Database Applications
(COMP09050)
Coursework

Solo Version

Work mode:	Individual Work (1 student)
Contribution:	50% of final mark
Submission date:	Upload by 4pm Friday 18th November (Week 10)

Coursework Overview

The purpose of this coursework is to simulate the process of design and building a database for a real company/organisation. However, in this case we have limited access to the real company/organisation as this is only available through a public website. Therefore in terms of capturing user requirements, this simulation is at the extreme end of the spectrum in terms of user involvement but does still simulate an approach to database design that can, at the very least, result in the construction of a close approximation to the underlying database supporting the website. Once a database design has been reverse engineered from what is known about a company/organisation and its website, the intention is to build a prototype version of the backend database using SQL Server DBMS or equivalent DBMS. This prototype will be capable of giving partial support to a customer/member user of the website and an (assumed) internal user of the website such as the database administrator or website administrator.

Coursework Requirements

1. Database Planning (10%)

Objective 1.1: To identify a company or organisation that conducts much or all of its business through a website.

Summary of Coursework Requirements

Database Planning Stage – Your Documentation (10%)
Present screen dumps of the home page and three other important web pages that show the business activities of your chosen company (or organisation). Annotate the screen dumps where appropriate and provide some background information on your company. You should try to use screen dumps that illustrate some of the main pages associated with the business process(es) that you plan to use for this coursework. Note: the details of the business process(es) are not required at this early stage.
Present reasons for your selection of the company (or organisation) for this coursework.

2. Systems Definition (5%)

Objective 2.1: To identify the focus of your investigation and to determine the scope of the underlying database. This will help identify the business process(es) (e.g. new customer registration, customer ordering) that are within the boundaries of your study and any that are related but will not be included in your study.

Objective 2.2: To identify two distinct user views that interact within the business process(es): including one **external** (e.g. Customer, Member) and one **internal** user view (e.g. Stock Controller).

Summary of Coursework Requirements

Systems Definition Stage – Your Documentation (5%)
Identify the business process(es) of your chosen company (or organisation) and discuss any related processes that must exist but will not form part of your study. Simple English language descriptions are sufficient at this stage.
Identify two user views that interact with the business process(es) that are identified above as being within the boundaries of your investigation.

3. Requirements Collection and Analysis (10%)

Objective 3.1: To provide more detail on the business process(es) and describe how the **external** and **internal** users interact with the business process(es) through the website.

Summary of Coursework Requirements

Requirements Collection and Analysis Stage – Your Documentation (15%)
Present use case diagrams for two user views that interact with your business process(es).
Present high-level use case description for two user views that interact with your business process(es). In particular focus on user interactions that involve important data operations i.e. the creation, reading (querying), modification or deletion of data.

4. Conceptual Database Design (EER Model) (15%)

Objective 4.1: To create an Enhanced Entity-Relationship (EER) model of the data required by the business process(es).

Your EER model should be drawn using Unified Modelling Language (UML) notation and model all of the data requirements for your business process(es). The EER model should be easily readable and fit one side of an A4 page. All attributes should be identified with the primary key attributes tagged {PK} and all relationships appropriately named and described

using multiplicity. You should use a drawing tool or better still a CASE tool that can create UML class diagrams. Although the concepts of EER models do not include foreign keys – many of the CASE tools do create diagrams that include foreign keys. Therefore, please present a diagram that either shows all FK or none at all – both representations will be considered equally correct. Your EER model should include about 8-10 entities (not including subclasses), each described using between 5 and 10 attributes, one example of superclass/subclasses (with at least 2 subclasses), one example of aggregation or composition.

Summary of Coursework Requirements

Conceptual Database Design (EER Model) Stage – Your Documentation (15%)
Present an enhanced entity relationship (EER) diagram using UML to represent the conceptual design for your case study database.

5. Logical Database Design (Relational Schema) (15%)

Objective 5.1: To create a relational database schema mapped from the EER model.

*Map **part of your EER model** to a relational schema. The part selected shown include at least 3-4 relations and support a distinct part of the business. Furthermore, the part selected should include an enhanced entity-relationship concept such as the specialisation/generalisation or aggregation or composition. Use the following format for each relation using Foreign Key and Derived Attribute where appropriate.*

Staff (staffNo, fName, lName, /fullName, address, NIN, sex, DOB, deptNo)
Primary Key staffNo
Foreign Key deptNo **references** Department(deptNo) **on Delete** No Action **on Update** Cascade
Derived Attribute fullName

In particular describe how you have chosen to represent the superclass/subclasses, aggregation or composition concepts in your relational schema.

Summary of Coursework Requirements

Logical Database Design (Relational Schema) Stage – Your Documentation (15%)
Present a relational schema to represent the logical design for part of your case study database.

6. Physical Database Design (Data Dictionary) (15%)

Objective 6.1: To produce a data dictionary to describe the content for **part of your relational schema** identified in the previous section. The part selected shown include at least 3-4 tables and support a distinct part of the business.

*Present a data dictionary to describe how the relational schema is represented as tables. Each relation name now described as table - should have the prefix **tbl**. For each column in your tables, describe the meaning of the column; identify an appropriate data type; specify whether nulls are allowed; identify any special role played (i.e. PK, PPK (partial primary key) or FK); any default value; any appropriate constraint/property (e.g. data range, example values, formula for the calculation, business rules) and finally the data classification (i.e. Restricted, Private or Public).*

Summary of Coursework Requirements

Physical Database Design (Data Dictionary) Stage – Your Documentation (15%)
Present a data dictionary to represent the physical design for a part of your case study database.

7. Prototype – Database Implementation (15%)

Objective 7.1: To create, relate and populate tables that form part of the backend database to your chosen website.

Present <u>two</u> database diagrams. For the Table View – Column, ensure that all tables, columns and named relationships are visible and that the database diagram is easily readable and can fit on one side of an A4 page. The same is true for the Table View - Standard diagram but in this case ensure that the descriptions of each column are clear.
Ensure that all of your parent tables have at least 5 rows, child tables with at least 15 rows and that you can demonstrate your useful database objects working in Section 8.

Summary of Coursework Requirements

Prototype (Implement Database) Stage – Your Documentation (15%)
Present two database diagrams and screen dumps showing the rows in each of your tables.

8. Prototype - Useful Database Objects (15%)

Objective 8.1: To create useful database objects including indexes, views and SQL scripts (e.g. insertions, deletions, updates and queries) to meet some of the requirements of the selected business process(es) and two user views.
Objective 8.2: To create useful triggers and/or stored procedures to meet some of the requirements of the selected business process(es) and the two user views.

*Describe how your database objects can be used to support one or both user views interacting with the business process(es) identified in Section 3. You should create **2** nonclustered indexes, **2** views, **2** SQL scripts and **2** stored procedures (or triggers). You should use these examples to demonstrate the breadth and depth of your knowledge. Identify your objects by prefixing the object names with **indx** for indexes, **vw** for views, **q** for the scripts and **sp** for stored procedures (or triggers). Use SQL code and screen dumps to show the creation and where appropriate the results of executing your database object. For each database object, identify the user view user and requirement being supported and where appropriate - the guideline that you are following to justify each index, the type of view for each view and the purpose of each SQL script and stored procedure.*

Summary of Coursework Requirements

Prototype Stage (Implement Useful Database Objects) – Your Documentation (15%)
Use screen dumps of your database to present evidence that your useful database objects have been created and when possible show evidence of your objects in use. Describe each object and including the purpose of each object in relation to satisfying a user view requirement.

Marking Scheme

The marks allocated to the parts of the coursework are as follows.

1. Database Planning	(10)
2. Systems Definition	(5)
3. Requirements Collection and Analysis	(10)
4. Conceptual Database Design (EER Model)	(15)
5. Logical Database Design (Database Schema)	(15)
6. Physical Database Design (Data Dictionary)	(15)
7. Prototype - Database Implementation	(15)
8. Prototype - Useful Database Objects	(15)
Total	(100)

Coursework Submission

You should use the template for this coursework – a Word document called Database Applications Coursework – Solo Version (see Resources in the Coursework page on Aula) to create a report on the sections described above. Instructions on how to upload the completed coursework report will be given on the Coursework page on Aula.