**MIDTERM #2: INFORMATION SYSTEMS (INDE499B)**

Dr. Jennifer Turns

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Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**QUESTION 1: THE DATA DESIGN PROCESS (25 points).**

Imagine that you have been assigned to a team that will be developing an inventory tracking system. As part of the project startup, your manager has asked each team leader to bring a basic work plan to the next meeting. At that meeting, these work plans will be analyzed to determine the overall project timeframe, costs, personnel requirements and software requirements.

For now, as the team leader for the data design team, you have been asked to bring a work plan that identifies the phases of data design and includes the following information for each phase:

a). a description of the data design phase,

b). the inputs of the phase,

c). the outputs of the phase,

d). a key issue addressed in the phase

e). a challenge that you can anticipate would occur in the phase.

Please prepare the response you will bring to the meeting.

**Solution:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Description** |  | **Issue** |  | **Input** | **Output** | **Challenge** |
| a. Conceptual Design  Create model that captures major entities, relationships among entities, and attributes of entities required for a particular system. |  | Capturing all data Capturing relationships Data integrity |  | Functional specs General understanding of problem | - ER diagram |  |
| b. Logical Design  Transform the major entity/attribute /relationship requirements into high level specification for database |  | Providing  location for all data  Data integrity | - | ER diagram | - Relational database schema | - |
| b2 Improving Logical Design  Improve the high-level database specification. |  | Minimizing redundancy Minimizing ambiguity | - | Relational database schema | - Relational database schema | - |
| c. Physical Design  Transform the high-level specifications for database into detailed specifications for how to construct actual database in a specific relational database software. |  | Performance Data integrity |  | Relational database schema  Meaning of data | - Technical specifications for construction of the database | - |

**QUESTION 3: CREATING A RELATIONAL DATABASE SCHEMA (37 points).**

Production tracking is important in many manufacturing environments (e.g., the pharmaceuticals industry, children’s toys, etc.). The following ER diagram captures important information in the

tracking of production. Specifically, the ER diagram captures relationships between production

lots (or batches), individual production units, and raw materials.

**Lot**

**Production**

**Units**

**Raw**

**Materials**

Includes

Created From

CreateDate

LotNumber

ProductDesc

ProductType

material-ID

type

serial-#

exactWeight

Units

qualityTest?

UnitCost

Cost-Of-Materials

a.

Please convert the ER diagram into a relational database schema. Be certain to indicate

primary keys and referential integrity constraints. (**25 pts**)

**Solutions**

:

**Lot**

**Raw Materials**

**Production Units**

**Raw Materials Usage**

LotNumber

CostOfMaterials

CreateDate

Serial#

ExactWeight

LotNumbe

QualityTest?

ProductDesc

ProductType

r

LotNumber

MaterialID

Units

MaterialID

UnitCost

Type