

Unit IT4 RELATIONAL DATABASES

In this Unit you have to create a Relational Database for a scenario of your choice, typical uses would be a Booking System for a business such as a Driving School or a stock control system which matched customers, products and sales people.

You will have to Normalise the data so it is well structured and understand the benefits of good data capture.

The Coursework structure is outlined below and must be followed closely to ensure full coverage of the marks on offer.

This is a major project often totalling over 100 pages of work and is worth 40% of the A2 mark and 20% of the whole A level

From working on this unit you should be able to:

- discover how a structured database could be used in an organisation
- understand data types and formats
- discover how data is captured and prepared for use in a relational database
- understand validation techniques to minimise errors
- learn and apply the principles of normalisation of data with respect to relational database design
- design, implement and test a relational database to meet a specification
- produce user documentation
- develop good practice in their use of ICT
- be able to evaluate their design

There are 6 Sections of work to be presented, each with a different mark allocation which total 100 overall. The break down of marks is show below.

<i>Components</i>	<i>Max Mark</i>
User requirements	12
Design	24
Implementation	25
Testing	16
User Documentation	15
Evaluation	8
Total	100

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USER REQUIREMENTS

This section is worth 12 Marks, the marks are accumulated as shown below

1 mark

2 marks

Background (2 marks)

Show a clear understanding of the background to the problem

- What is the organisation; where is it; who owns or manages it; how big is it? 1 mark
- More detail on what the organisation does i.e. the main functions of the organization 1 mark

Expected outcomes/ aims and objectives (6 marks)

A clear statement of the aims and objectives of the system, along with the expected outcomes

- Data capture and inputs 1 mark
- Processes including security queries calculations sorts etc 1 mark
- Reports and any other outputs 1 mark
- *Ethos and house style* 1 mark
- Quality and depth of analysis 2 marks

User Interface requirements (1 mark)

Details of specific user interface requirements of the system and how this reflects the ethos of the organisation.

Hardware (1 mark)

Details of the minimum hardware requirements for the system to function. – must be sensible to chosen topic

Entity relationship diagram (2 marks)

- **1 mark for basic One to Many diagram**
- **Second mark for more complex system involving Many to Many relationship**

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Design

This section is worth 24 Marks, almost a quarter of the total marks come from here

Design of inputs

Data dictionary for a minimum of 3 tables (4 marks)

Data structure table showing Fieldname + data type 3 marks

- **1 mark for each table**
- **1 mark for design of format of the data in each table**

Normalisation (2 marks)

Diagram/ tables showing normalised tables;

- **1 mark for normalised form of tables**
- **1 mark identifying primary key and foreign keys**

Design of validation techniques (2 marks)

At least **2 different types validation techniques**

Not use the default wizards such as input masks and not drop lists

Design of security/password protection technique

(As a flowchart or pseudo code or list) 1 mark

Design of on screen data entry forms (3 marks)

(Hand drawn or DTP design)

- 1 mark design of at least two forms;
- 1 mark for form with a sub form
- 1 mark is for quality and detail-names of all fields and sample data/ special features on the form/adherence to house style

Note this is pre implementation so no screenshots of forms can be counted as design

Design of user interface (1 mark)

Design of user-friendly, menu driven, front end interface (Hand drawn or DTP design)

Note this is pre implementation so no screenshots of forms can be counted as design 1 mark

Design of queries (6 marks)

The Design of 6 different queries. Each must have realistic reason/purpose and structure of the search criteria.

There must be 6 separate queries for 6 separate distinctive reasons. **You cannot double up** by saying a single query using a **parameter** counts as two marks. It is either a parameter query or a single table query and another would have to be done.

You could have three single table queries all controlled by a parameter if you wish but you must clearly indicate which are to be counted as the parameter query and which as the two single table queries. The same applies for multiple table queries.

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Single table queries (2 marks)

Each must have realistic reasons for each query not just describing what the query does and not just to display certain fields.

The fieldname logical operator and search criteria must be clearly shown in the design.

Multiple table query using relational links

- If you use these to create the calculated field. You will need to produce a separate calculation for calculation in report or form 1 mark

Multiple table query using relational links with search criteria

- There must be a realistic reason for the search stated in the design.
- The fieldnames logical operator and criteria must be clearly shown in the design. 1 mark

Parameter query

Remember to design the statements you will ask as well as the reason for the search and the criteria needed. 1 mark

Append or Delete or Update query

Identify what you want to search and why you want the data 1 mark

Design of outputs

Design of report.(2 marks)

There must be a realistic reason why your organisation wants these reports. In addition to reasons, report design must 1 mark

- Clearly display fields and contain reasonable detail
- Details of the data/tables or queries required
- Allow for suitable headers and footers
- Have sorted or grouped

A design of a set of calculations, totals or other statistical Fields 1 mark

Design of processes (2 marks)

Automated routines using programming code

Design at least 2 simple Visual Basic / code procedures.

A screenshot or printout of implemented code is not acceptable as design.

Code; pseudo code or flowcharts are acceptable methods of design.

Examples could be;

- code for own validation procedures
- toggle buttons to hide data
- username and password routines code
- own calculation routines written in VB and different from that below

NOT MACROS and NOT simple things like putting =Now() in a text box

Design a calculation in a query or form (1 mark)

Design at least one calculated field using facilities provided by the software. 1 mark

A second calculation is needed if the mark awarded for this is already awarded in Multiple tables One calculation cannot be awarded more than 1 mark.

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Implementation

Create tables and links (*Printout all tables and screenshot relational links diagram to provide evidence of links*)

Tables = 3 marks

Links = 1 mark

Two Data validation techniques (*screenshot evidence required of construction of both techniques used. (2 marks)*)

Design their own – do not use the wizards

NOT DROP LISTS

Calculated field in query or form

(*screenshot evidence required of construction*) **(1 mark)**

Create 2 forms

They must look clear and easy to read with no cut off field names or data.

(*screenshot evidence required*) **(2 marks)**

Create form with sub form

(*screenshot evidence required*) **(1 mark)**

Create user friendly interface (*screenshot evidence required*) **(1 mark)**

Create two macros

For example navigation controls from User Interface and forms.

Other macros you have used to enhance your solution.

e.g. macros to create start up options.

Note you can only have one navigation macro the other macro must have a different purpose.

(*screenshot evidence required of construction*) **(2 marks)**

Queries

Screenshot evidence of the construction of each of the following types of queries

⌚ Single table queries x 2 **(2 marks)**

⌚ Multiple table query using relational links **(1 mark)**

⌚ Multiple table using relational links with search criteria **(1 mark)**

⌚ Parameter queries **(1 mark)**

⌚ Append. or Delete or Update queries **(1 mark)**

Create a report

which must match the stated purpose (*screenshot evidence required of construction*)

Report fields **(1 mark)**

Report H & F **(1 mark)**

Sorted grouping **(1 mark)**

Calculation I **(1 mark)**

Provide evidence such as a screenshot or printout of the code written for at least 2 routines implemented. **(2 marks)**

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Testing

Testing to a Test Plan

- ⌚ There must be a recognisable test plan.
- ⌚ Screenshot or annotated printouts evidence required
- ⌚ I recommend you use a table with the following headings.

Test Type, Criteria, Expected Outcome, Actual Outcome, Evidence

If you prefer to test as you go along then make sure you set it out so a test plan is recognisable.

Tests

Test user interface and test all routes through the system

(evidence could be in the form of a sequence diagram taken and signed by your teacher who witnessed the system working) (1 mark)

Test all data entry

- ⌚ **with valid data (1 mark)**
- ⌚ **extremes of data (1 mark)**
(Extremes of data should be accepted and not produce an error message)

Test two different types of validation procedures with invalid data

- ⌚ **Validation 1 (1 mark)**
- ⌚ **Validation 2 (1 mark)**

Test report

Printout your report. (1 mark)

Test all six queries

Must test with stated test criteria in design section

- ⌚ Single table queries x 2 (2 marks)
- ⌚ Multiple table query using relational links (1 mark)
- ⌚ Multiple table using relational links with search criteria (1 mark)
- ⌚ Parameter queries (1 mark)
- ⌚ Append. or Delete or Update queries (1 mark)

Test security systems

Start up options or password system (1 mark)

Test with incorrect password (1 mark)

Test two automated routines created via code

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🕒 Auto 1

🕒 Auto 2 (1 mark)

Test your calculation is correct.

*This is the calculated field you have produced in your queries or forms your **not** any produced using Visual basic code)*

Must be at least a sentence to say how they ensured it was correct and it was accurate.

User Documentation

Details of where to find the database (directories) and how to start up the database (1 mark)

- Details of how to enter passwords or other security procedures 1 mark)
- Details of how to navigate the user interface 1 mark)
- Details of how to **add, delete, edit, print and save** data in records via examples given in screenshots of data entry forms (5 marks)
- Examples of **two different** validation text to support validation procedures. (2 marks)
- Instructions about using different types of queries (3 marks)
- (1mark =2 queries)
- Instructions about how to print one report (1 mark)
- Instructions about disaster recovery techniques (1 mark)

Use lots of screenshots!

Evaluation

Evaluation **how well you have met the user requirements.** (4 marks)

Describe the **problems encountered and strategies** used to resolve them (4 marks)

See evaluation guide sheet