



UNIVERSITY
of
TECHNOLOGY,
MAURITIUS

The Spring Double Glazing Application

On Microsoft Access

Mr Ajit GOPEE

School of Innovative Technologies and Engineering

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Microsoft Access and Spring Double Glazing

Lecturer: Mr Ajit Gopee

Microsoft Access and Spring Double Glazing

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About this Handbook

This handbook is intended to help you get by providing guidance towards learning Microsoft Access by completing the Spring Double Glazing application.

This handbook is *not* to be used as your sole reference. You should be making use of other sources of information such as:

- Tutors / Lectures
- Access handbooks
- The Access Help system
- Database theory books

In particular, the Access commands used to implement *Spring Double Glazing* are for guidance and suggestion, and are not intended to be a comprehensive 'key by key' walkthrough. Access is a sophisticated piece of software and there are several ways of accomplishing the same results.

It is essential that you become self-sufficient with the software and you can only do this by learning how to find help, and by trial and error.

There is no 'quick fix' to becoming a good application developer - it **DOES** take time.

The Spring Double Glazing Company Application

The Spring Double Glazing Company obtains most of its business via door-to-door selling. Their sales agents discuss with the potential customer the various products manufactured and fitted by the company. The windows and doors of the house are measured and the customer decides on the type of double-glazing he / she requires.

The sales agent completes a statement on which is entered:

- The customer's name and address
- Each individual item, its quantity, item price, discounts available
- Method of payment i.e. cash or finance

At the end of the week the sales agents submit all orders to head office. The information is entered onto a computer.

Once an order has been placed with the company a job specification is produced which itemises the stock requirements.

A certain amount of standard stock is held on site. Purchase orders are sent to the supplier of the required stock parts if there are none already in stock.

Deliveries from suppliers include an invoice.

When the stock is ready for a particular job, the installers are advised and the stock file is amended.

When the installers send a completion note indicating that job has been completed, an invoice is prepared and sent out to the customer.

The customer may receive a 5% discount if paying by cash.

All orders are subject to VAT at the current rate.

Sales Agents receive a monthly notification of the commission they have earned from completed jobs.

The company is interested in computerising their ordering system. They already have an accounts package, which deals with their payroll requirements.

In consultation with the managing director, you have decided to:

Produce a specification for the entire system

Stage the implementation using a prototyping approach.

The first stage of the implementation will be to record Customers and their Orders.

Application Development in Access

An Access application consists of some or all of the following elements :

Database that contain all the individual objects necessary for the application

Tables that contain the individual pieces of data and to which data can be added, deleted or amended

Queries that can bring together data from different tables, and then select the data of specific interest

Forms used to view or update existing data as well as to add new data

Reports that summarise data and format it for display on the screen or for printing

Macros that automate repetitive operations without the necessity for using a structured programming language.

Modules that contain Visual Basic programming to perform operations beyond the capabilities of macros.

In Access, all these elements are brought together as a Database, for example, *SDG.MDB*.

Create a new Database

Run Microsoft Access.

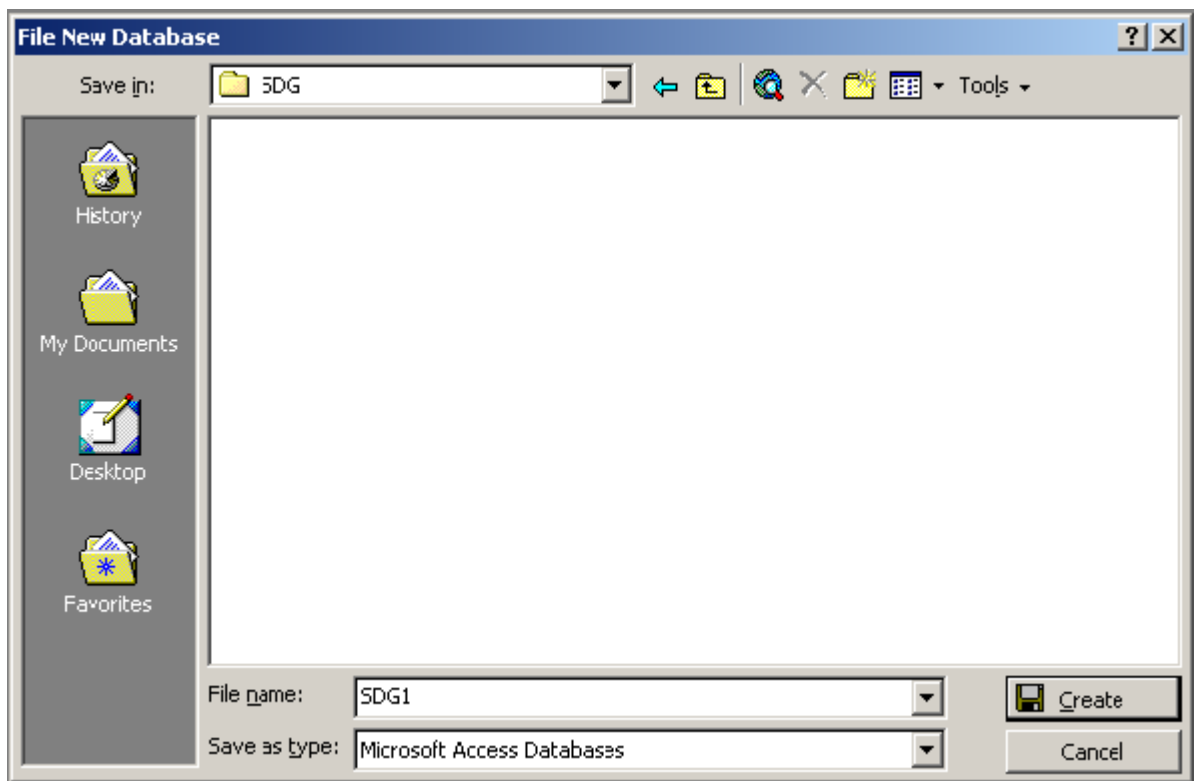
The opening dialogue in Access 2000 and Access XP is slightly different. In both cases, it is used to create a new database or open an existing one.

To create a new database, select New / Blank Database.

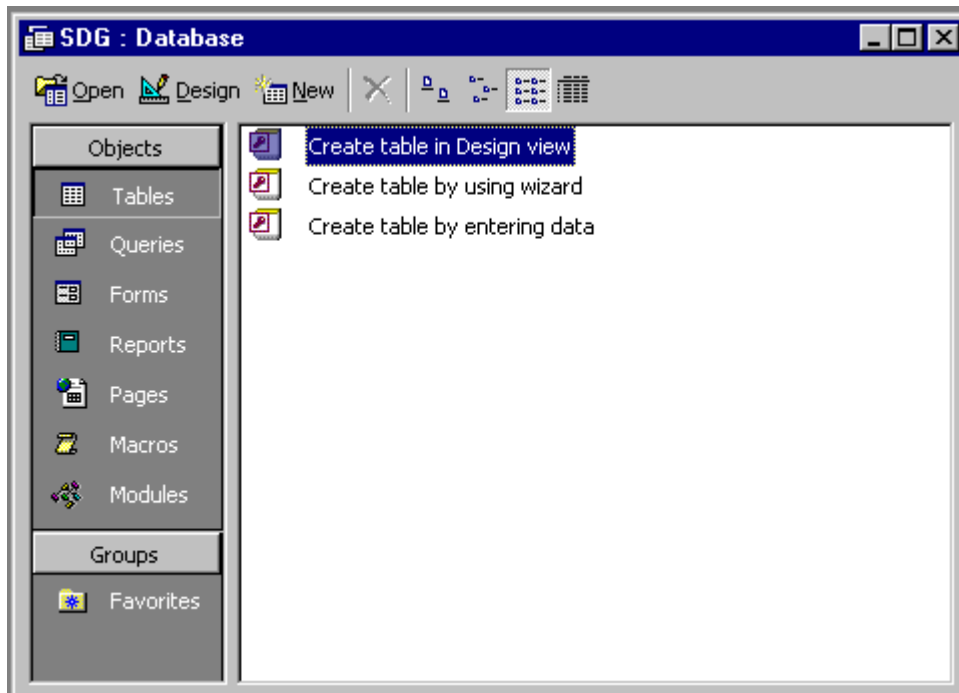
At the next screen, make sure you select the A: drive or a directory in your user area to save your database.

Name your database SDG

Click the Create button.



The Database Window



An Access database is made up of objects: tables, forms, reports, macros, queries and modules that are listed in the Database window.

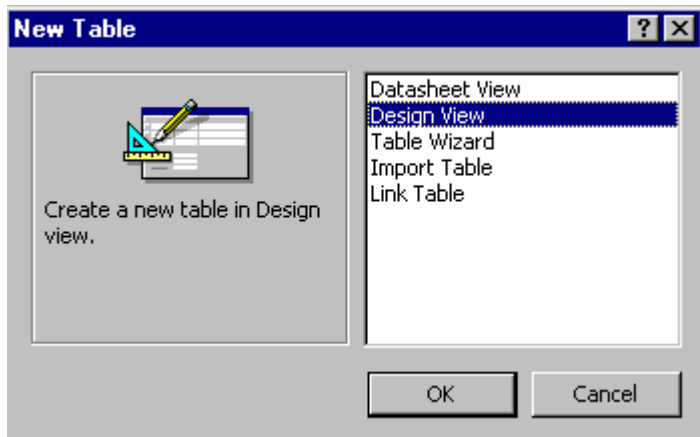
Defining the Tables and Fields

Access is a Relational Database Management System. In a RDMS, all data is organised into two dimensional tables (relations). A table is a grid in which the rows correspond to data records, and the columns correspond to data fields.

Designing tables is about defining the fields. A field definition must contain the fieldname, the data type of the data to be held in the field, and the field size.

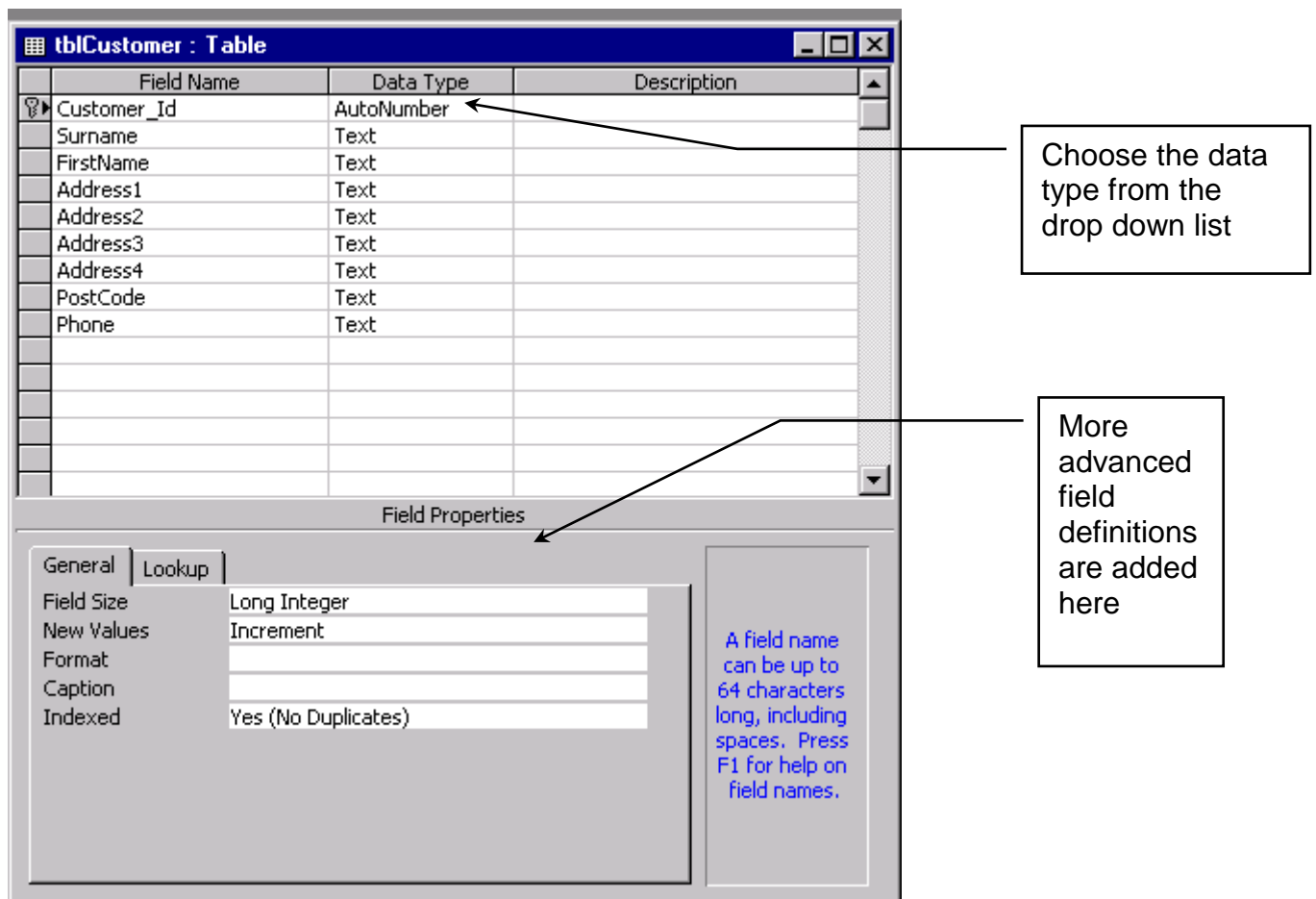
To define a table, click the Tables tab in the Database window, click New and then Design view in the New Table dialogue:

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You enter the field definitions in the following grid.

The field definitions should look like this:

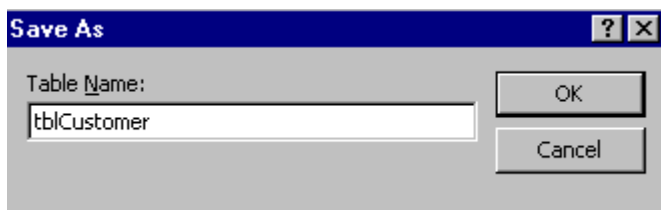


You enter or adjust the Field Size for each of the fields in the Field Properties window.

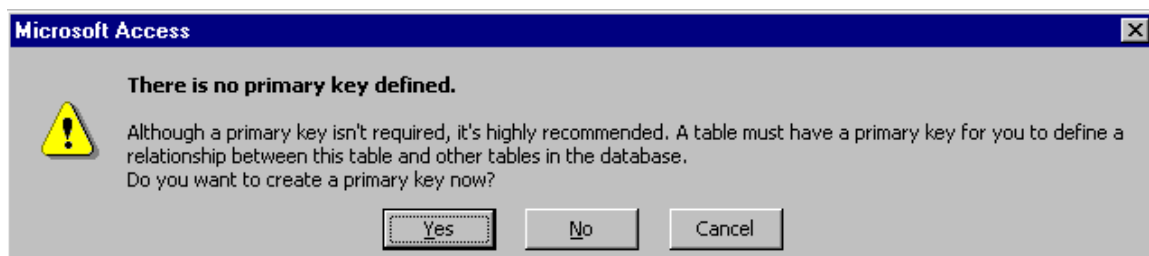
tblCustomer

<i>Fields</i>	<i>Data Type</i>	<i>Field Size</i>
Customer_Id	Autonumber	
Surname	Text	30
FirstName	Text	30
Address1	Text	30
Address2	Text	30
Address3	Text	30
Address4	Text	30
PostCode	Text	8
Phone	Text	15

At any time you can save the table definition. Your first table should be called tblCustomer.



You will get the following dialogue:



Click the No button.

Naming conventions

Always use meaningful names within your database.

It is also a good idea to include a prefix which identifies what kind of object is being named.

For example:

tblCustomer	a table containing records about customers
qryCustomerBySurname	a query sorting records from the Customer table in order of the Surname field
frmOrder	a form for processing Orders
rptInvoice	a report which produces and invoice

Note that Access allows spaces in names. This is best avoided as problems may occur later when using Access together with other packages (such as Visual Basic). Note that you can use underscores to improve readability e.g. Customer_Id

Primary Keys

Primary Keys

Each record in a table must be able to be uniquely identified. This is achieved by defining one of the fields as the Primary Key of the table.

A Primary Key must be:

- Not Null the primary key should always have a value
- Stable the value of the primary key should not change once entered
- Unique the value of the primary key should uniquely identify the record

In many cases there does not naturally occur a field that meets these criteria.


In practice, it is most convenient to always use a computer-generated key - in Access this is called an *Autonumber* field.

An AutoNumber field automatically enters a unique number as each record is added to the table. The number itself does not have any special significance.

Designating such a field as the primary key for a table is the simplest way to create a primary key.

Using Autonumber ensures that the primary key follows the 3 rules concerning the creation of a primary key.

How to set a primary key

- 1 Select the field you want to define as the primary key.
- 2 Click Primary Key  on the toolbar.

Set *Customer_Id* in **tblCustomer** as the Primary Key

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Now create the following tables:

tblStock

<i>Fields</i>	<i>Data Type</i>	<i>Field Size</i>
Stock_Id	Autonumber	
Description	Text	50
SellingPrice	Currency	

Set *Stock_Id* as the Primary Key

tblOrder

<i>Fields</i>	<i>Data Type</i>	<i>Field Size</i>
Order_Id	Autonumber	
Customer_Id	Number	Long Integer
OrderDate	Date	
PaymentMethod	Text	1

Set *Order_Id* as the Primary Key

tblOrderLine

<i>Fields</i>	<i>Data Type</i>	<i>Field Size</i>
OrderLine_Id	Autonumber	
Order_Id	Number	Long Integer
Stock_Id	Number	Long Integer
Quantity	Number	Byte

Set *OrderLine_Id* as the Primary Key

Default values

You can use a field's *DefaultValue* property to specify a value that will be automatically entered when the user adds a new record. The user can accept the default value or type a new value over it.

This can be useful to:

- Reduce the amount of typing a user has to do
- Give a template to guide the user as to the format required for the data

Field validation rules & validation text

A system is only as good as the data it handles. Data should be validated before it gets stored.

In Access, validation can be achieved through:

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- Table design
- Form design
- Coding
- Lookup tables

Data should be validated at the first level possible. In Access this means it is better to include validation as part of the table design, rather than rely only on entry validation at form level.

In table design, to validate a value entered into a field, you create a validation rule and then define the text that you want to display when the data entered doesn't meet that rule. For example, you might create a rule that says all dates entered must be in 1996.

There are also situations where you must use macros or Visual Basic for Applications code in conjunction with a form to perform more complex validation. For example, you might want to be able to override your validation rule under certain circumstances or compare values from different tables.

Examples of validation rules:

5	Must be 5
Between 1 and 5	Between 1 and 5 inclusive
Between #2/3/1994# and #1/31/1995#	Between those dates inclusive
"USA"	Must be USA
"C" or "F"	Must be C or F
Like "C*"	Must begin with C
Not "C"	Must not be C

Set the following default values, validation rules and validation text.

tblOrder

PaymentMethod	Default value	"C"
	Validation Rule	"C" Or "F"
	Validation Text	Must be [C]ash or [F]inance

OrderDate	Default Value	= Date()
	Validation Rule	<=Date()
	Validation Text	Must be today or earlier

tblOrderLine

Quantity	Default Value	1
	Validation Rule	> 0
	Validation Text	Must be greater than zero

tblStock

SellingPrice	Validation Rule	> 0
	Validation Text	Must be greater than zero

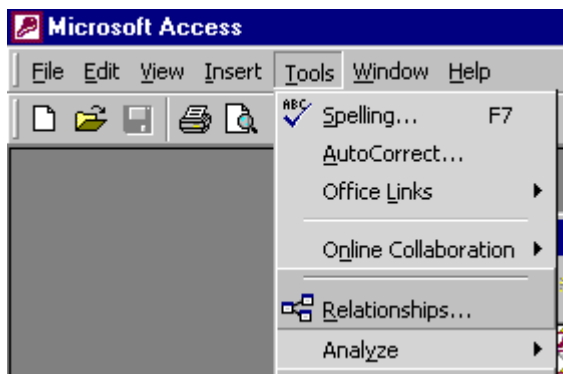
Required entry

You can use the Required property to specify whether a value is required in a field. If this property is set to Yes, when you enter data in a record, you must enter a value in the field.


Relationships between tables

- A customer may place many orders.
- Each order may have many order lines.
- Each order line is for a particular item of stock.

Table relationships are set up in the Relationships window, which is accessible from the Tools option on the menu.



How to set relationships

- 1 Close any tables you have open. You can't create or modify relationships between open tables.
- 2 If you haven't already done so, switch to the Database window. You can press F11 to switch to the Database window from any other window.
- 3 Choose Tools / Relationships on the toolbar or the  button
- 4 If your database doesn't have any relationships defined, the Show Tables dialogue will automatically be displayed. If you need to add the tables you want to relate and the Add Table dialog box isn't displayed, choose Relationships / Show Table on the menu. If the tables you want to relate are already displayed, skip to step 6.
- 5 Double-click the names of the tables you want to relate, and then close the Add Tables/Queries dialog box.
- 6 Drag the field that you want to relate from one table to the related field in the other table.

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In most cases, you drag the primary key field (which is displayed in bold text) from one table to a similar field (often with the same name) called the *foreign key* in the other table.

The related fields don't have to have the same names, but they must have the same data type and contain the same kind of information.

Note that you can match an AutoNumber field with a Number field whose FieldSize property is set to Long Integer.

- 7 The Relationships dialog box is displayed. Check the field names displayed in the two columns to ensure they are correct.

Choose Enforce Referential Integrity
Choose both Cascade options

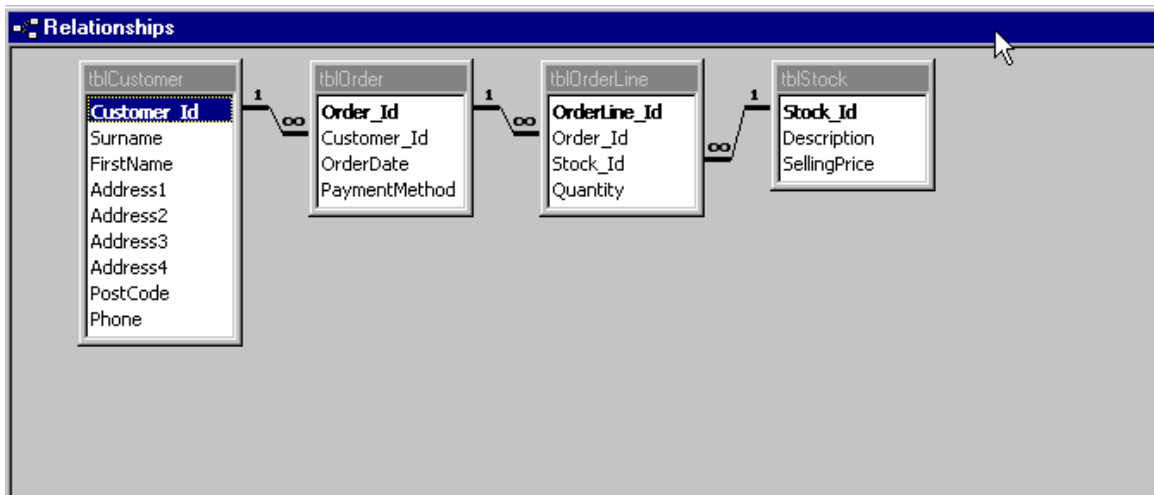
- 8 Click the Create button to create the relationship.
- 9 Repeat steps 5 through 8 for each pair of tables you want to relate.

When you close the Relationships window, Microsoft Access asks if you want to save the layout. Whether you save the layout or not, the relationships you create are saved in the database.

How to Delete a Relationship

In the Relationships window, click on the relationship line you want to delete, and press the Delete key.

When completed, the relationships for SDG should look like this:



Referential Integrity

Referential integrity is a system of rules to ensure that relationships between records in related tables are valid, and that the user doesn't accidentally delete or change related data.

When referential integrity is enforced, you must observe the following rules:

- You can't enter a value in the foreign key field of the related table that doesn't exist in the primary key of the primary table. For example, you can't have an order that is assigned to a customer that doesn't exist.
- You can't delete a record from a primary table if matching records exist in a related table. For example, you can't delete an employee record from the Customer table if there are orders assigned to the customer in the Orders table.

If you want Microsoft Access to enforce these rules for a relationship, select the Enforce Referential Integrity check box when you create the relationship. If referential integrity is enforced and you break one of the rules with related tables, Microsoft Access displays a message and doesn't allow the change.

You can override the restrictions against deleting or changing related records and still preserve referential integrity by setting the Cascade Update Related Fields and Cascade Delete Related Records check boxes.

When the Cascade Update Related Fields check box is set, changing a primary key value in the primary table automatically updates the matching value in all related records. Since you

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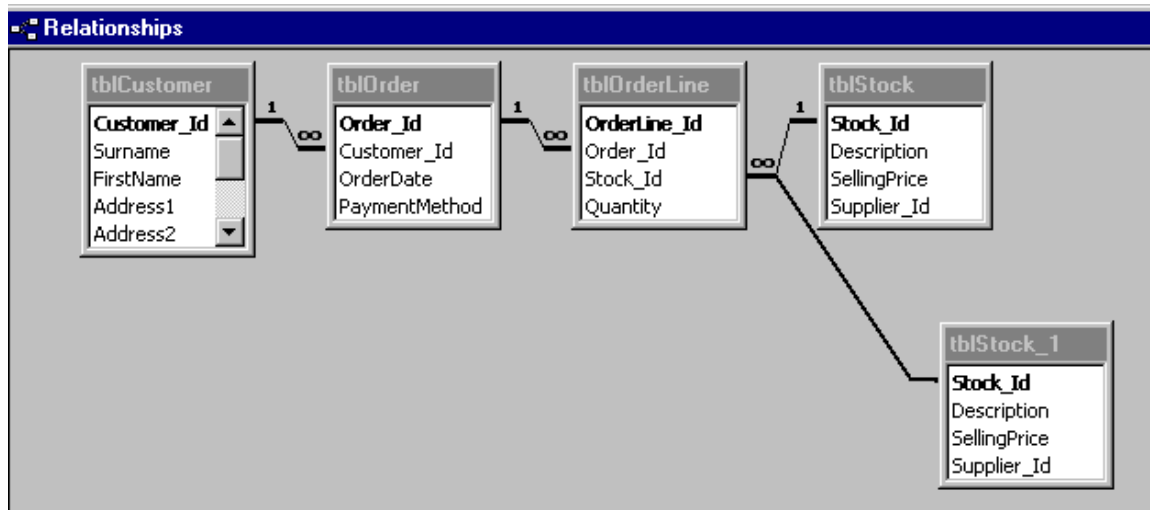
are using Autonumber for primary keys, and Autonumber fields cannot be changed, this is unnecessary in this application.

When the Cascade Delete Related Records check box is set, deleting a record in the primary table deletes any related records in the related table. (The user does get a warning message that this is about to happen, and can decide against deleting the record !)

You should check the Cascade Delete Related Records check box.

Deleting unwanted tables

A common problem is illustrated below:



You can see that an extra copy of the tblStock table has been added to the relationships window. To get rid of this unwanted table, first delete the relationship to it. Then highlight the table with the right mouse button, and select Hide Table.

CHECKPOINT: SDGCheck1