UECS1203 Database System Fundamentals

1.0 Objective

The goal of this project is to design and implement a physical database design using Oracle.

2.0 Task

You are assigned to analyze, design and develop the database system. The Assignments 1 through 3 are cumulative in design; each one leads to another and each one includes what was required in the previous Assignment(s). The Project required is the actual construction of database application. Students, working as though they were employed by a particular business or organization to solve an information system problem or need, will design and develop a database information application to meet the needs and situations defined.

The students must submit their projects by modules which are listed below.

ACTIVITY		Duration to complete assignment	Marks Allocation
Programming Project Assignment I	**Objectives : To familiar with constructing the ERD model** Students are required to get the requirement from the case, analyze the requirement and create ER model based on the requirements.	**3 weeks**	**10%**
Programming Project Assignment II	**Objective : To examine the physical design** Students need to do normalization from the ERD diagram and prepare the data dictionary	**2 weeks**	**10%**
Programming Project Assignment III	**Objectives: To familiar with creating database application.** Students need to use Oracle to implement the flow control and logic design of the physical database.	**3 weeks**	**10%**

Detailed specifications for each assignment are listed in the following sections.

2.1 Programming Project Assignment I

Students are required to study the case given, analyze the requirement and create ER model based on the requirements. PLEASE INCLUDE ANY ASSUMPTIONS THAT YOU MAKE.

The content of this assignment should be including:

a) Introduction

Explain briefly about the problem in the case chosen. Explain the main purpose and objective of the project. A discussion in your own words of what the needs of the enterprise are.

b) User Requirement

Based from the case study given, identify and list in detail the user requirement. Students required to add additional requirement from the existing requirement. However, the additional requirement should not violate the existing requirement.

c) State an assumptions

Assumptions are to clarify unclear business rules or procedures. Assumptions are to reflect common-sense and student's ability to make the right judgment when information is missing. Any unreasonable assumption that aims to make the design simpler and compromise or ignore business rules gains no marks.

d) Entity Relationship Modeling (ERD)

You are required to design an ER diagram for the case study given and the additional requirement specified in the section B. Identify entities, identify relationships, identify associate attribute and determine keys.

Submission Date: week 7.

Marking Scheme		
Introduction (15)	Introduction to the case study	4
	Purpose of the system	3
	Objective of the system	3
User Requirement (15)	Correct requirement identified from the case study given	15
	Specified additional requirements without changing the original requirement (At least 2 new requirements)	5
Assumptions (5)	Reasonable Assumptions	5
ER Modeling (25)*	Identifying Entities with a proper unique identifier	15
	Identifying the Relationship, Generalisation/Specialisation hierarchies	10
	Cardinality and Participation Constraints of relationships	10
	Total	**70**

*Marks will be deducted if the ERD consist with additional or inappropriate entities, relationship and multiplicity which not specified in the requirement. Entity (minus 1 mark); relationship (minus ½ mark); multiplicity (minus ½ mark)

2.2 Programming Project Assignment II

Based on the ER diagram that you created in Assignment 1, use normalization to check whether the tables are well designed. Map the ER diagram to a set of tables.

The content of this assignment should be including:
a) Logical Design Process

Normalized ER diagram with your normalization procedure and provide adequate explanations. The steps are shown in the Logical Design chapter.

b) Data Dictionary

Based on the ER diagram that you created in 2.2(a), map the ER diagram to a set of tables. Each table required to define the data dictionary as shown in the table below.

Table Name: Employee

Column Name	Description	Data Type	Size	Primary key?	Foreign Key?	FK referenced table
EmpNumber	Unique identification for all employees	Text	5	Yes		-
EmpName	Employee name	Text	30	-		-
Address	Employee's address	Text	40	-		-
TelephoneNum	Employee's phone number	Number	7	-		-
Date_of_birth	Employee's date of birth	Date		-		-
DepartmentNum	Unique identification for employee's department	Text	4	-	Yes	department

Submission Date: week 10.

Marking Scheme		
Logical Design Process (35)	Provide the correct or amended ERD diagram from the Programming Project Assignment I.	5
	*Remove features not compatible with the relational model	10
	*Derive relations for local logical data model	15
	*Normalization Check The produce logical schema is expected to be in 3^{rd}NF. Student may normalise their tables to produce the 3rdNF version, or (if the schema in 3^{rd}NF, an assurance statement that the produced relational schema is in 3^{rd}NF is essential).	5
	List the summary of relations with attributes, primary and foreign key; A **PK** may be identified by an underline (a common practice) and a FK by any other means as described by the student (e.g. double underline, italic style, different colour font, etc.)	5
Data Dictionary (25)	Define data type logically	10
	Define the size logically	5
	All the columns define in the table above are listed in the Data Dictionary	5
	Total	**60**

*Marks will be deducted if the ERD consist with additional or inappropriate entities, relationship and multiplicity which not specified in the requirement. Entity (minus 1 mark); relationship (minus ½ mark); multiplicity (minus ½ mark)

2.3 Programming Project Assignment III

Students need to use Oracle to implement the flow control and logic design in the physical database.

The content of this assignment should be including:

1) **Tables** - Create all necessary tables/columns/keys using SQL Queries. Include all necessary relationships between the tables and insert some sample data in the database.
2) **Information** - Produce at least 6 queries of your choice to extract the information from the database that you think are useful for the association/company to . Include an **explanation** on how the association /company can use the queries or how the queries can help the association /company.

Items to be submitted:
1) Softcopy of application in one zip file. Burn into the CD and attached with the hardcopy of your reports.
2) Hardcopy – present SQL script to create tables (not more than 5 pages)
   - present SQL script to extract information (with explanation) not more than 2 pages.

ii) Submission Date
   Week 13

Marking Scheme		
Tables (10)	Student should implement the Database on the target DBMS and populate each table with sample data (3-5 records each).	10
Information (30)	Each Query awarded with 5 marks. The marks given based on the level of explicitness of the queries which able to extract the meaning of the data.	30
	Total	**40**

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3.0 Case Study

The Dean of the business school wishes to create an UTD "family" consisting of its graduates and corporations that have been staunch supporters of the School of Management. Finding the existing database inadequate in terms of providing him with the information he needs to achieve his goal, he wishes to develop a new alumni database for the college. He wants the new database to capture all relevant information on alumni of the college and the corporate supporters of the college. To build a long-term relationship with alumni, he wishes to keep track of all alumni from each functional area (e.g., MIS, Acctg, Fin, Mkt, etc.) of the college, where they work (or have worked in the past), and any donations that they have made to the college. Similarly, for corporate supporters, the database must capture all relevant information on donations made by each corporation.

Upon further interviews with the Dean, he has indicated the following specific requirements:

1. A report that displays alumni information for a specified area for a particular year (e.g., 1999 MIS graduates). The report should list, for the specified area and year of graduation, each alumnus's name, e-mail address, the degree earned (e.g., BS, MS, MBA, Ph.D., etc.), work phone number, and home phone number. Note that a similar report could be required for any area and any graduating year.
2. For a specified city (e.g., Houston), a report listing all alumni who live in that city. The report will display the name of the city, and for each alumnus in that city, their name, home address, email address, work phone, and home phone.
3. A report listing all corporate donors who have donated a total amount greater than $25,000. The report will be sorted in descending order of the total donated amount.
4. A report that displays all donations made to a particular G/L (General Ledger) account. The ID of the donor, as well as the date and amount of the donation must be displayed.
5. A report listing all alumni working for a particular company (e.g., NORTEL). This report must also display the date an individual joined the company, as well as, their job title and salary.
6. A report that displays the employment history for a particular alumnus. The report must show, for each employer that alumnus has worked for, the employer name, the most recent job title the alumnus had with that employer company (e.g., Vice-President), the date the alumnus joined the company, and the date the alumnus left the company (if applicable).

Additional Information:
- Donations can be made to one of several funds; example funds are the College's General Fund, the TI Scholarship Fund, etc.
- A company's ID number is a 7 digit number uniquely identifying a particular company. A company's industry is a 3 digit code representing whether a company's PRIMARY business is banking, construction, etc.

4.0 Instruction

4.1 Format of the report:
- The report shall be typed only on one side of the paper.

- Font size is in **12pt Times New Roman** font with 1.5 line spacing and includes **page number**.
- Include Table of content, front cover of the report.
- **Do not comb bind your report.**

4.2 Important Notes:

1. This assignment is to be done in **groups of FIVE (5) or SIX (6).** *It is your responsibility to find team member that you can work with * **Do not exceed six (6) **
2. Plagiarized or outsourced work will result in a mark of **ZERO** being awarded to the entire group. Each group of students must do and complete their own work. Copying any part of any other student's work will result in the grade of zero on the assignment for group(s) copying and for group(s) copied from. Protect your work from other groups copying any part of it.
3. Subjects that stipulate group-based assessments assume that all group-based elements will be rewarded by a single group mark, awarded equally to all members of the team. However, **in exceptional circumstances**, weighted marks can be allocated within a team for those groups who feel that this approach better reflects the contribution of individual members. Any student found not participating in the assignment tasks will be penalized.

4.3 Academic regulation:

Plagiarism

Plagiarism is defined as the submission or presentation of work, in any form, which is not one's own, without acknowledgment of the sources. If a student obtains information or ideas from an outside source, that source must be acknowledged. Another rule to follow is that any direct quotation must be placed in quotation marks and the source immediately cited.

Plagiarism is also defined as copy of all or part of the work of another student(s) of current or previous batch of this University or another higher learning institution. The University's degree and other academic awards are given in recognition of the candidate's personal achievement. Plagiarism is therefore considered as an act of academic fraudulence and as an offence against University discipline.

Intellectual Property

Copyright must be seriously protected. The University takes a strong stand against any illegal photocopying of textbooks and any other materials by students. Students are forewarned of the consequences and the penalty that may be meted out if they are "caught in the act".