Homework 1: Environment Setup (Total Points: 100)
Due: Tuesday March 17, 11:59PM ET

Problem 1: Database Keys (Points: 20)

During the normalization process, you end up with the following candidate keys for a 1NF table:

Key 1: InvoiceNo, InvoiceDate

Key 2: InvoiceNo, SalespersonID

Key 3: InvoiceNo, SalespersonEmail

Key 4: InvoiceNo, SalespersonSSN

Assuming all keys cover all potential cases, which one would you choose as the Primary Key? Explain the reasons for discarding the options as appropriate:

Key 1: Key 2: Key 3: Key 4:

Problem 2: Functional Dependencies (Points: 20)

Given the following four functional dependencies:

FD-1: GuestID --> FirstName, LastName, Email
FD-2: GuestID, PhoneID --> FirstName, LastName, Email, PhoneNo, PhoneType
FD-3: EventID --> EventDate, EventDescription
FD-4: RSVPNo --> GuestID, FirstName, LastName, Email, RSVPDate, NoOfGuests, EventID, EventDate, EventDescription

For each FD, indicate whether it is a FD or not. If any of the above are not, what changes would you need to make to turn them into full functional dependencies?

Problem 3: Design (Points: 30)

A school tracks student in its database as follows:

StudentId	FirstName	LastName	Last 4 of SSN	Email	Degree	Major
123456	Mary	Smith	1111	smithm@school.edu	BS	Business
123457	Jamie	Jameson	2222	jameson@school.edu	BA	Criminal Justice
123458	John	Jones	3333	jones@school.edu	BS	Business

a. Some students wish to pursue a minor. What changes would the school need to make to its database to keep track of students who pursue a major and a minor? You can enter a descriptive explanation with conceptual diagrams to support your proposal:

b. Some students wish to pursue double majors. What changes would the school need to make to the database to keep track of students who pursue double majors? You can enter a descriptive explanation with conceptual diagrams to support your proposal:

Problem 4: Entity Relationship Diagram (Points: 30)

Karen has been making fashion jewelry for a few years now. She's been so successful that she wants to take her passion to the Web. With this in mind, she founded KewlJewels.

KewlJewels sells different types of jewelry pieces (e.g., bracelets, pendants). Each jewelry piece has a specific description (e.g., white pearl earrings). She wants to be able to produce sales reports that indicate how many pieces per type the company has sold. Potential customers may browse the online catalog without registering on the site.

While browsing the catalog, they may add jewelry pieces to a virtual shopping cart. Once they select to go to the checkout, they will need to provide personal information (e.g., name, phone

number, address, email). Only credit card payments are accepted. The site collects the credit card type and number, and expiration date.

Customers may choose a shipping address different from the billing address, and the database needs to keep track of both addresses. Only complete orders are shipped, no partials are allowed. The database does not track inventory control, only sales information. You are asked to design the database to support the Web operations

a. Create some sample data which meets the requirements identified in the description above. Use a table format similar to slide 20 of lecture 5. (15 points)

b) Create a physical ERD (identify entities, relationships, attributes, primary and foreign keys) using Crow's foot notation. (15 points)

BONUS: BASIC NORMALIZATION PROCESS (20 points)

The following is an inventory report from your new customer, a small plastic container reseller:

Howard & Sons Inventory Report
Fiscal Year Ending June 30 2019

Department Code: 01 Shape: Round Responsible: Joe

Item ID	Capacity	Quantity on Hand	Last Physical Count	Re-order when inventory falls below
101 102	1 oz 2 oz	200 400	6/30/2019 6/30/2019	30 50
				Total Items: 2

Department Code: 02 Shape: Square Responsible: Tanya

Item ID	Capacity	Quantity on Hand	Last Physical Count	Re-order when inventory falls below
101 102	1 oz 2 oz	100 100	6/30/2019 6/30/2019	30 20

a. Normalize the data in First Normal Form. Identify Functional Dependencies, Candidate Keys and Primary Keys.
b. Normalize the data into Second Normal Form.
c. Normalize the data into Third Normal Form.