## **COSC 30603**

**Homework 4**

**Grade: 5%**

Requirement: Your answers must be printed or typed. You may attach hand-drawn figures if needed (The picture of the drawing MUST BE legible!!!). ER diagrams must follow the notations from the lecture slides.

1. (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. You can use this table as a reference.**

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| --- | --- | --- | --- | --- |
| Description | Issue | Input | Output | Challenge |
| Conceptual Design |  |  |  |  |
| Logical Design |  |  |  |  |
| Physical Design |  |  |  |  |
| Secure Design |  |  |  |  |

1. (25 Points) A university registrar’s office maintains data about the following entities: (a) courses, including number, title, credits, syllabus, and prerequisites; (b) course offerings, including course number, year, semester, section number, instructor(s), timings, and classroom; (c) students, including student-id, name, and program; and (d) instructors, including identification number, name, department, and title. Further, the enrollment of students in courses and grades awarded to students in each course they are enrolled for must be appropriately modeled. Construct an E-R diagram for the registrar’s office. **Document all assumptions that you make about the mapping constraints.**
2. (25 Points) UPS prides itself on having up-to-date information on the processing and current location of each shipped item. To do this, UPS relies on a company-wide information system. Shipped items are the heart of the UPS product tracking information system. Shipped items can be characterized by item number (unique), weight, dimensions, insurance amount, destination, and final delivery date. Shipped items are received into the UPS system at a single retail center. Retail centers are characterized by their type, uniqueID, and address. Shipped items make their way to their destination via one or more standard UPS transportation events (i.e., flights, truck deliveries). These transportation events are characterized by a unique scheduleNumber, a type (e.g, flight, truck), and a deliveryRoute.

Please create an Entity Relationship diagram that captures this information about the UPS system. Be certain to indicate identifiers and cardinality constraints. **Document all assumptions that you make about the mapping constraints.**

1. (25 Points) Consider the following ER diagram. Map it into a relational database schema. Use the seven-step algorithm.

A diagram of a company

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