



Please read carefully

- This assignment sheet is to be returned back to the lecturer by the student with the completed work. Work handed in after the deadline date will be penalized.
- Students caught copying from other students or plagiarizing (copying from lecturers' notes, handouts, slides, internet, books or any other printed or digital media) will be disqualified and will get a REFERRAL for their assignment or a FAIL if it is the last resit.
- An assessor has the right to ask the student to attend an interview without prior notice if the assessor wishes to confirm that the work submitted has been clearly understood by the student.
- It is the students' responsibility to keep a copy of the assignment for revision.
- Students should not share assignment sheets between different classes.

Student's Name	Michael Cassar																																																																																																							
Programme	Higher National Diploma Year One - Software		Academic Year	2011/2012																																																																																																				
Assessor's Name	Luke Vella Critien		Group/s	1HND6S																																																																																																				
Unit No	33	Unit Name	Data Analysis and Design																																																																																																					
Assignment No	2	Sit	First Sit	Type	Home																																																																																																			
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Assignment IV	Mark Anthony Farrugia		Date	30 May 2012																																																																																																				
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Assessment Criteria Description	
Unit 33-DADD : P1.3	Analyse different approaches to database design
Unit 33-DADD : P2.2	Build a relational database system based on a prepared design
Unit 33-DADD : P3.1	Explain the benefits of using manipulation and query tools in a relational database system
Unit 33-DADD : P3.2	Implement a query language into the relational database system
Unit 33-DADD : P4.1	Critically review and test a relational database system
Unit 33-DADD : P4.2	Create documentation to support the implementation and testing of a relational database system
Unit 33-DADD : P4.3	Create user documentation for a developed relational database system
Unit 33-DADD : P4.4	Evaluate a range of testing techniques and apply one to your own database design
Unit 33-DADD : P4.5	Explain how control mechanisms have been used
Unit 33-DADD : M3.1	Present and communicate appropriate findings
Unit 33-DADD : D1.1	Use critical reflection to evaluate own work and justify valid conclusions
Unit 33-DADD : D2.1	Take responsibility for managing and organising activities

Data Analysis Database Design



First Year Higher National Diploma

Assignment 2
Sit 01
Database Implementation

INSTRUCTIONS TO STUDENTS

Read the following instructions carefully before you start the assignment. If you do not understand any of them, ask your lecturer.

- This assignment should be completed in **1 Week**.
- You are to present your assignment in a bound booklet with the assignment cover sheet as the first page followed by this assignment brief then your documentation.
- You are to include a CD with all SQL scripts and a PDF version of your documentation
- You are not to print the SQL code as part of your documentation, this will be assessed via the CD.
- Your SQL code should have appropriate inline documentation to identify which question is being answered.

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Scenario

You have been employed as a database designer at an ICT company that are working on a new software according to the following scenario:

The database should store a list of persons. The details for each person should include their full name, address, date of birth, email address, contact number. A person may choose to register a VAT number.

A person could be either a client or an employee. An employee would have an employment date whilst a client would have a registration date. An employee may be the manager of another employee. Irrespectively each person will have a username, password, secret question and secret answer. User roles are created for permission purposes such as, Guests, Normal Users, Stock Managers and System Administrators. Each user account will be will be associated to a user role.

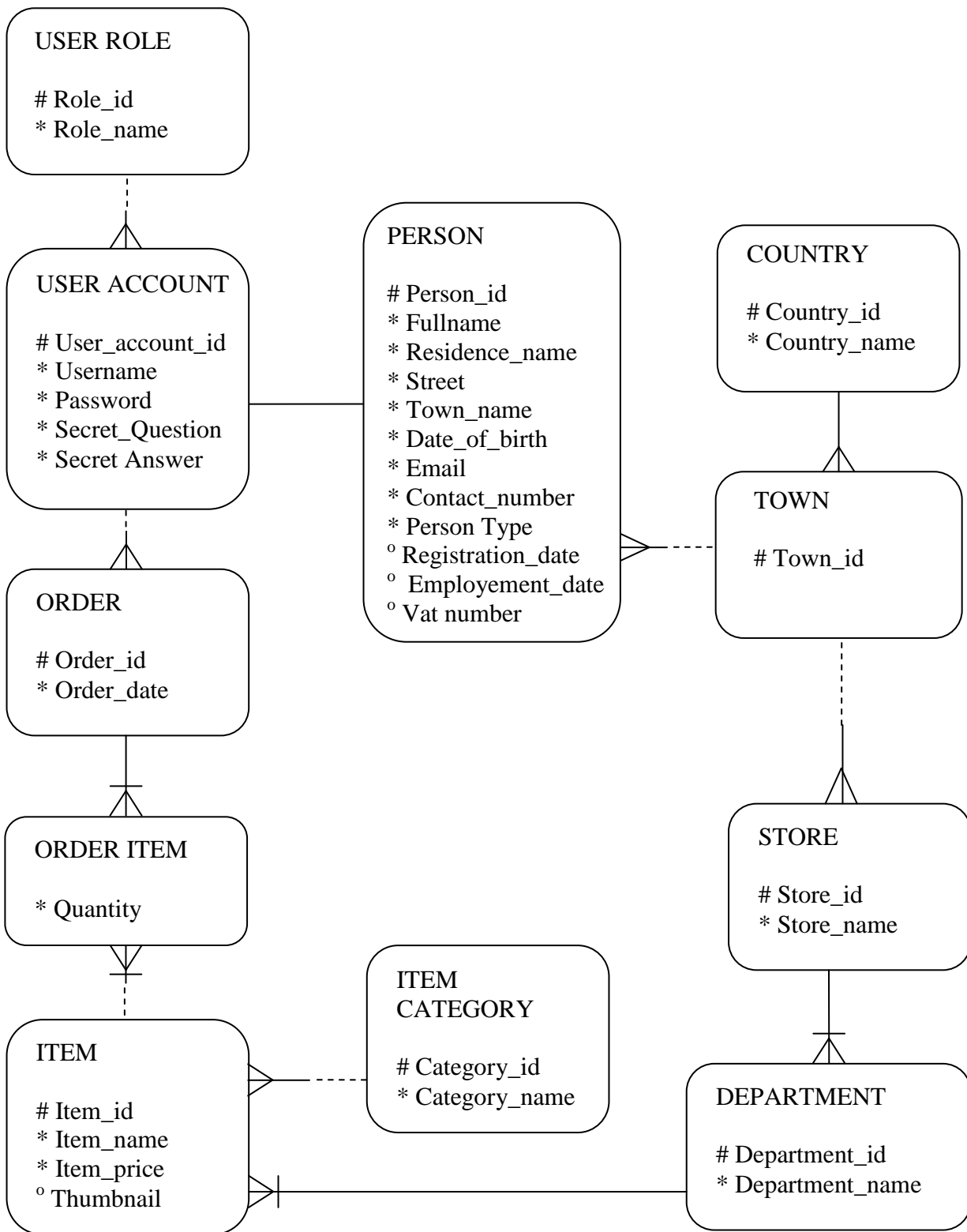
A list of stores should be registered. For each store the name and address is registered. Each store would have a number of department stores for which a name would be sufficient. A department store is identified by the store number and the department number. The items available for sale would be particular to a department store and therefore are identified by store number, department number and item number.

For each item the following details are stored: name, description and unit price excluding tax. A thumbnail for each item may be stored.

Orders are placed via a person's account. An order should have the date and time associated with it, the list of items and quantity per item.

ERD

The database designer before you designed the following ERD for the above scenario:



Section A (P2.2, P3.2) – Table Creation

In this section you are to develop a fully relational database as designed in the given ERD. You are to provide the SQL query language using Oracle syntax and notation for Oracle's 11g DBMS. You are to implement the database as is (normalization problems should not be solved)

In this task you are to implement:

1. Tables for all entities.
2. Attributes for all entities.
3. Foreign keys for all relationships
4. Constraints on all attributes (use a mix of column level and table level constraints)

N.B. You are to save the SQL code in a file using the following format:

<first_name>_<last_name>_<class>_sectionA.sql

Section B (P1.3, D1.1) – Normalization and Design Improvements

Part 1 (P1.3)

The previous ERD contains a number of normalization and design problems which need to be solved:

1. In the PERSON entity we have a 1NF problem, as Fullname is a composite attribute and this needs to be split.
2. In the PERSON entity we have a 3NF problem, as Town_name is transitively dependent on the primary key.
3. The third problem lies once again in the PERSON entity. In this entity we have three attributes (Person_type, Registration_date and Employment_date) which are there to distinguish between a client and an employee.

These are there to take care of the following: *“A person could be either a client or an employee. An employee would have an employment date whilst a client would have a registration date. An employee may be the manager of another employee.”*

Your tasks in this section are to:

1. Solve the first and second problem by properly implementing the SQL code to reflect the required changes.
2. Solve the third problem by analyzing the different database design approaches that exist. Once again you are to implement the reflected changes using SQL syntax.

N.B. In all cases you are to amend the existing structure and NOT delete the tables and re-create them.

N.B. Save the SQL code in a file using the following format:

<first_name>_<last_name>_<class>_sectionB_Part1.sql

Part 2 (D1.1)

You have been asked by the management to include one improvement of your choice which has not been described in previous questions.

Your tasks are to:

1. Propose realistic improvements against defined characteristics for success by documenting/describing your proposed improvements.
2. Implement the proposed improvement for this section using SQL syntax

N.B. Save the SQL code in a file using the following format:

<first_name>_<last_name>_<class>_sectionB_Part2.sql

Section C (P3.1, P4.5) – Additional Schema Objects

In this section you are to demonstrate how verification and validation have been taken into consideration in this database and you are also to justify the use of manipulation and query tools in a relational database system.

Your task involves:

1. Create the following views:
 - a. Guest Accounts: that includes the username, password and role_id which should always refer to the id of the guest's role. This view should allow only guest user accounts to be inserted, updated and deleted
 - b. Person Details: that includes the name and surname, date of birth, contact number and the whole address (including residence, street, town and country). This view should be used only to retrieve data.
2. Explain at least three benefits that are obtained by the database owner when views are used

N.B. Save the SQL code in a file using the following format:

<first_name>_<last_name>_<class>_sectionC.sql

Section D (P4.1, P4.4) – Testing

This section is all about testing. You are to attempt all the tasks listed below in order to obtain the criteria in this section.

You are to do the following tasks:

1. Create a sequence for each entity. You are to make sure that no number is used more than once. You need to have an approximate idea of the number of expected rows so that you cache sequence numbers accordingly.
2. Create at least two correct insert statements per entity.
3. Create two statements to test each of the following:
 - a. Not Null Constraint
 - b. Unique Constraint
 - c. Check Constraint
4. Give a description and two statements to test each of the following:
 - a. Entity integrity rule
 - b. Referential integrity rule

N.B. Save the SQL code in a file using the following format:

<first_name>_<last_name>_<class>_sectionD.sql

Section E (P4.2, P4.3) – Data Dictionary

You are to provide documentation to support the database implementation.

Your tasks in this section are to:

1. Create a short user manual for the users which will be using the database. You are to create two INSERT, DELETE and UPDATE statements for the Person entity. You are to give a step by step explanation of what is to be included and what can be left out while adding, removing or modifying data for this table. You are to explain any restrictions found in the database
2. Document each schema object created, specify the name, description, contents, settings and purpose of creation.

N.B. Use the following structure as a template

Table Name: table_name		
Purpose: purpose of this table		
Attributes		
Name	Data type	Constraints
Attribute_name	Data type used	Any constraints used.

Sequence Name: sequence_name
Purpose: purpose of this sequence
First Value:
Increment:
Maximum Value:
Minimum Value:
Cycle:
Cache Amount:

View Name: view_name
Purpose: purpose of this view
Description: a description of what this view does
Constraints: a description of the various constraints used in the view

Section F (D2.1) – Planning

You are to clean the system in this section.

Your tasks in this section are to cater for the unforeseen event that all data and structure needs to be removed by:

- 1) You are to modify any three foreign keys of your choice so that if the primary key is deleted the rows having the corresponding foreign keys are not deleted.
- 2) You are to include SQL statements that will remove all schema objects that were created during this assignment. It is important to give the administrator the opportunity to restore the system if the need arises

N.B. Save the SQL code in a file using the following format:

<first_name>_<last_name>_<class>_sectionF.sql

Section G (M3.1) – Presentation

In this last section you are to present the work that you did to your lecturer. Here you are to demonstrate to your lecturer that your database is in good working order.

It is your task to use any method of your choice to present your work by incorporating technical language:

- 1) Prepare a presentation (in any form of your choice, not necessarily a slideshow) where you will demonstrate the various sections of this assignment.
- 2) Explain the main technical aspects of your implementation (normalization solutions, subtype implementations, etc.)

N.B. You are to include a document or slideshow

include your presentation in your documentation either as a slideshow or as a document with screenshots.

Grading Criteria

DADD – P2.2:	Correctly answer all questions from section A <ul style="list-style-type: none"> • Correctly create at least 9/11 tables • Correctly create all attributes of the 9/11 tables • Correctly implement all relationships of the 9/11 tables • Correctly implement all constraints of the 9/11 tables 	Met	Not Met

DADD-P3.2	Correctly write all scripts in sections A using Oracle notation SQL for Oracle 11g	Met	Not Met

DADD-P1.3	Correctly answer all questions from section B <ul style="list-style-type: none"> • Correctly implement 1/2 normalization problems from question 1 and 2. • Correctly implement the problem suggested in the last question 	Met	Not Met

DADD-D1.1	Correctly answer Section B Part 02 <ul style="list-style-type: none"> • Describe an improvement • Implement the improvement of Section B part 02. 	Met	Not Met

DADD-P4.5	Correctly create at least one of the two views listed in the first question	Met	Not Met

DADD-P3.1	Correctly list and explain two of the benefits required in question 2	Met	Not Met

DADD-P4.4	<p>Correctly answer Section D</p> <ul style="list-style-type: none"> • Correctly create at least 5 correct sequences. • Correctly create at least 2 rows out for at least 9 out of the 11 tables required in Section A. • Correctly create statements which violate one NOT NULL, one UNIQUE and one CHECK constraint. 	Met	Not Met

DADD-P4.1	You are to describe one of the rules and give one violation for the same rule in question 4	Met	Not Met

DADD-P4.3	Create a user manual which describes how a user can carry out at least one insert, update and delete statement correctly	Met	Not Met

DADD-P4.2	Correctly document at least 9 tables, 5 sequences, and 1 view.	Met	Not Met

DADD-D2.1	<p>Correctly answer Section F</p> <ul style="list-style-type: none"> • Correctly write the statement that will modify 2 foreign key constraints • Correctly write the SQL statements to remove at least 9 tables, 5 sequences, 1 view. 	Met	Not Met

DADD-M3.1	<p>Correctly answer Section G</p> <ul style="list-style-type: none"> • Correctly prepare a presentation where to explain all tasks in each section • Properly present your assignment to your lecturer. 	Met	Not Met