

I believe that there are a number of advantages using Access as a Database Design tool rather than an ERD Tool. It can print data dictionaries, it can document data validation and it can test out the design by entering sample data

# Table Design

Field Name	Field Type	Description
WineID	AutoNumber	A unique number used to identify a particular wine
WineName	Text	The name of the wine used on the wine label
Summary	Text	A summary of the main characteristics of each wine
Description	Memo	A full description with tasting notes by wine experts
Vineyard	Text	The name of the Vineyard producing the wine
Colour	Text	The colour of the wine, red, white or rose
IsSparkling	Yes/No	Whether the wine is sparkling or not
Vintage	Number	The year the grapes were harvested
ImageUrl	Text	The location of an image file
AlcoholContent	Number	The percentage of alcohol
Region	Text	The main region of the country where the grapes were grown e.g. Bordeaux
Area	Text	The area in the region where the grapes were grown e.g. Margaux
BottlePrice	Currency	The price to buy one 75cl bottle of the wine
Maturity	Number	How ready the wine is to drink, 1=ready, 2=ready but will improve, 3 = not ready, lay down
BBR_Rating	Number	How good the wine is rated out of 100 by the company
ParkersRating	Number	How good the wine is rated out of 100 by Robert Parker

Basic Table design can be documented by adding a comment to each field. Each field can also be documented with data validation

# Data Validation

## Vintage

General	Lookup
Field Size	Integer
Format	
Decimal Places	Auto
Input Mask	
Caption	
Default Value	
Validation Rule	>=1900 And <=2013
Validation Text	Please enter the year the wine was harvested as a four digit figure
Required	Yes
Indexed	No
Smart Tags	
Text Align	General

## Alcohol Content

General	Lookup
Field Size	Single
Format	
Decimal Places	1
Input Mask	
Caption	
Default Value	
Validation Rule	>=7 And <=16
Validation Text	Please enter the alcohol content as a percentage e.g. 12.5
Required	No
Indexed	No
Smart Tags	
Text Align	General

## Colour (Lookup Wizard..)

General	Lookup
Display Control	Combo Box
Row Source Type	Value List
Row Source	"Red";"White";"Rose"
Bound Column	1
Column Count	1
Column Heads	No
Column Widths	2.54cm
List Rows	16
List Width	2.54cm
Limit To List	Yes
Allow Multiple Values	No
Allow Value List Edits	Yes
List Items Edit Form	
Show Only Row Source V	No

Data validation is vital in order to ensure that mistakes are minimized, and customers provide all the correct information needed to complete the sale. However overuse of the required attribute can be irritating for staff maintaining the database. There are cases when not all the information for a new record is available initially. So some fields should be able to be left blank (or null) and filled in later when the information is available. Fields such as email and url can be validated by complex input masks or patterns more easily in ASP.NET than in Access.

# Test Data Plan

## Description of Item to Be Tested: WineName

WineName is going to store the name of the wine, which is a required field and must be start with at least 3 letters and must be no more than 30 characters long in total. This name is displayed on the wine label.

### Required Field Y

Test Type	Test Data	Expected Result	Actual Result
Extreme Min	No Chars	Display Error Message	Error Message
Min -1	2 Chars	Display Error Message	No Error Message, pattern added which required at least 3 letters followed by an optional 27 further chars
Min (Boundary)	3 Chars	Accepted	Accepted
Min +1	4 Chars	Accepted	Accepted
Max -1	29 Chars	Accepted	Accepted
Max (Boundary)	30 Chars	Accepted	Accepted
Max +1	31 Chars	Only 30 chars accepted	Only 30 chars accepted
Mid	60 Chars	Only 30 chars accepted	Only 30 chars accepted
Extreme Max	120 chars	Only 30 chars accepted	Only 30 chars accepted
Invalid data type	NA		
Other tests			

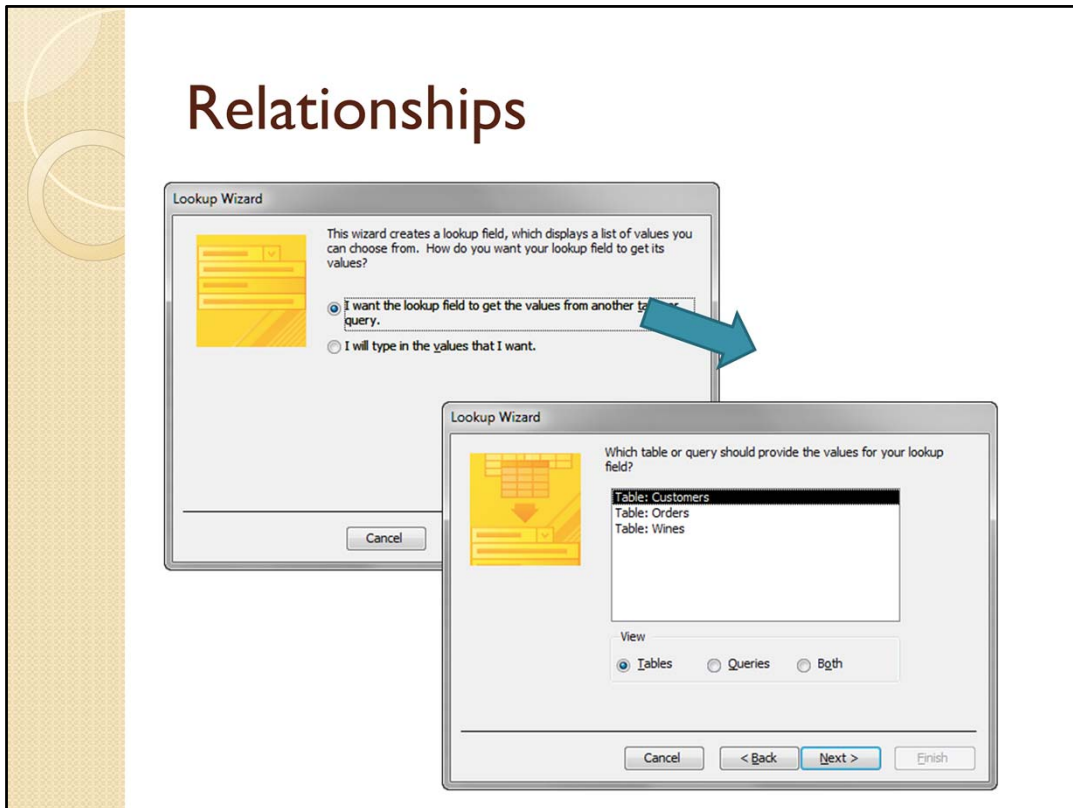
### Additional Notes / Instructions:

Although most names will only contain letters it is possible that someone could name a wine "Opus 1" or any other such name that contains digits or symbols

While designing the tables and their field validation, that should be closely followed by creating the test data plan. Students have already used the above Test Data Log in the Visual Web Development module, so it is one possibility. Test Driven Development is possible using MVC, and in my view that is a better and more interesting way of automating test planning and testing.

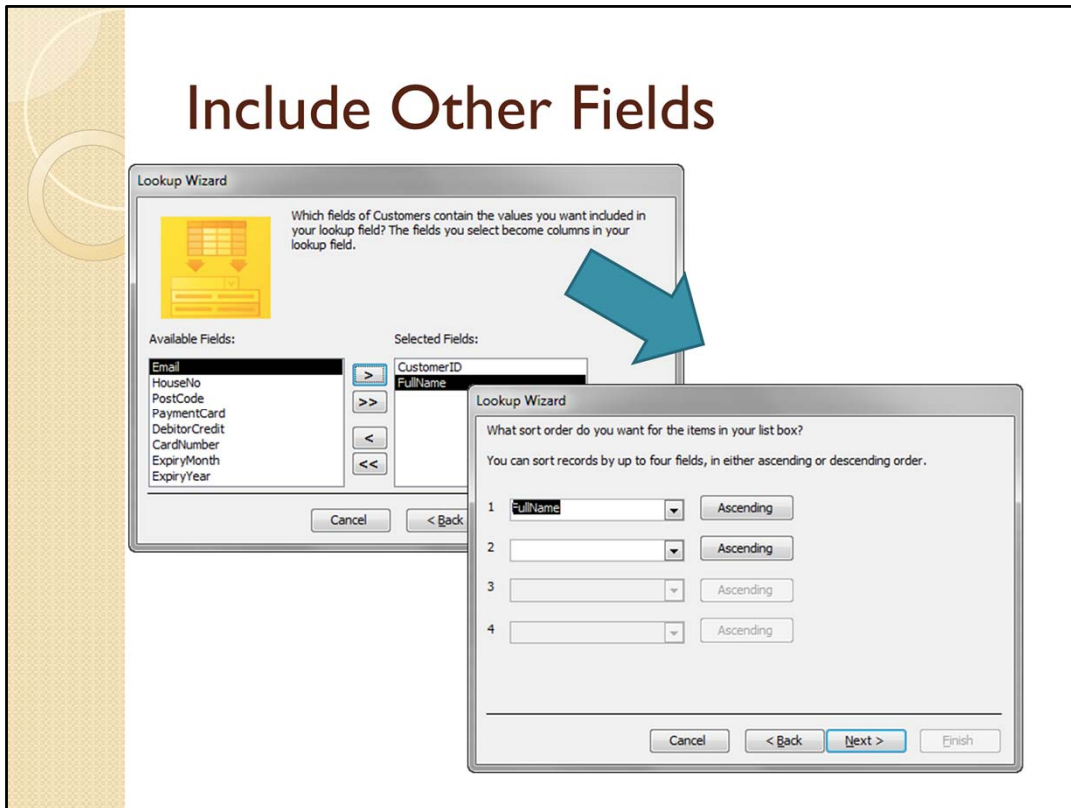
This data log is very detailed and with 60 fields to validate it gets very boring and repetitive. Using MVC this would be wasted testing as data validation can be built into class annotations.

# Relationships



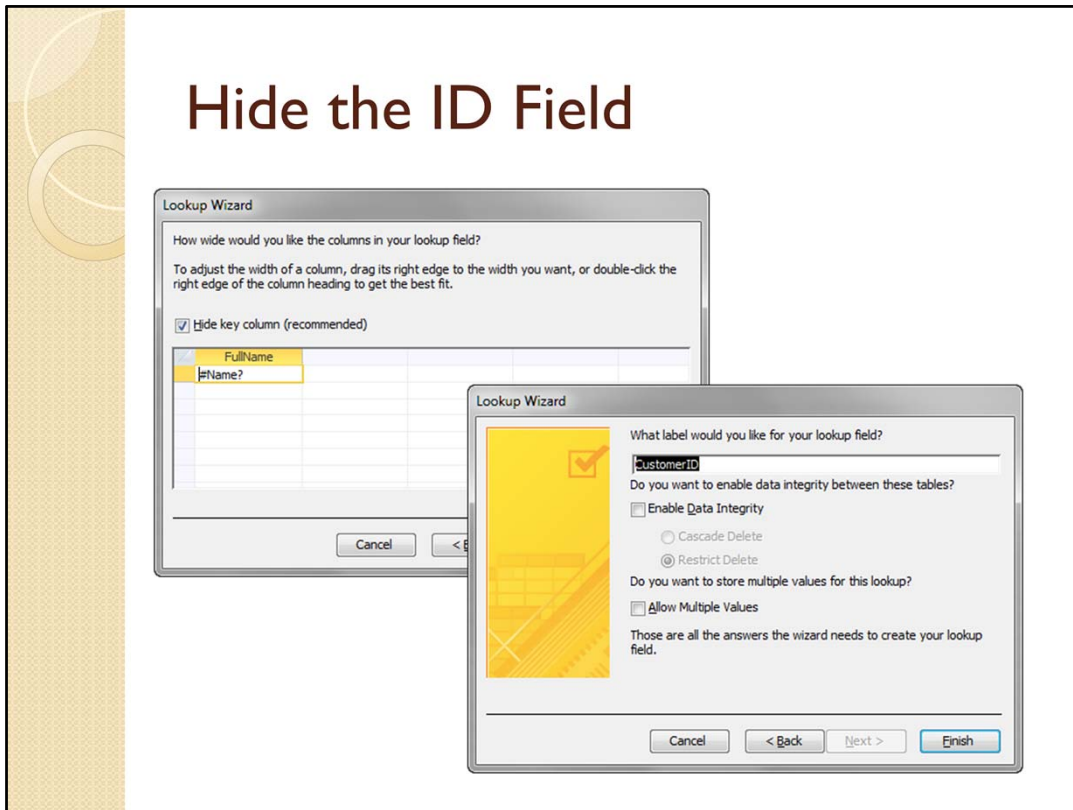
In the Orders table there is a relationship between Orders and Customers, a Customer may place one or more orders. Use the lookup wizard when entering the Foreign key CustomerID in the Orders Table.

## Include Other Fields



One advantage of using a Full Name rather than forename and surname is that it can be used to identify which customer is which, (although it is not necessarily unique). The disadvantage is that customers cannot easily be listed in surname order. The optimal solution is two separate fields, with a query field which links them together as FullName,

# Hide the ID Field



Users should never see ID fields as they have no meaning for them. However when testing developers need to see ID fields to check that the links are being correctly made.

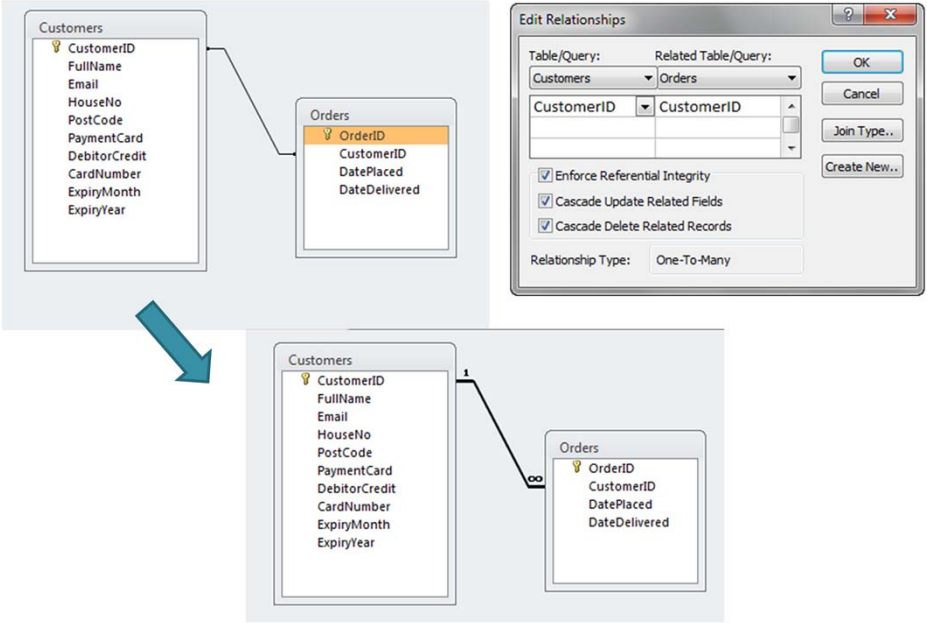
# Internal Queries

General	Lookup
Display Control	Combo Box
Row Source Type	Table/Query
Row Source	SELECT [Customers].[CustomerID], [Customers].[FullName] FROM Customers ORDER BY [FullName];
Bound Column	1
Column Count	2
Column Heads	No
Column Widths	0cm;2.54cm
List Rows	16
List Width	2.54cm
Limit To List	Yes
Allow Multiple Values	No
Allow Value List Edits	Yes
List Items Edit Form	
Show Only Row Source	No

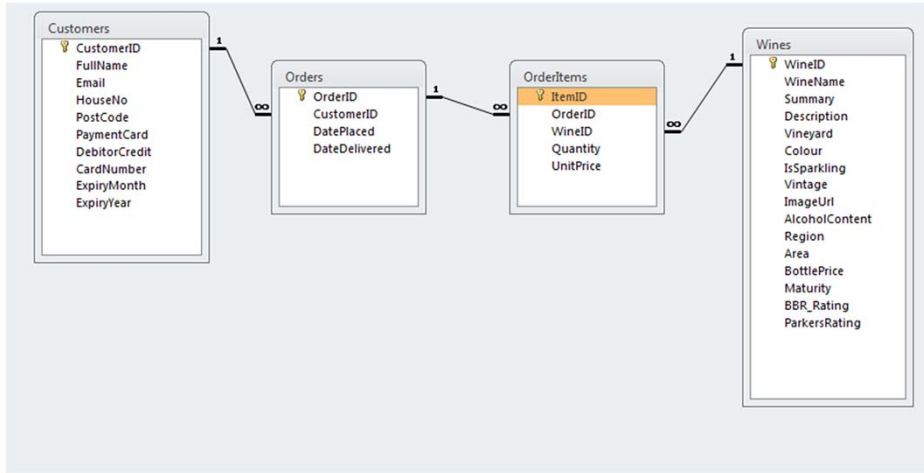
In practice Access creates an SQL query stored internally in the table object. The ID field has a column width of zero cm in order to hide it.



# Referential Integrity

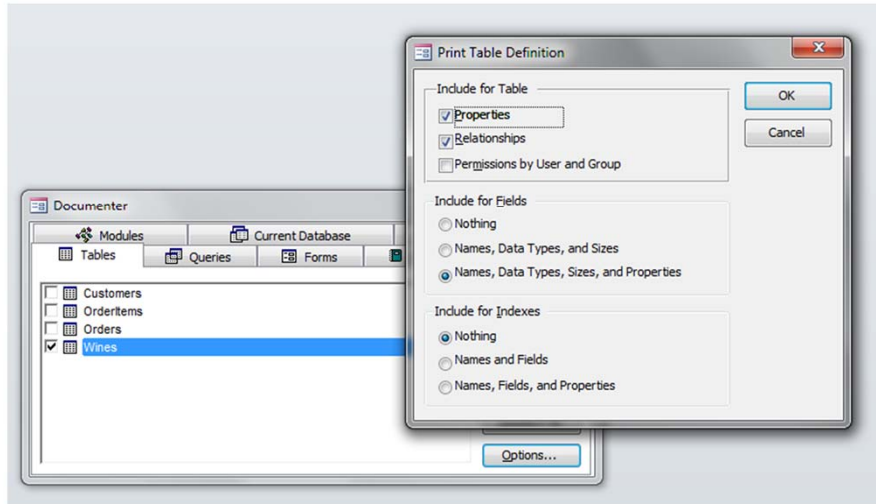


# Order Items



The actual content of the order are bottles of wine, but an order can be form many bottles, and each wine can be ordered many times. Although the purchase price at the time of order is the same as that in the wines table, the sale price is variable and may be subsequently changed, thus each order item has a unit price copied into it.

# Database Documentation



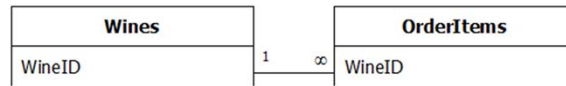
# Field Documentation

Vintage	Integer	2
AggregateType:	-1	
AllowZeroLength:	False	
AppendOnly:	False	
Attributes:	Fixed Size	
CollatingOrder:	General	
ColumnHidden:	False	
ColumnOrder:	Default	
ColumnWidth:	Default	
CurrencyLCID:	0	
DataUpdatable:	False	
DecimalPlaces:	255	
Description:	The year the grapes were harvested	
DisplayControl:	Text Box	
GUID:	{guid {234236F2-C7A3-407F-9CD5-B82A6E1A6C43}}	
OrdinalPosition:	7	
Required:	True	
ResultType:	0	
SourceField:	Vintage	
SourceTable:	Wines	
TextAlign:	0	
ValidationRule:	>=1900 And <=2013	
ValidationText:	Please enter the year the wine was harvested as a four digit figure	

# Relationship Documentation

## Relationships

### WinesOrderItems



Attributes:

RelationshipType:

Enforced, Cascade Updates, Cascade Deletes

One-To-Many

# Minimal Test Data

Cu	FullName	Email	House	PostCode	PaymentCar	Debit	CardNumber	Expi	Expiry	Cl
1	Derek Peacock	derek@yahoo.	256	LE7 9SD	Barclaycard	<input checked="" type="checkbox"/>	1234567812345678	8	2015	
2	Veena Lakhani	veena@gmail.	12	LE8 8DF	Nationwide	<input type="checkbox"/>	8765432187654321	7	2016	
3	Gita Cooke	gita@yahoo.cc	20	WD5 0EL	Tesco	<input checked="" type="checkbox"/>	2345678923456789	3	2017	
(New)						<input type="checkbox"/>				

W	WineName	Producer	Colour	Vinta	Alcoh	Region	Area	BottlePri	Mat	Swee	BBR	Park	C
2	Petrus	Petrus	Red	1988	12.5	Bordeaux	Pomerol	£7,750.00	1	Dry	95	93	
3	Ch Latour	Chateaux Latour	Red	1982	12.5	Bordeaux	Pauillac	£2,250.00	1	Dry	100	100	
4	Ch Mouton-Ro	Chateaux Mouton-I	Red	2002	12.5	Bordeaux	Pauillac	£1,890.00	3	Dry	98	99	
(New)													

Orde	CustomerID	DatePlaced	DateDelive	C
1	Derek Peacock	17-Sep-13		
2	Derek Peacock	05-Sep-13	07-Sep-13	
3	Veena Lakhlan	06-Sep-13		
(New)				

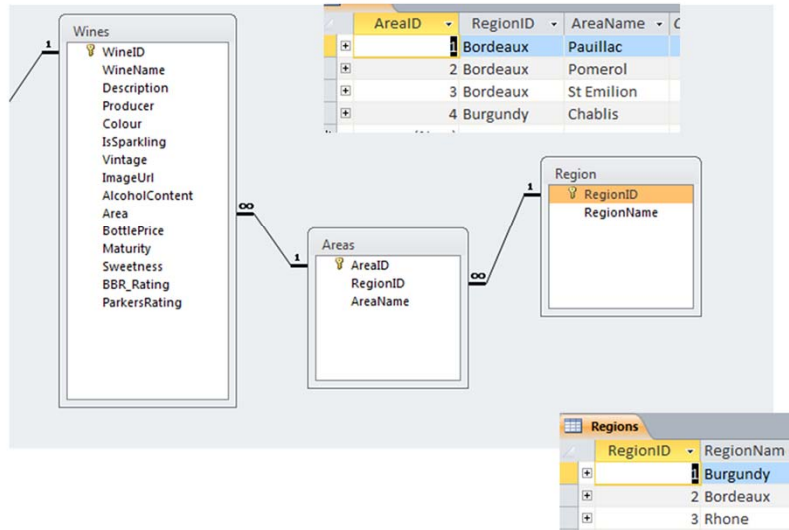
Item	Orde	WineID	Qua	UnitPrice	C
1	1	Ch Latour	1	£2,250.00	
2	1	Petrus	1	£7,750.00	
3	2	Ch Latour	1	£2,250.00	
4	3	Ch Mouton-Ro	1	£1,890.00	
(New)			1		

To test the design out, data needs to be added that is sufficient to show that the one to many, and the many to many relationships work. Usually three records is sufficient. However in this case the data must be incomplete as how can Gita be a customer without having placed an order? It is however possible to have some wines that no one has bought. Orders must have at least one order item.

## Notes => Reflections

- Anything essential missing?
- Why limited to French wines?
- Is Region unnecessary duplication?
- Should Customer have more than one address/email/phone no/credit card?
- Therefore should customer be split?
- Should Wines be split into wine and vintage?

# Regions & Areas



By using lookup tables the duplication of the region names can be avoided.



## Further Normalisation

- **Wines**

- Producer
- WineName
- Colour
- Sweetness
- IsSparkling
- Area

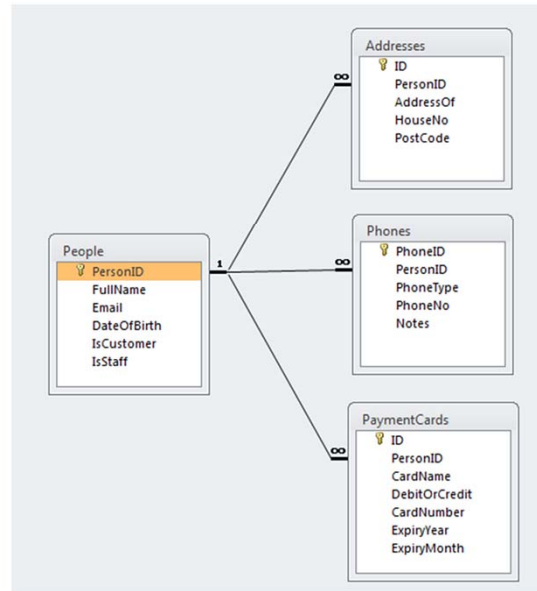
1:Many

- **Vintage**

- WineID
- VintageYear
- Alcohol
- Description
- Maturity
- Rating
- Price

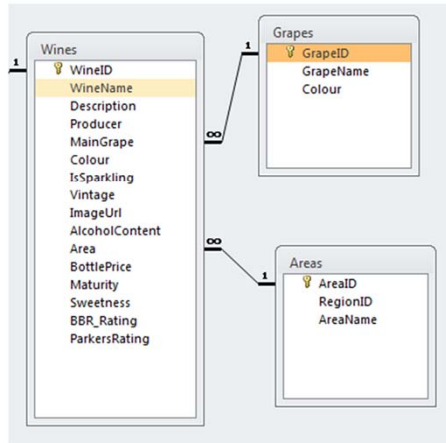
The suggested Wines table is not normalised as the same wine is produced each year, and some attributes are the same for all years, and some are different each year. However in due of the shortage of time the single de-normalised table will be used.

## More on Normalisation



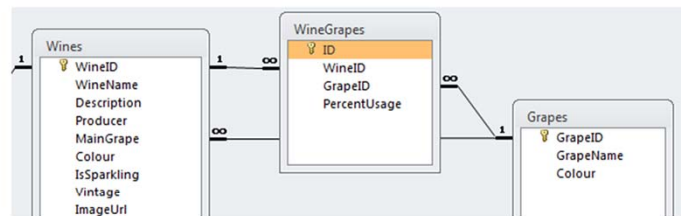
In some web sites customer details can be more extensive as in the real world a customer may order wine for someone else, so the Billing Address will be different from the delivery address. To make matters worse two people living at the same address could order wine. In this case there will be unnecessary duplication of data. The duplication in this case is minor. You also may want more than one phone number for your customer in case of a query on the order

# What About the Grape?



I was aware initially that which grape the wine is made from is an important attribute of the wine. The problem is that some wines are made from a mixture of grapes. So I hesitated between recording all the grapes used in each wine (overkill perhaps?) and just recording the main grape. Or even having a single text field and just typing in all the grapes used, The problem with the last suggestion is that lookup tables cannot be used. In the end I put off the decision and then forgot to put any fields in!!!

# Alternative Grapes



WineGrapes			
ID	WineID	GrapeID	Perce
1	Petrus	Merlot	100
2	Ch Latour	Cabinet Sauvignon	85
3	Ch Latour	Merlot	15

You can of course have both the main grape and all the contributing grapes, but in the end the simplest is to have the main grape only. My advice is go for the simplest that fulfils the brief, but in your reflexions talk about all the other more complex and more complete alternatives.