Not all employees run divisions). |
| ***<Paste ERD Here>*** |



1. (8 pts) Create a complete ERD in Crow’s Foot notation (using Visio or MySQL Workbench Designer) using the following description of operations.

Read them and then **a)** understand how many entities there are, **b)** how each entity relates to other entity/ies, **c)** what rules exist for how they relate to each other, **d)** draw the ERD with the appropriate connectivities and cardinalities. Be sure to identify the correct relationship type, identify all primary and foreign keys and use the correct crow’s foot symbols.

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| **SPA-CO is a small start-up company that is a distributor for spas. It is the intermediary organization that buys spas from manufacturers solely to sell to retailers such as HomeCenter and Highs who in turn sell to end customers.**   * SPA-CO can get spas from several different manufacturers. (Hint: SPA-CO is the name of the company and should not be an entity). * Each manufacturer produces one or more different brands of spas. * Each brand is produced by only one manufacturer. * Every brand has one or more models and every model is related to only one brand.   + For example, ***Lazy Lizard Spas*** is a manufacturer that produces entry-level brands. ***Iguana Bay Spas*** is a different manufacturer that produces premium-level brands.   + One of the brands belonging to ***Iguana Bay Spas*** is Big Blue Iguana spas.   + The Big Blue Iguana brand offers several models, such as:     - *Model BBI-6*, an 81-jet spa with two 6-hp motors     - *Model BBI-10*, a 102-jet spa with three 6-hp motors * SPA-CO sells spa models to different retailers. Each spa model may be sold to 1 and only 1 retailer yet each retailer may buy 1 or more models. * Every manufacturer is identified by a manufacturer code. Each manufacturer’s code, company name, address, area code, phone number, and account number is kept in the database system. * For each brand, the brand name and brand level (premium, mid-level, or entry-level) are kept in the database system. * For each model, the model number, number of jets, number of motors, the motor horsepower, suggested retail price, SPA-CO retail price, dry weight, water capacity, and seating capacity must be kept in the database system. |
| ***<Paste ERD Here>*** |



1. (9 pts) Create an ERD based on the Crow’s Foot model (using Visio or MySQL Workbench Designer), using the following requirements.

Read them and then **a)** understand how many entities there are, **b)** how each entity relates to other entity/ies, **c)** what rules exist for how they relate to each other, **d)** draw the ERD with the appropriate connectivities and cardinalities. Be sure to identify the correct relationship type, identify all primary and foreign keys and use the correct crow’s foot symbols.

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| * An INVOICE is written by a SALESREP. Each sales representative can write many invoices, but each invoice is written by a single sales representative. * The INVOICE is written for a single CUSTOMER. However, each customer can have many invoices. * A SEASON\_DISCOUNT may be applied to an INVOICE depending on the month in which an invoice is generated. This means that an INVOICE may have NO discount or ONE discount applied to it, and a SEASON\_DISCOUNT may be applied to zero, one, or many INVOICES. * An INVOICE can include many detail lines (INVOICE\_LINE) * Each PRODUCT may exist on multiple INVOICE\_LINES, yet each individual INVOICE\_LINE is related to only one product bought by the customer. * Detailed product information for a product on an invoice line is stored in a PRODUCT entity. * Vendor information for each product is found in a VENDOR entity. * Key information that is kept in the database system includes:   + **invoices**: invoice number, invoice date, salesrep id, customer id, season discount id   + **sales reps**: salesrep id, salesrep name, phone number   + **customers**: customer id, customer name, customer address, phone number   + **season discounts**: season discount id, season month, season discount percentage   + **invoice lines**: invoice number, invoice line number, product code, quantity   + **products**: product code, product description, product weight, product price   + **vendors**: vendor code, vendor name, vendor address, vendor phone. |
| ***<Paste ERD Here>*** |

