

Ryan Jones

IT4

User Requirements



User Requirements

Background

G. Jones is a small sized window selling business owned by Glynn Jones which was established in 1985, originally as a window cleaning company, however it eventually turned into a window selling business, but the company logo remained the same, with the 'Window Cleaning' text. Initially the company was a business run only by Glynn, with all services being provided by Glynn himself. However, over the years it has expanded and changed purpose. Glynn now has a large number employees. G. Jones Window Cleaning provides their customers with windows ranging from all types and sizes, they also deliver the windows to customers who have ordered them. Cost of their service is dependent upon the window type, size and the price that is been chosen by the company for that given type and size. The company works within the Vale of Glamorgan, primarily around Barry, Cardiff, Dinas Powys, Kyncoed and Penarth, with roughly 150 customers of ages ranging from 20 to 95. Employees are often busy taking orders, handling windows, storing them in their warehouse and delivering the windows ordered by customers.

By conducting an investigation of the company's data entry and methods, as well as an interview with Glynn himself, I have learned that.

The business is currently run via a paper based system, storing information on:

- Customers details - Contact numbers, Contact's first name, Contact's surname, addresses, postcodes, email addresses, etc.
- Work Records - Date and times of orders, cost of orders.
- Window information – The types and sizes of window in stock and their costs.

The advantage of the current paper based system is that it allows the company to very quickly keep records without the reliance on technology as well as learning how to use electronic methods.

However, the problem is that there is no backup of records in case of accidents. Large amounts of paper are used in the process of making work records and it can be very difficult to locate specific information very quickly. It can also be difficult to update information, e.g. a new customer mobile number. If Glynn converted to a digital, computer based system then it would

User Requirements

allow him to keep backups of his records, customer details and payments on external storage devices such as an external hard drive, in case of accidents.

The business requires a computer based database system which will allow for quick access of a large amount of data. They want to be able to access specific information for specific purposes via the use of queries, for instance; all customers within Dinas Powys, houses/jobs that cost the most, which customers have late payments, etc. They also want the advantage of ease of updating (customer details/service details/work records).

Aims and objectives

The business wants to use the database for storing information on customers (names, contact numbers, addresses, postcodes, date of births), orders (date, time, cost, delivery date, total cost and VAT costs), windows (window type, window size and cost of window) and the window orders, mainly the window quantity of an order.

It is important that the database is capable of using queries, so that the company can very quickly find specific data. For example: "The company wants to find out the number of customers in a given location, e.g. Dinas Powys alone, in order to find out if more advertisement is needed in that area." This kind of query is going to allow managers to find useful and relevant information which they can then use to make decisions. They've also requested that the database is able to perform specific calculations based upon window orders, such as the total cost of a customer's order (which will be dependent upon the quantity of windows, window sizes, the type of windows and the cost of the window on its own).

A feature of the database which the company has stressed is that of reports. They want to be able to create a report which can calculate total income for the month in orders, number of orders this month, the previous month's total income, the average daily subtotals as well as display the order ID, order date, delivery date, order time, order cost, order total cost, customer ID and order VAT cost. These reports will help the company track their expansion by following their monthly incomes over the year. It will also make data comparisons much easier so the company can gauge their progress. If the

User Requirements

average monthly income a year ago was higher than it is for the current year then it may mean that the company needs to invest more into advertisement.

The company has requested that their house style and logo be displayed on the background of their database system and that the overall feel of the system is professional, slick and smooth, whilst also being easy to read and use. The whole database will follow the house-style, for example, buttons will be a dark colour two tone colour and the logo will be consistently placed throughout forms.

In summary, goal for the user requirements will be that they complete the following objectives:

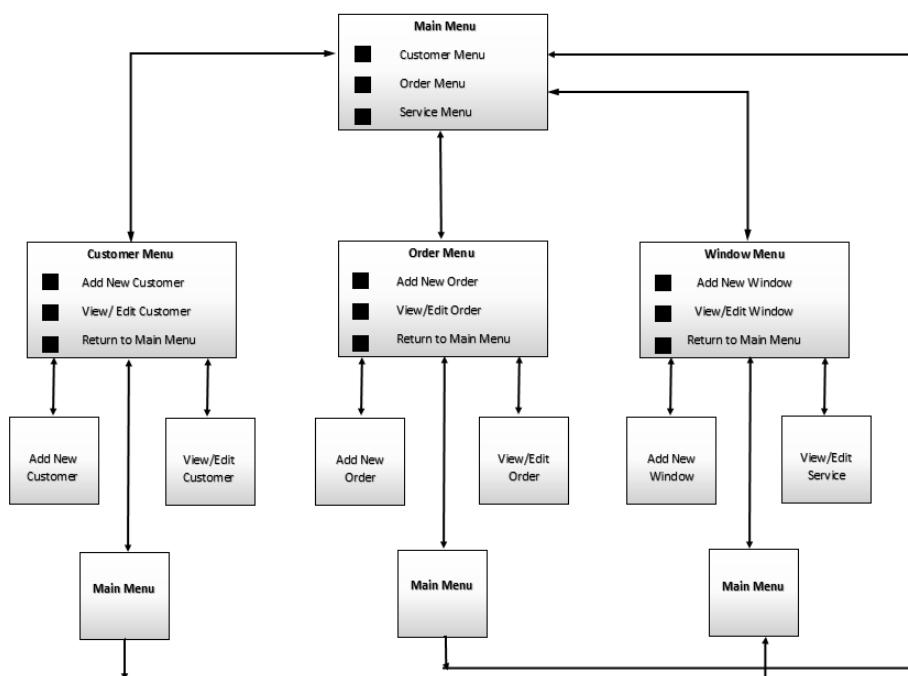
- Provide the company with an easy to use, unitive, menu driven interface so that it will not require any training to take advantage of.
- Store customer information, including: title, first name, surname, address line 1, address line 2, city, postcode, contact number and email address.
- Store window information, including: type, size and cost.
- Store order information, including: date, time, delivery date, cost, VAT cost, total cost, sales person and month.
- Have a login system to ensure that all customer information is secured.
- Have an 'add new order' form which is capable of calculating VAT cost of order and the total order cost (including the VAT).
- Have an 'add new window' form which contains a sub-form of the order form.
- Display a splash screen window before taking the user to the login form.
- Have the ability to edit/delete customer records.
- Have the ability to edit/delete window records.
- Have the ability to edit/delete order records.
- Provide users with the ability to utilise queries within the database including a query that can reduce the cost of particular windows.
- Produce a report that will display the company's total income for the month.
- Have the ability to printout reports with the click of a button.
- Include validation rules to reduce error.
- A comprehensive guide on how to use the system.
- And lastly present a system that follows the house style of the company.

User Requirements

User Interface Requirements

The database's user interface will include a simple background showing the company's logo to effectively convey the house style and ethos of the company, this will make the system look more professional. It is paramount that the user interface is easily navigable and menu driven, so that it is easier to use. There will be a user login page where usernames and passwords will be required. There will be a number of buttons and menus so that accessing of forms, queries and reports is made easier.

The company wants the database to look professional and slick. So I will be using a plain white background with a centred logo image and the buttons will be black/dark grey with a light grey font (preferably in Calibri). The dark buttons will reflect the black font in the logo. This house style will be continuous throughout the forms. There are a number of different menus and submenus within the database system, including a main menu, customer menu, order menu and service menu. The below diagram shows the relationship between the menus and submenus (as well as the relationship between the command buttons). However, as I begin to design the database this will not necessarily reflect an exact navigational template.



User Requirements

Hardware and Software Requirements

Hardware

I will be using Microsoft access 2010 to create/design this database system. This is because the software contains all the features and tools necessary to design a sufficient and effect database system for the business.

The minimum hardware requirements for the new system are:

Processor - Intel Boxed Core I7-6700K 4.00 GHz 8M.

Operating system – Windows 10

RAM – 4GB

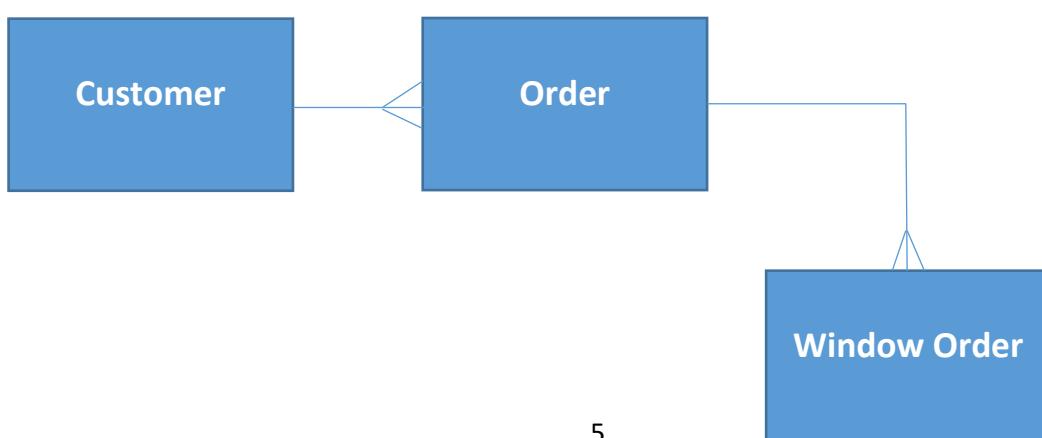
Graphics Card – AMD Radeon HD 6370D

Hard Drive – 500 GB

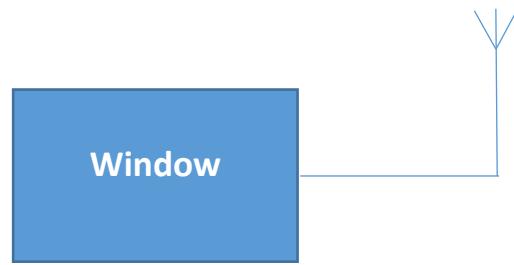
USB Flash Drive – 4GB

A USB flash drive should be used so that the owner can regularly back up all records, as a good business practice. Generally the database should be backed up about once per day to have a fully secure database with no chance of information loss. 4GB of storage will be more than enough for backup purposes. The USB flash drive should be kept in a safe location to prevent loss or damage, e.g. in a fireproof safe.

Normalised Entity Relationship Diagram:

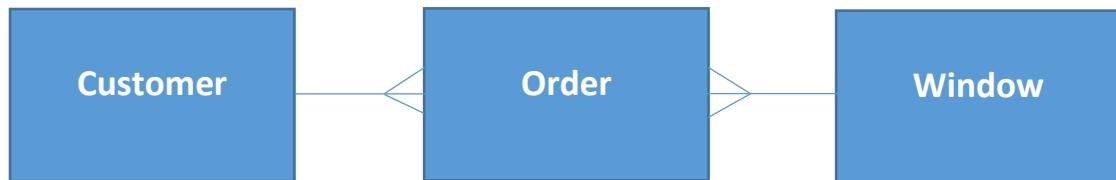


User Requirements



This entity relationship diagram shows the different relationships between the four tables. It is showing that the customer can place many orders, orders can have many window orders and windows have many window orders. The diagram is in a normalised form.

Many-to-many Entity Relationship Diagram:



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Data Dictionary

Customer

Field Name	Data Type	Validation/Input Mask	Description
Customer ID	Autonumber	No duplication	Automatically produces a number which will uniquely identify the customer.
Customer Title	Text	Maximum length – 20 Presence check	Allows the user to input their title.
Customer First Name	Text	Maximum length – 20 Presence check	Allows the user to input customer's first name.
Customer Surname	Text	Maximum length – 20 Presence check	Allows the user to input customer's surname.
Customer Address Line 1	Text	Maximum length – 60 Presence check	Allows the user to input the first line of customer's address.
Customer Address Line 2	Text	Maximum length – 50 Presence check	Allows the user to input the second line of customer's address.
Customer City	Text	Maximum length – 20 Presence check	Allows the user to input customer's city.
Customer Postcode	Text	Maximum length – 10 Presence check Format Check	Allows the user to input customer's postcode.
Customer Contact Number	Number	Maximum length – 11 Presence check Input Mask	Allows the user to input customer's contact number.
Customer Date of Birth	Date/Time Short Date	Presence check Input Mask	Allows the user to input customer's date of birth.

Window Order – (Window Link)

Design

Field Name	Data Type	Validation/Input Mask	Description
Window Order ID	Autonumber	No duplication	Automatically produces a number which will uniquely identify the window order details.
Order ID	Number	Foreign Key Presence check	Automatically produces a number which will uniquely identify the order.
Window ID	Number	Foreign Key Presence check	Automatically produces a number which will uniquely identify the window.
Window Quantity	Text	Presence check	Allows the user to select the quantity of windows chosen.

Window

Field Name	Data Type	Validation/Input Mask	Description
Window ID	Autonumber	No duplication	Automatically produces a number which will uniquely identify the service.
Window Type	Number	Presence check	Allows the user to select what type of window they want, for example 'Bay', 'Standard', 'Door', etc.
Window Size	Number	Presence check	Allows the user to select the size of the window they want, for example 'small', 'medium' and 'large'.
Cost of Window	Currency	Presence check	Allows user to set the cost of a window type with a given window size.

Design

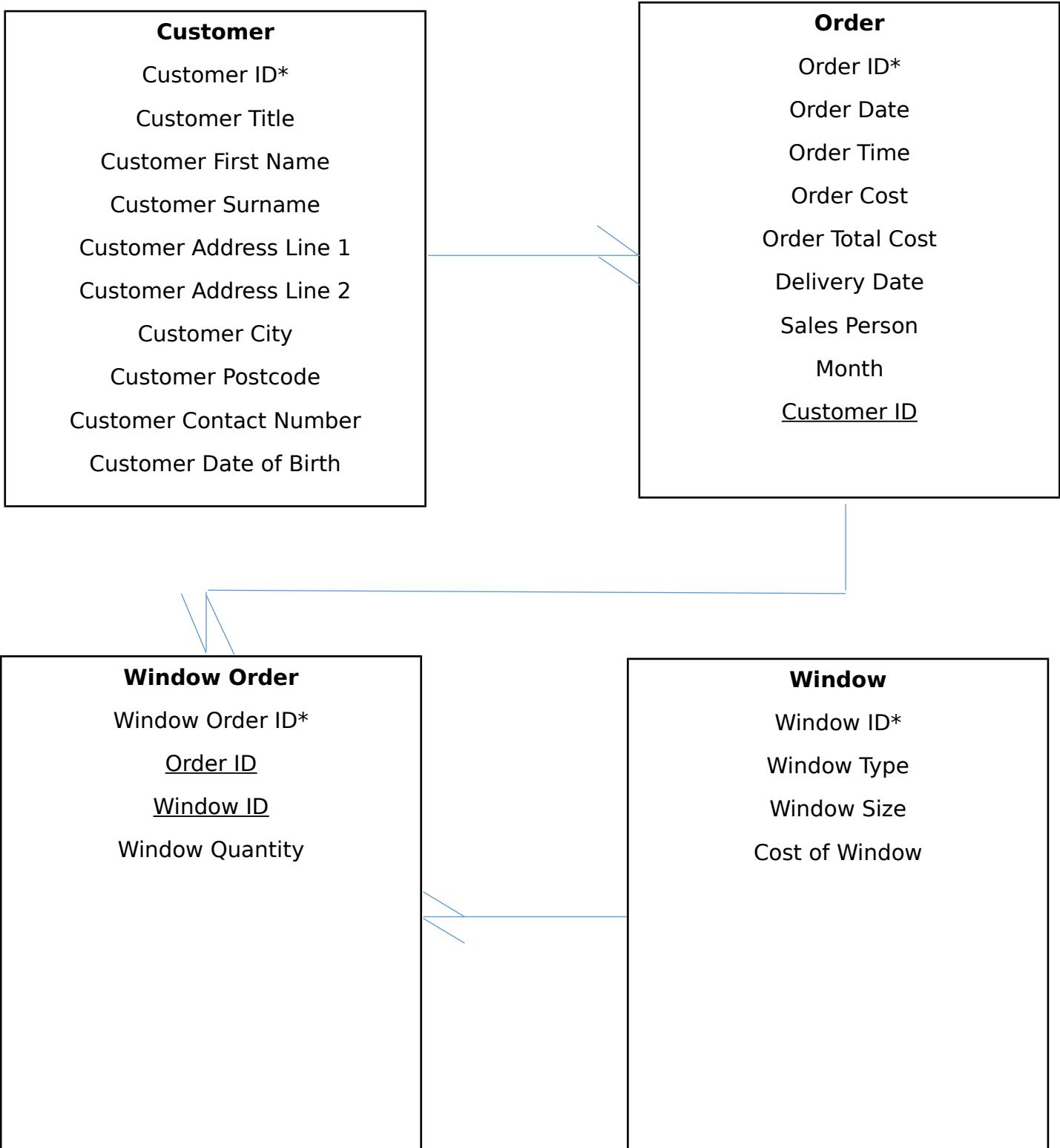
Order

Field Name	Data Type	Validation/Input Mask	Description
Order ID	Autonumber	No duplicates	Automatically produces a number which will uniquely identify the order.
Order Date	Date/Time Short date	Presence check	Allows the user to input the date of order.
Order Time	Date/Time Short time	Presence check Input mask	Allows the user to input the time of order.
Order Cost	Currency	Presence check	Automatically produces the cost of the customer's order.
Order Total Cost	Currency	Presence check	Automatically adds the Order Cost and the Order VAT Cost together to produce the Total Cost of the customer's order.
Customer ID	Number	Foreign key Presence check	Automatically places the Customer ID taken from the customer record – links this table with the customer table.
Delivery Date	Date/Time	Presence check Input mask	This allows the user to input the delivery date of the customer's order.
Sales Person	Text	Maximum length - 50 Presence check	Allows user to input the name of sales person for particular order (this is used for the employee of the month report).
Month	Text	Maximum length - 10 Presence check	Allows user to input the month in which the order was made.
VAT Cost	Number	Presence check	Automatically calculates the amount of cost of VAT for a given

Design

			order.
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Foreign Key Identification Diagram



Design

Asterisk * = Primary Key

Underline = Foreign Key

Validation

Technique:

Presence Check - This validation check will be used for all fields to check if data has been entered into the relevant and required fields which the user must fill out. I will be using this technique because it will ensure that data is entered into relevant fields, in an effort to ensure data is sensible and reasonable.

Technique:

Format Check - This validation check will be used in the customer table for the customer postcode field. It will require that the postcode has only: letters, numbers and spaces. I will be using this technique to ensure that the required field's data is in the exact format that the company wants. If the user enters a postcode that is not in that format (for example, it includes a hyphen) then it then a validation text will appear, reading "Incorrect Format." This type of postcode format validation will allow for different kinds of postcode formats, as it allows for variation in numbers and digits. To achieve this validation check I will be using the expression: Not Like "*[!0-9a-z]*"

Technique:

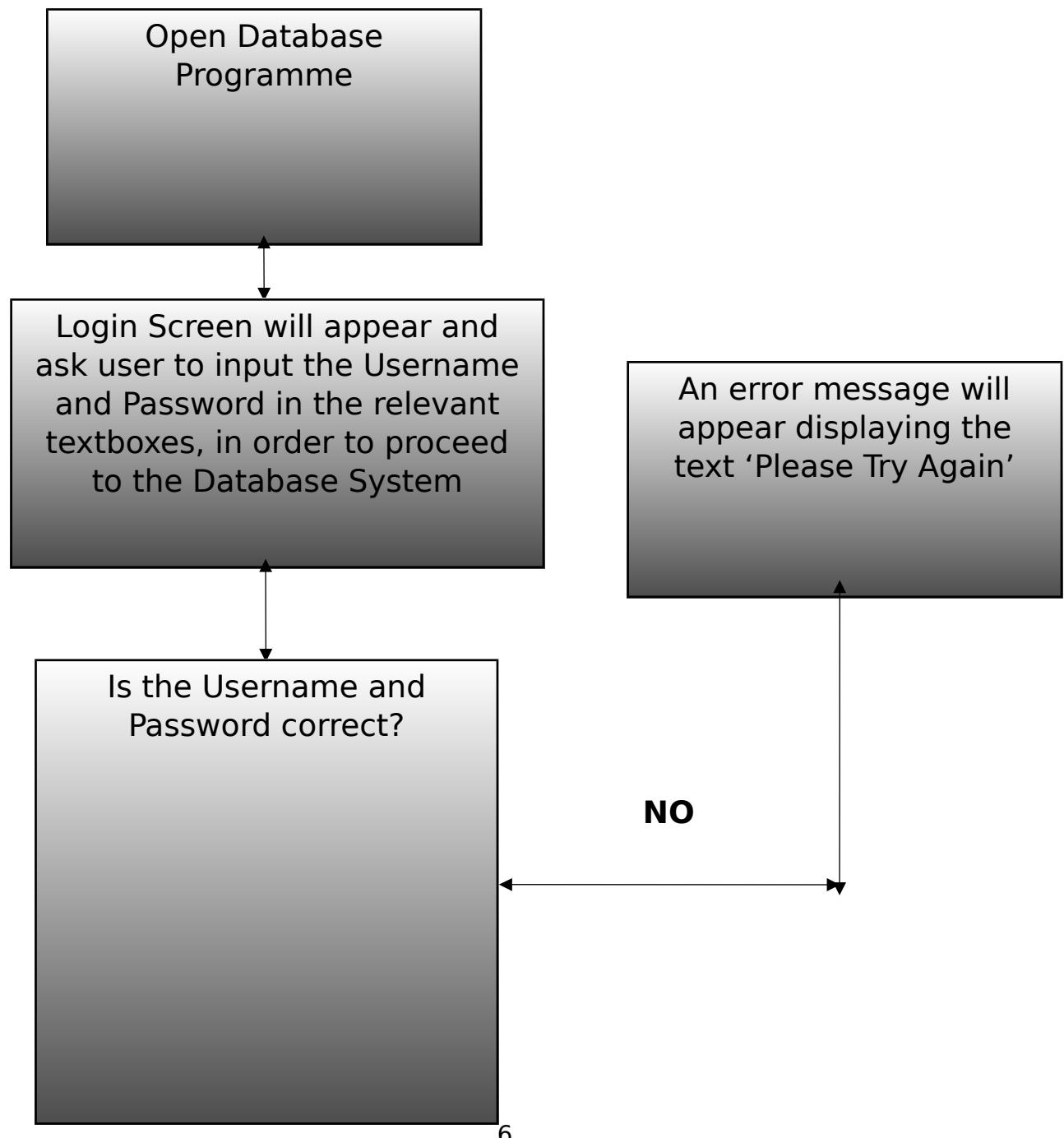
Range Check - This validation check will be used in the window order table under the window quantity field. It will ensure that an unrealistic number of windows for domestic houses are not entered into the field. E.g. a window quantity of 100 will not be accepted and a message box will pop up saying 'Invalid quantity'.

This will ensure that the quantity of windows entered is sensible, reasonable and not excessive.

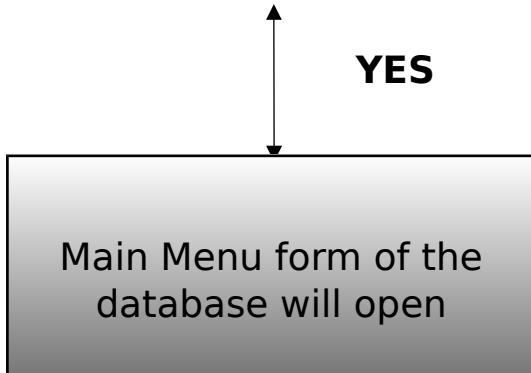
Design

Security Protection Technique:

This is a flowchart showing the logical process of the password security system.



Design



Add New Customer - Form Design

This menu will allow users to enter customer information and store it within the database.

Image: Company Logo	 G. Jones Window Cleaning	Add New Customer	Label: Font - Calibri (Detail) Bold Font Size - 24 Font Colour - Black
Labels: Font - Calibri (Detail) Font Size - 11 Font Colour - Black (Lighter)	Title: _____ *	First Name: _____ *	Text Boxes: Font - Calibri (Detail) Font Size - 11 Font Colour - Black (Lighter)
	Surname: _____ *	Date of Birth: _____ *	
	Address Line 1: _____ *	Address Line 2: _____ *	
	City: _____ *	Postcode: _____ *	
Command Buttons: Font - Calibri (Detail) Font Size - 11 Font Colour - White Fill Colour - Black (Lighter 35%) +	Contact Number: _____ *	OK Main Menu Customer Menu	

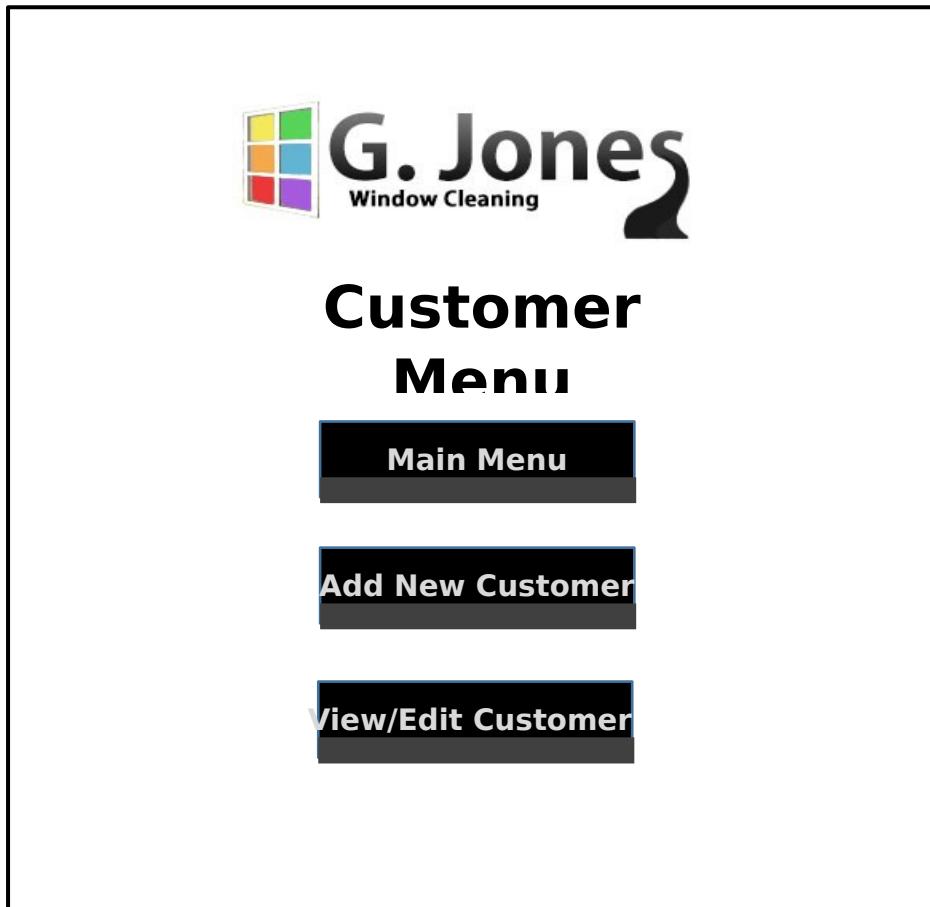
Design



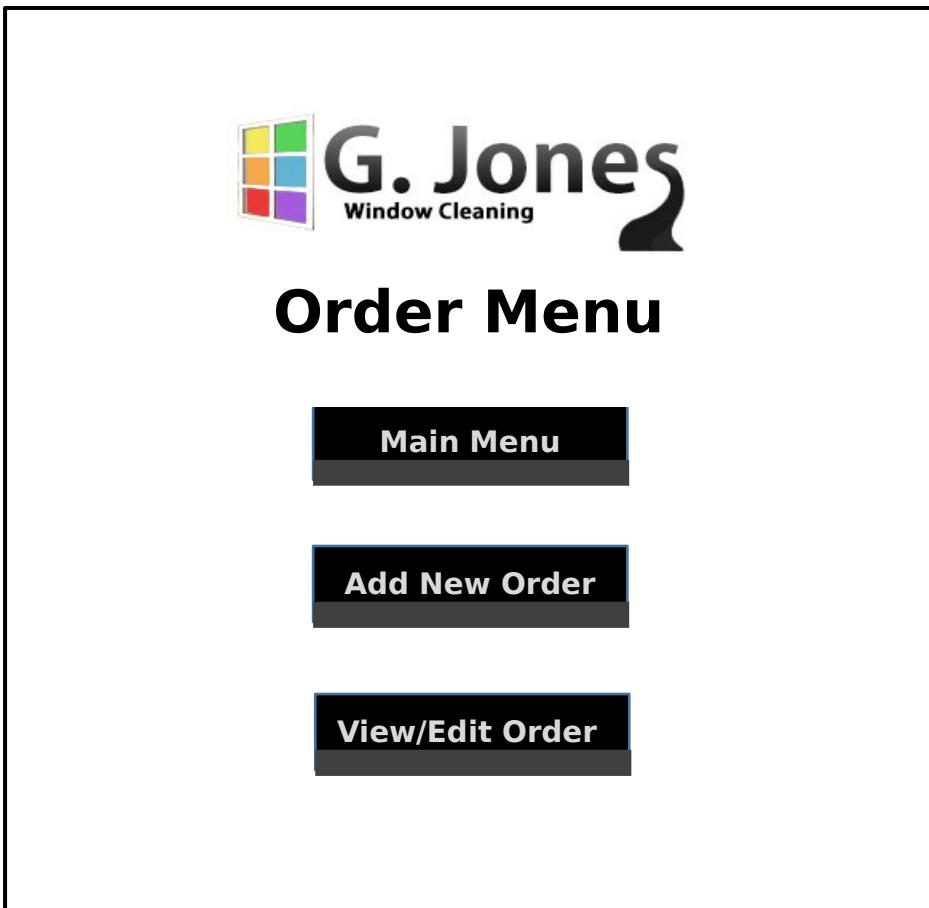
Order Menu

Service Menu

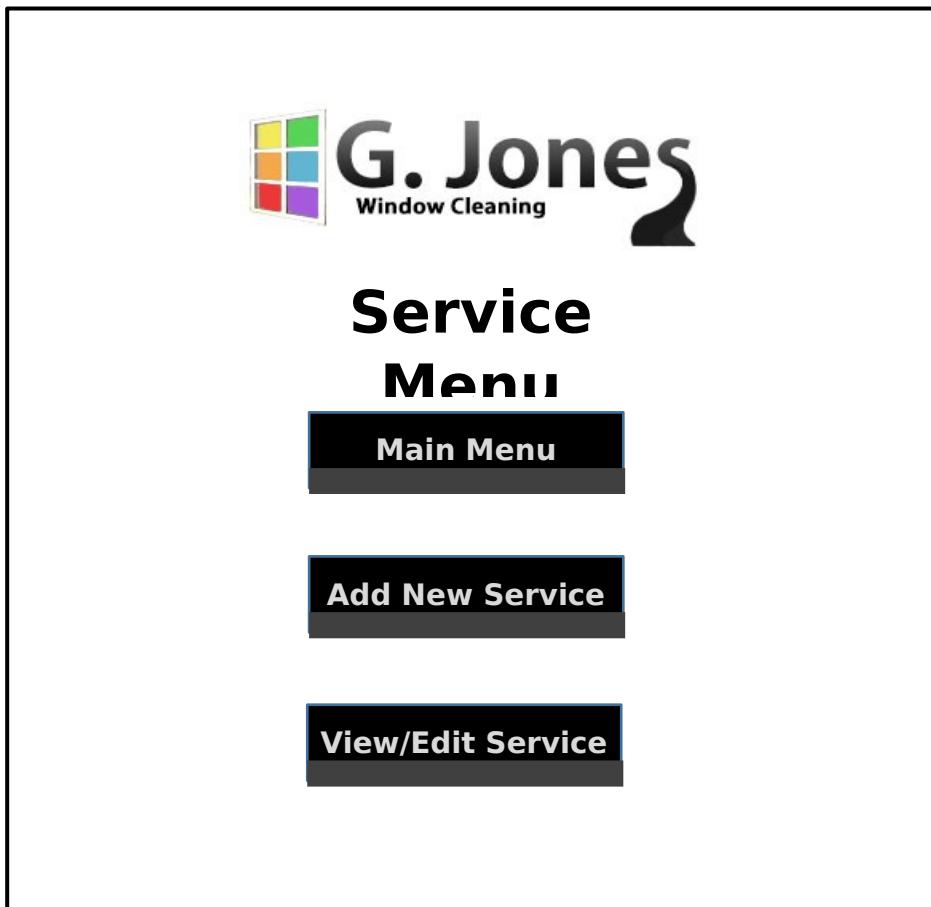
Design



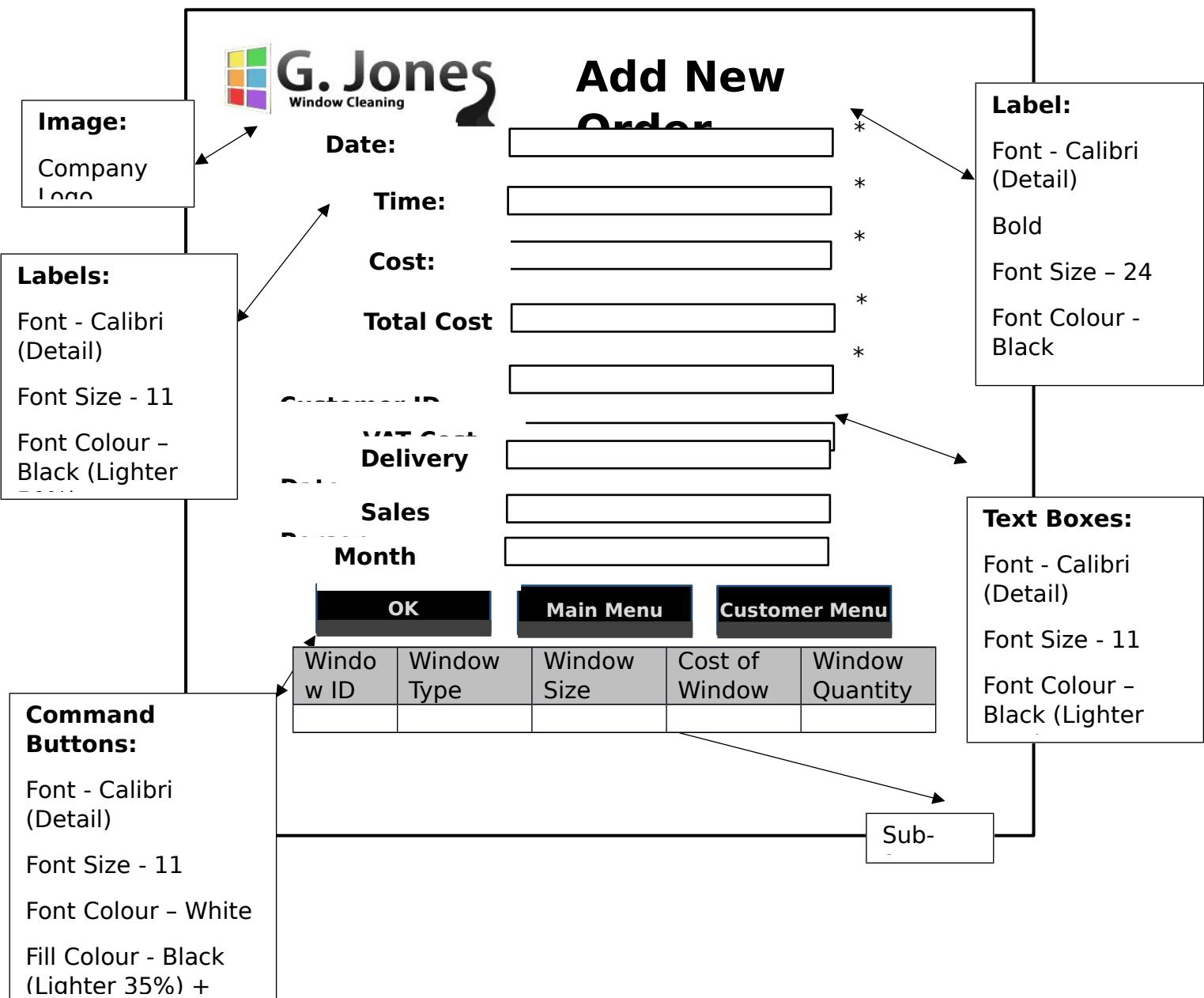
Design



Design



Design



Design



G. Jones
Window Cleaning

Add New Window

Window ID: *

Window *

Window Size: *

Window *

Stock: *

OK **Main Menu** **Order Menu**

Design



G. Jones
Window Cleaning

View/Edit Window

Window ID:

Window **Save**

Window Size: **Delete**

Cost: **Window**

Stock:

Window Menu **Main Menu**

Design



View/Edit Customer

Title:

First Name:

Surname:

Date of Birth:

Address Line 1:

Address Line 2:

City:

Postcode:

Contact Number:

Save

Delete

Customer Menu

Main Menu

Design



G. Jones
Window Cleaning

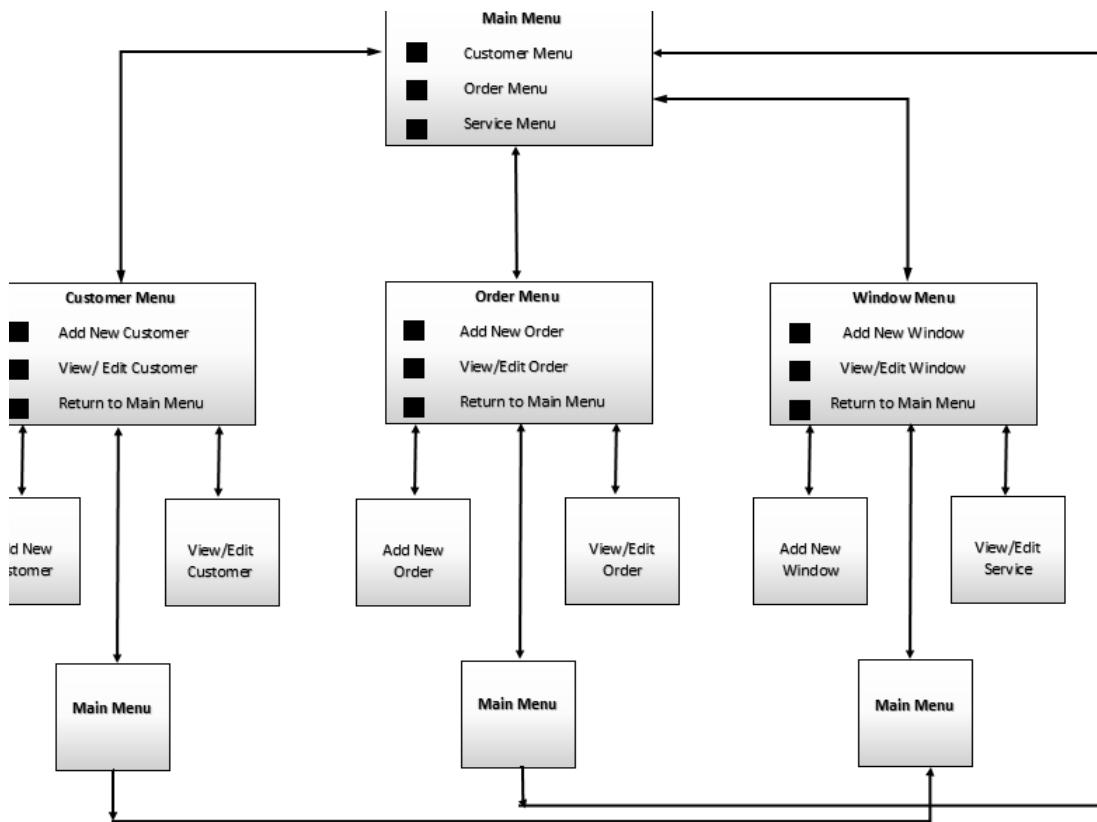
View/Edit Order

Date:	<input type="text"/>	
Time:	<input type="text"/>	Save
Cost:	<input type="text"/>	Delete
Total Cost	<input type="text"/>	Report
Delivery	<input type="text"/>	
Sales	<input type="text"/>	
Month	<input type="text"/>	

Order Menu **Main Menu**

All forms should follow this clear navigational structure. Below is a diagram that shows the navigational relationship between the forms and how to navigate from form to form.

Design



Design



Username:

Password:

LOGIN

CLOSE

Queries

Design

Type of Query	Tables and Fields Included	Criteria	Fields Returned	Justification
Single Query	Tables: Window Fields: Window ID, Window Type, Cost of Window, Stock, Window Size	“Small”	Window ID, Window Type, Cost of Window, Stock, Window Size	The company wants to find out how many small windows they have, regardless of window type. They will be able to view the type, cost and stock of all small windows.
Single Query (Parameter Query)	Tables: Order Fields: Order ID*, Customer ID, Order Date, Order Time, Order Cost, Order Total Cost, Sales Person, Delivery Date	[Enter delivery date]	Order ID*, Customer ID, Order Date, Order Time, Order Cost, Order Total Cost, Sales Person, Delivery Date	The company want to find out what orders were delivered on a specific date. This query will allow them to view all the order details as well as the customer ID for any date they have input into the database.
Multiple Query	Tables: Window, Order Fields: Window Type, Order Date, Window Size, Cost of Window, Customer ID.	“Door”	Window Type, Order Date, Window Size, Cost of Window, Customer ID.	The company wants to be able to find out how many orders included a door type, as this allows them to see how popular this window type is.

Design

Multiple Query 2	<p>Tables: Customer, Order and Window Order.</p> <p>Fields: Customer ID, Customer surname, Order ID, Window ID, Window Quantity, Order Total Cost, Customer Contact Number.</p>		N/A	<p>The company want to be able to view both the order details of the customer as well as the relevant customer details (such as their contact number) simultaneously. This allows the user to not have to switch between the customer and order records when looking at the details of each. For instance, if the company had to ring a customer regarding an order, it is easier to have information like the contact number, cost of order, quantity of windows, surname, etc, all in one place, to avoid switching between</p>
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Design

				records to find the information they need, which may lead to confusing and waste time.
Parameter Query	Tables: Customer Fields: Customer ID*, Customer Title, Customer First, Name, Customer Surname, Customer Address Line 1, Customer Address Line 2, Customer City, Customer Postcode, Customer Contact Number, Customer Date of Birth.	[Please enter Customer ID]	Customer ID*, Customer Title, Customer First, Name, Customer Surname, Customer Address Line 1, Customer Address Line 2, Customer City, Customer Postcode, Customer Contact Number, Customer Date of Birth.	The company want to view all the details for a single customer as quickly as possible so that if a customer calls then they are able to quickly get just their information alone up.
Action Query	Tables: Window Fields: Cost of Window, Window Type, Window Size.	Update to: [Cost of Window]*0.8 Criteria: 'Regular', 'Large'.	N/A	The company want to have a sale and reduce the cost of their regular large windows by 20%. This query allows them to automatically reduce the cost with the

Design

				click of a button as opposed to manual alteration.
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Calculations

Design of calculation in a form:

It has been specified by the company that they want a calculation in a form which can automatically calculate the total cost of a customer's order. The manager wants this calculation to be consistently correct without needing any human involvement in the process of calculation.

The calculation will factor in the window cost as well as the window quantity selected.

The formula that will be used is: =Sum([Cost Of Window]*[Window Quantity])

Then in order to calculate the VAT cost we will use the calculation: =[OrderCostText]/100*20. This will be added to the cost to produce the total order cost.

Design of Report

Justification

G. Jones window cleaning have requested that the programme can produce a report which is simple, easy to digest and easily printable. There will be a number of different data outputs within the database system, including data outputted via forms and tables. However, the main source of output data in the system will be that of the reports. The reports are specifically

Design

for providing output data, so these will be the main source of data output. The following report will be structured into columns and rows as this is a much more organised method and it will make the data easier for the user to interpret. However, the outputs that are not in the table records will involve some form of calculation which will be stored within a textbox and have a label identifying the context of the value, e.g. 'Total'

Order Report: The data outputs that will be in the order report are as follows: total income for the month in orders, order ID, order date, order total cost, customer ID, sales person and total (this is the order total cost added up for the month). These outputs will be important because it is essential that a company can track their financial profit, and the best way to keep track of that is by knowing your total income over a given period, e.g. a month, a year, etc. By having this monthly total in the report it will allow the company to easily keep track of their earnings. By having a calculation that produces the total income for that month it will allow the company to keep track of their monthly earnings, which will help them make future financial projections by analysing the variations of total income from month to month. The rest of the fields will be included in the report so that the specifics of the orders throughout the month are kept as a hardcopy record, as this data could potentially be very useful in making predictions about what types and sizes of windows they should buy more of, depending on how successful they are. Additionally, the use of 'Sales Person' will allow the company to track the progress of sales people by viewing how many orders they have taken and how much those orders were.

In order to calculate the total income of the month, I will be using the following calculation: =Sum([Order Total Cost])

This is going to take each total order cost and add them together to give us the total income.

Design

Header: G. Jones Window Cleaning Logo in the top left hand corner and a title that reads 'Monthly Orders Report' in the top right corner.

Footer: The date the report was printed, page number, print button and TOTAL cost text box.

Font style: Calibri (detail)

Font size: Between 11pt and 28 pt.

Grouping: Sales Person (with A on top), Order Date (newest to oldest). ~~I will be grouping by sales person because it will allow the company to view how the sales people are doing, by seeing how many orders they take and how much those orders are worth. From this it could be possible to deduce an employee of the month or to decide what sales person should have a pay rise.~~

Sorting: Order Total Cost (from largest to smallest). I will be sorting by order total cost because it is better to view the orders in order of how much they are worth. I've selected from largest to smallest because the user may be more concerned with the higher cost orders than the lowest, and those records that are at the top will be seen first.

G. Jones Window
Cleaning

Page

White background – buttons will be in black, following the company's

Text Box - Monthly Income Report

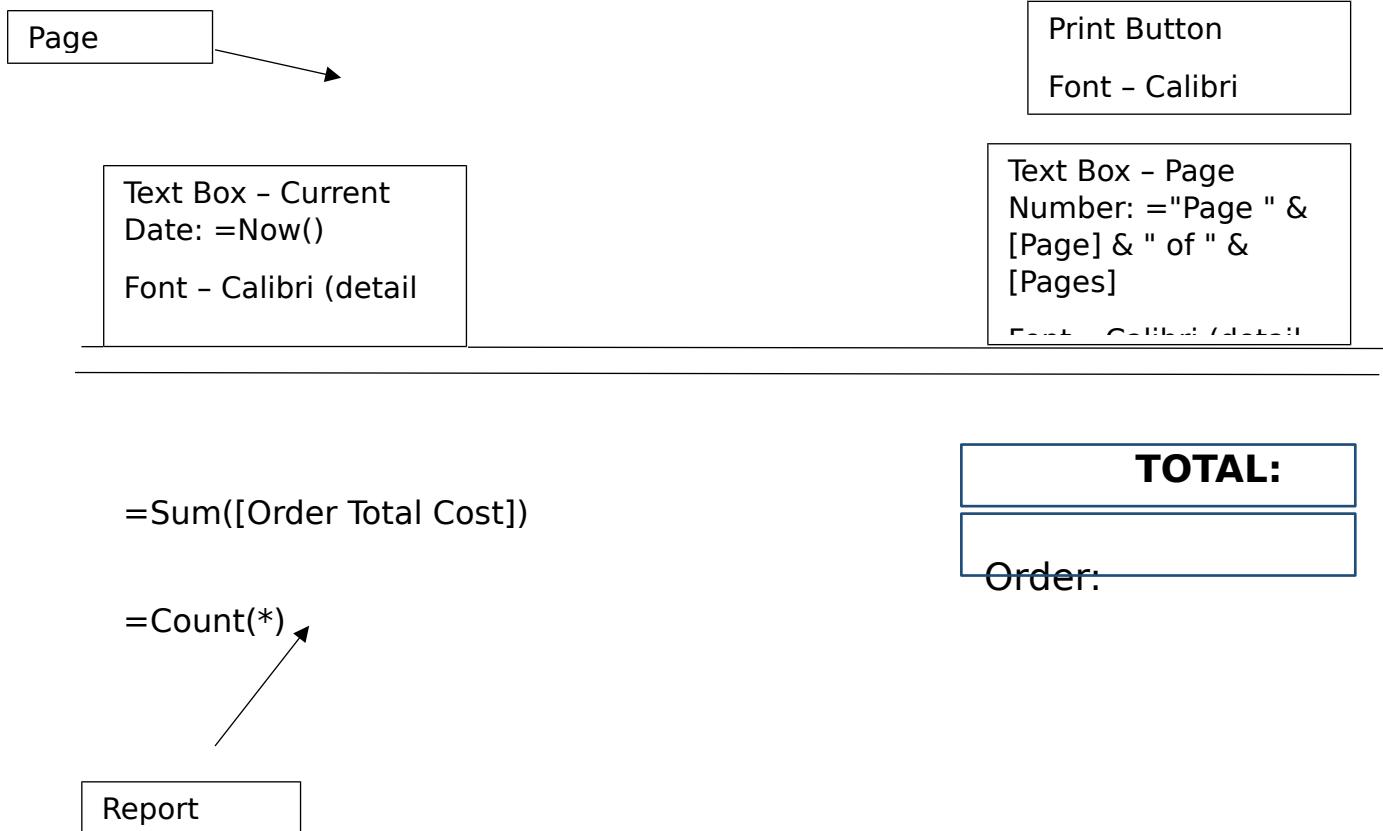
Font style – Calibri (detail)

Font size – 28

Colour – Black

Sales Person	Order ID	Customer ID	Order Date	Total Order Cost

Design



Design of Processes

Visual Basic Code Implementation

Splash Screen:

Design

When a user attempts to open the programme they will be greeted with a splash screen. The splash screen is an alternative take on the standard G. Jones logo, where the background is black and the writing is white. The splash screen will last roughly 5 seconds before the login form will appear.

Login Form

Now the login form has appeared the user will have to input both a username and password that the system recognises as an employee. Once they have been input the user will have to select the 'OK' button, or they can select the 'Cancel button and the programme will shut down.

Once the user has input the correct username and password, then selected 'OK' the login form will close and the user will be greeted with the main menu form to the programme.

If the system does not recognise the username or password then a message box prompt will appear saying "Incorrect username or password".

From the main menu the user will be able to access various forms, reports and queries that are contained within the database system.

Login form system in visual basic code:

```
Private Sub LoginButton_Click()
```

```
If UsernameText = "G.Jones" And PasswordText =  
"helloworld42" Then
```

```
DoCmd.Close
```

```
DoCmd.OpenForm ("Main Menu")
```

```
Else
```

```
MsgBox "Please try again"
```

```
End If
```

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Design

End Sub

Queries

Type of Query	Tables and Fields Included	Criteria	Fields Returned	Justification
Single Query	Tables: Customer Fields: Customer Address line 1, Customer Address line 2.	“Customer address line 2”=[Choose a location]	N/A	The window cleaner wants to find out the number of customers in a given location, e.g. Dinas Powys alone, in order to find out if more advertisement is needed in that area.
Single Query (Parameter Query)	Tables: Order Fields: Order ID*, Order Date, Order Time, Order Cost, Order Total Cost.	“Order Date”=[What is the order Date?]	N/A	The window cleaner wants to find out how many orders were placed on a specific date, (e.g. the 22nd of February) so that he knows the number of jobs he will be doing on a particular day.
Multiple Query	Tables: Order, Customer Fields: Customer City, Customer	“Order Date, Customer Address line 2”=[Please enter the order date and the customer’s address]	N/A	The window cleaner wants to find the quantity of orders are in Cardiff and Barry on a particular

	address line 1, customer address line 2, Order Date			date, so that staff can be distributed to the various locations for that day of work.
Multiple Query	Tables: Customer, Order Fields: Customer first name, Customer surname, Order date	"Customer ID, Order Date"=[Please enter Customer ID and Order Date]	N/A	The window cleaner wants to see what customer has placed an order on a particular date, so that he knows who he will be working for on a particular day.
Parameter Query	Tables: Customer	N/A	Customer ID*, Customer Title, Customer First, Name, Customer Surname, Customer Address Line 1, Customer Address Line 2, Customer City, Customer Postcode, Customer Contact Number, Customer Date of Birth.	A customer has called the company wishing to change their details. A user must swiftly locate the customer's record without sifting through the entire database.
Action Query	Tables:	[Please enter	N/A	A customer

	Service Order	Window Quantity] = 29		has called the company wishing to append their service order – changing their window quantity from 30 to 29.
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IT4 Implementation



Implementation

Tables and Links

1. Customer Table:

Customer Table Fields:

Field Name	Data Type	Description (Optional)
ID	AutoNumber	
First Name	Short Text	
Surname	Short Text	
Username	Short Text	
Password	Short Text	

Field Properties - ID:

Field Size	Long Integer
New Values	Increment
Format	
Caption	
Indexed	Yes (No Duplicates)
Text Align	General

A field name can be up to 64 characters long, including spaces. Press F1 for help on field names.

2. Employee Table:

Employee Table Fields:

Field Name	Data Type	Description (Optional)
Customer_ID	AutoNumber	Automatically produces a number which will uniquely identify the customer.
Customer Title	Short Text	Allows the user to select their title.
Customer First Name	Short Text	Allows the user to input customer's first name.
Customer Surname	Short Text	Allows the user to input customer's surname.
Customer Address Line 1	Short Text	Allows the user to input the first line of customer's address.
Customer Address Line 2	Short Text	Allows the user to input the second line of customer's address.
Customer City	Short Text	Allows the user to input customer's city.
Customer Postcode	Short Text	Allows the user to input customer's postcode.
Customer Contact Number	Short Text	Allows the user to input customer's contact number.
Customer Date of Birth	Date/Time	Allows the user to input customer's date of birth.

Field Properties - Customer_ID:

Field Size	Long Integer
New Values	Increment
Format	
Caption	
Indexed	Yes (No Duplicates)
Text Align	General

A field name can be up to 64 characters long, including spaces. Press F1 for help on field names.

3. Order Table:

4. Window Table:

Implementation

The screenshot shows the Microsoft Access Database Design View for the 'Window' table. The table has three fields: 'Window ID' (AutoNumber, Primary Key), 'Window Type' (Short Text), and 'Window Quantity' (Number). The 'Window Type' field is described as allowing the user to input type of the customer's windows. The 'Window Quantity' field is described as allowing the user to input customer's number of windows.

Field Name	Data Type	Description (Optional)
Window ID	AutoNumber	Automatically produces a number which will uniquely identify the service.
Window Type	Short Text	Allows the user to input type of the customer's windows.
Window Quantity	Number	Allows the user to select whether the customer's windows are domestic or commercial.

5. Window Order Table (Link Table):

The screenshot shows the Microsoft Access Database Design View for the 'Window Order' table. The table has six fields: 'Window Order ID' (AutoNumber, Primary Key), 'Order ID' (Number), 'Window ID' (Number), 'Window Type' (Short Text), 'Service Cost Per Window' (Currency), and 'Window Quantity' (Number). The 'Window Order ID' field is described as automatically producing a number which will uniquely identify the order details. The 'Window ID' field is described as automatically producing a number which will uniquely identify the service. The 'Window Type' field is described as allowing the user to input the type of the customer's windows. The 'Service Cost Per Window' field is described as automatically calculating the cost of the service per window selected. The 'Window Quantity' field is described as allowing the user to input customer's number of windows. The 'Cost Per Window Order' field is described as automatically calculating the cost per window in the customer's order.

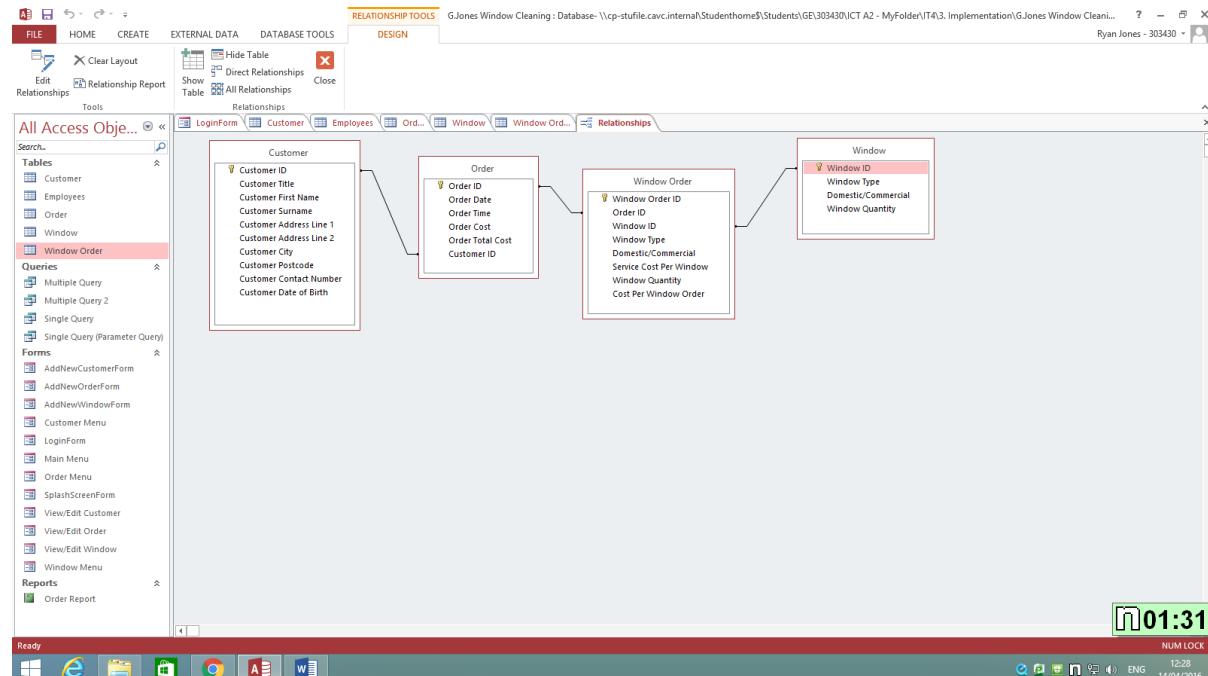
Field Name	Data Type	Description (Optional)
Window Order ID	AutoNumber	Automatically produces a number which will uniquely identify the order details.
Order ID	Number	Automatically produces a number which will uniquely identify the order.
Window ID	Number	Automatically produces a number which will uniquely identify the service.
Window Type	Short Text	Allows the user to input the type of the customer's windows.
Service Cost Per Window	Currency	Allows the user to select whether the customer's windows are domestic or commercial.
Window Quantity	Number	Allows the user to input customer's number of windows.
Cost Per Window Order	Currency	Automatically calculates the cost per window in the customer's order.

Table

Links:

Implementation

This print screen is showing us the relationship between the tables and how the primary and foreign keys are related.



Validation Techniques

1. Presence Check (added to all fields):

Before

s

1. Format Check (added to the postcode field in both the customer table and order table)

The screenshot shows the 'Customer' table in 'Design View'. The 'Customer Postcode' field has a validation rule set to 'Required'. A red arrow points to the 'Required' checkbox in the 'Field Properties' pane.

Field	Type	Description
Customer ID	AutoNumber	Automatically produces a number which will uniquely identify the customer.
Customer Title	Short Text	Allows the user to select their title.
Customer Surname	Short Text	Allows the user to input customer's surname.
Customer Address Line 1	Short Text	Allows the user to input the first line of customer's address.
Customer Address Line 2	Short Text	Allows the user to input the second line of customer's address.
Customer City	Short Text	Allows the user to input customer's city.
Customer Postcode	Short Text	Allows the user to input customer's postcode.
Customer Contact Number	Short Text	Allows the user to input customer's contact number.
Customer Date of Birth	Date/Time	Allows the user to input customer's date of birth.

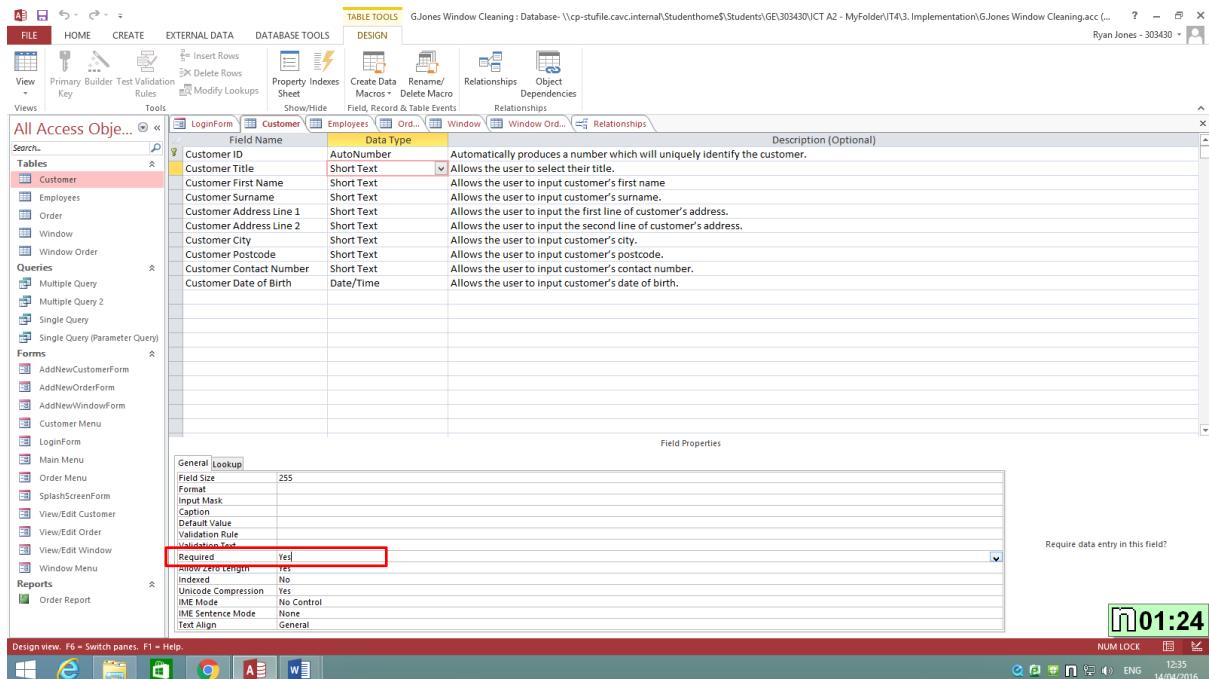
Field Properties for Customer Postcode:

- General: Field Size: 255, Input Mask: None, Caption: Postcode, Default Value: , Validation Rule: Required, Validation Text:
- Format:
- Text:
- Index:
- Unicode Compression: Yes, IME Mode: No Control, IME Sentence Mode: None, Text Align: General

3

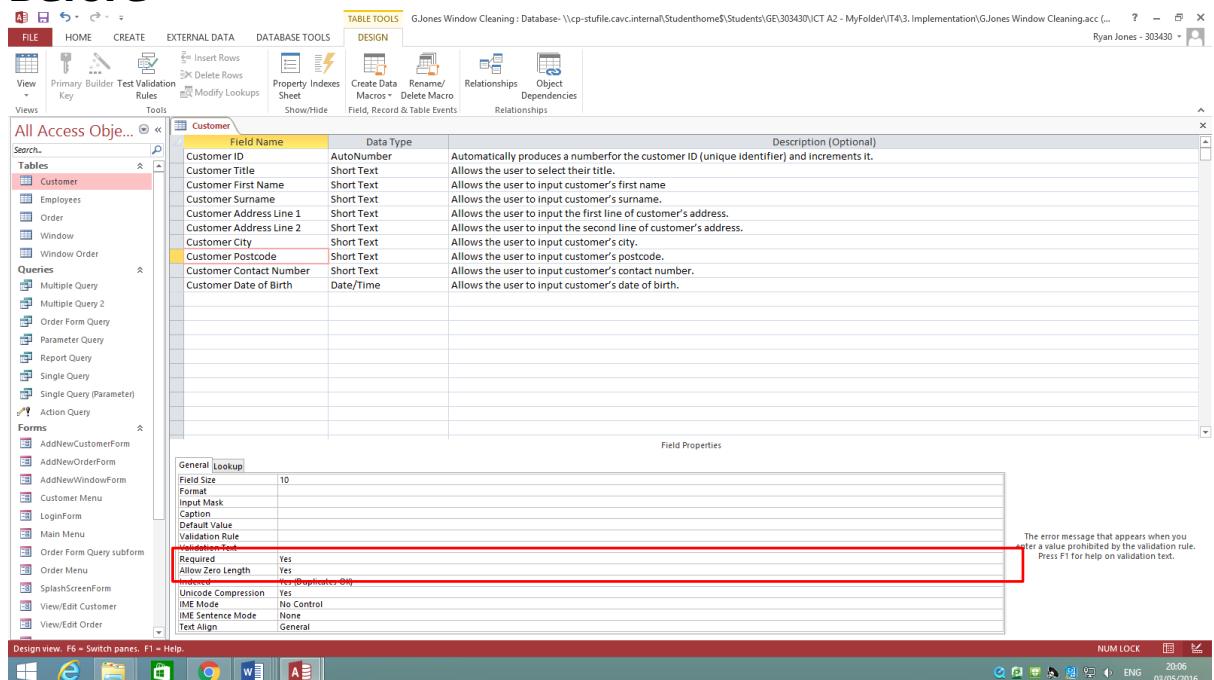
Implementation

After



2. Format Check (used for the date of birth field in the customer table and the order table):

Before



Implementation

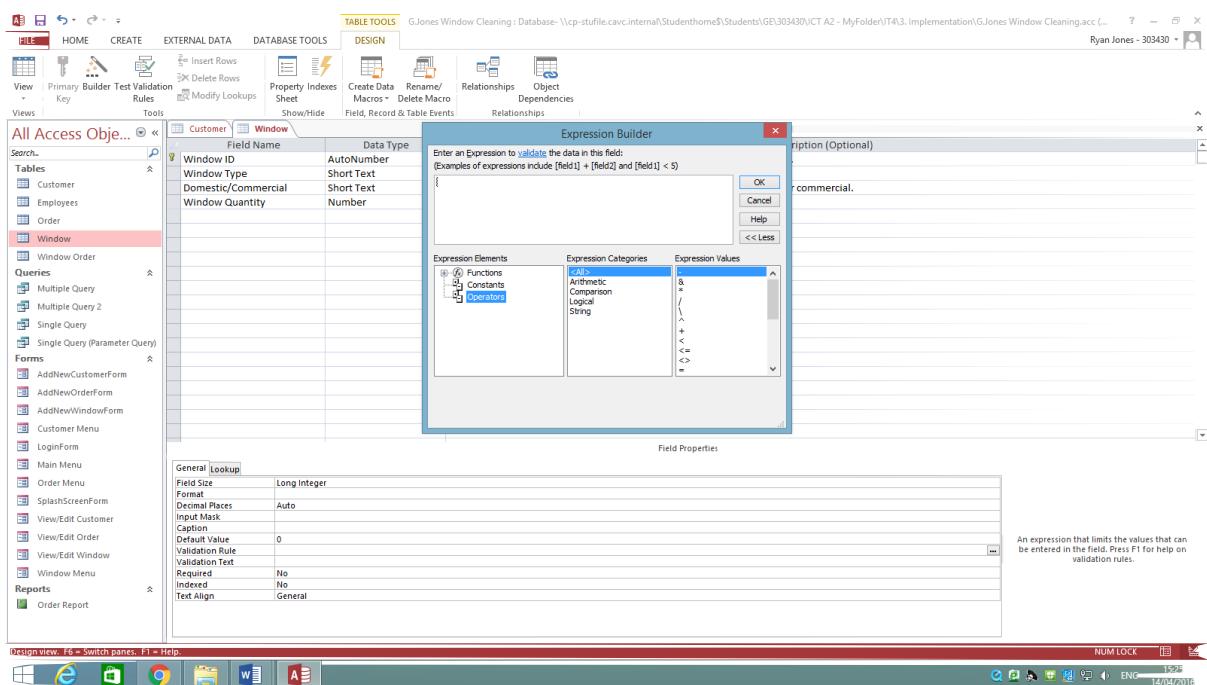
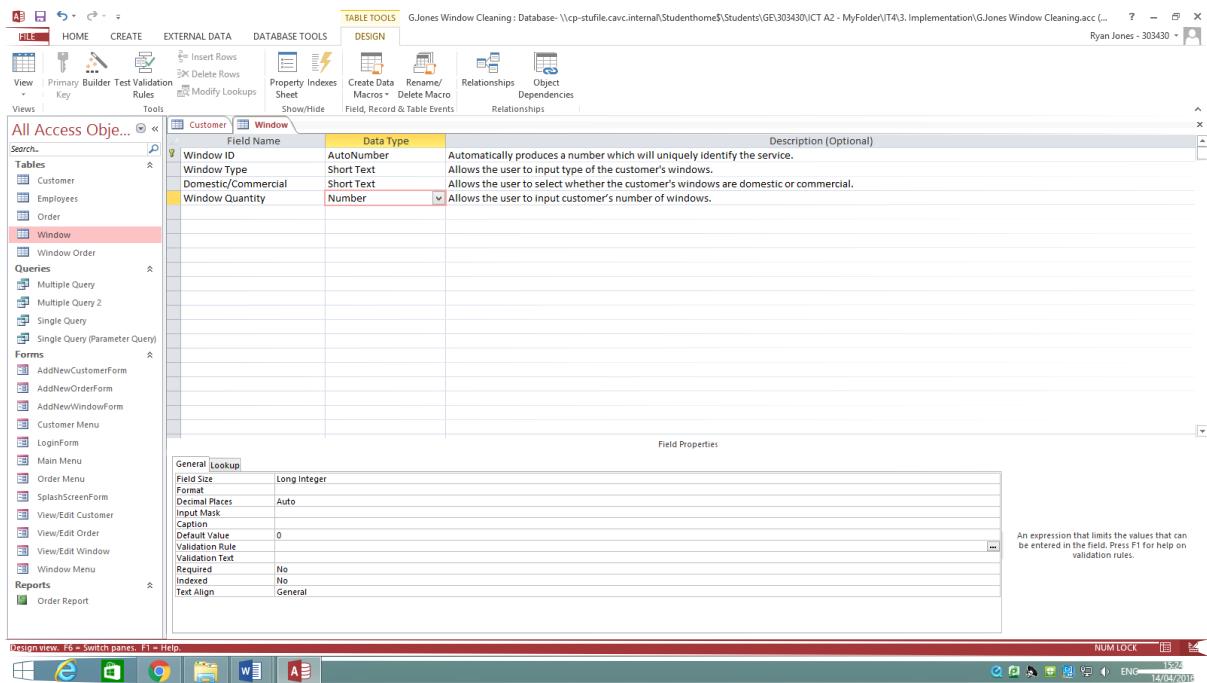
After

The screenshot shows the Microsoft Access 'Customer' table in 'Design' view. The 'Customer' table is selected in the object list on the left. The 'Customer' field is highlighted in yellow. A red box highlights the 'Validation Rule' field in the 'Field Properties' pane, which contains the expression: `Not Like "[!0-9a-z]*"`. A red callout points to this validation rule with the text 'Not Like "[!0-9a-z]*"'.

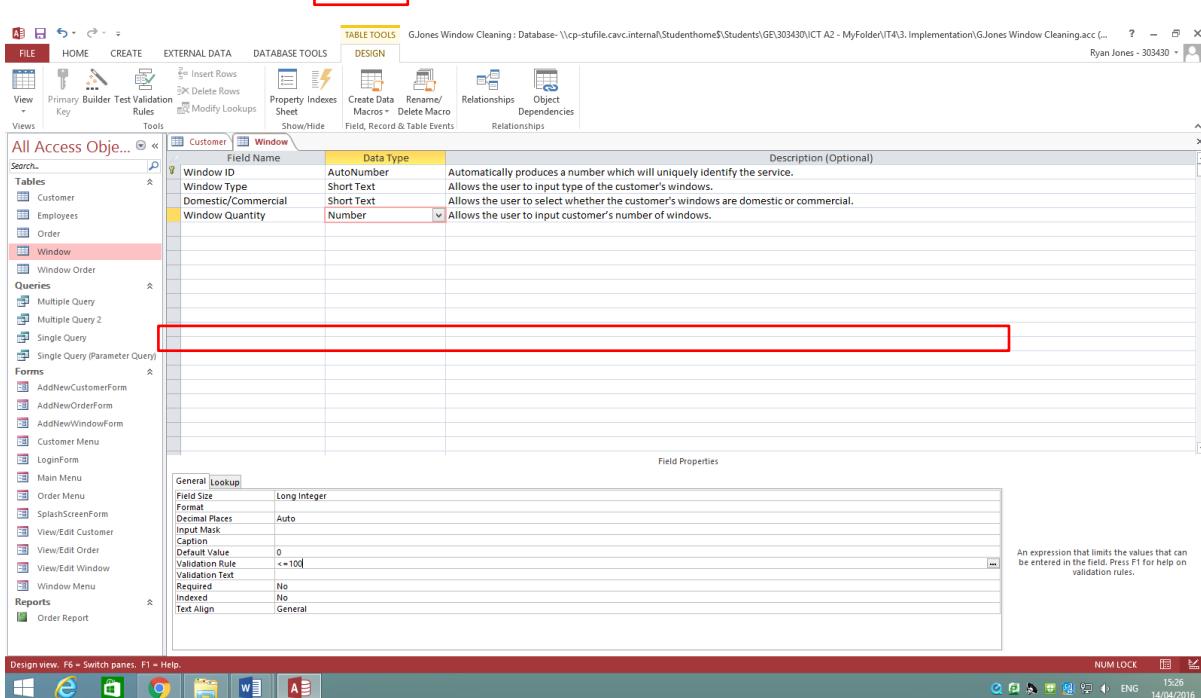
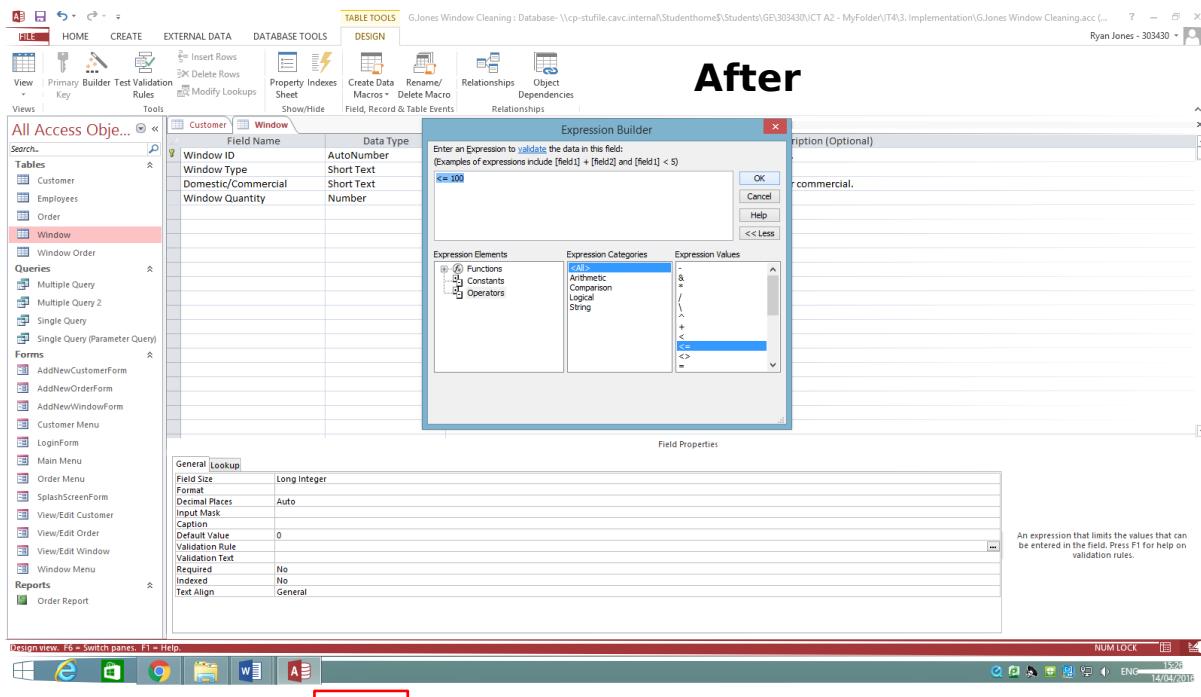
Field Name	Data Type	Description (Optional)
Customer ID	AutoNumber	Automatically produces a number for the customer ID (unique identifier) and increments it.
Customer Title	Short Text	Allows the user to select their title.
Customer First Name	Short Text	Allows the user to input customer's first name.
Customer Surname	Short Text	Allows the user to input customer's surname.
Customer Address Line 1	Short Text	Allows the user to input the first line of customer's address.
Customer Address Line 2	Short Text	Allows the user to input the second line of customer's address.
Customer City	Short Text	Allows the user to input customer's city.
Customer Postcode	Short Text	Allows the user to input customer's postcode.
Customer Contact Number	Short Text	Allows the user to input customer's contact number.
Customer Date of Birth	Date/Time	Allows the user to input customer's date of birth.

3. Range Check (this will be on the window quantity field, in the window table): **Before**

Implementation



Implementation



Implementation

Calculated field in form

1. This calculation is used to find the cost before VAT, the VAT cost and the total cost. The calculation is made

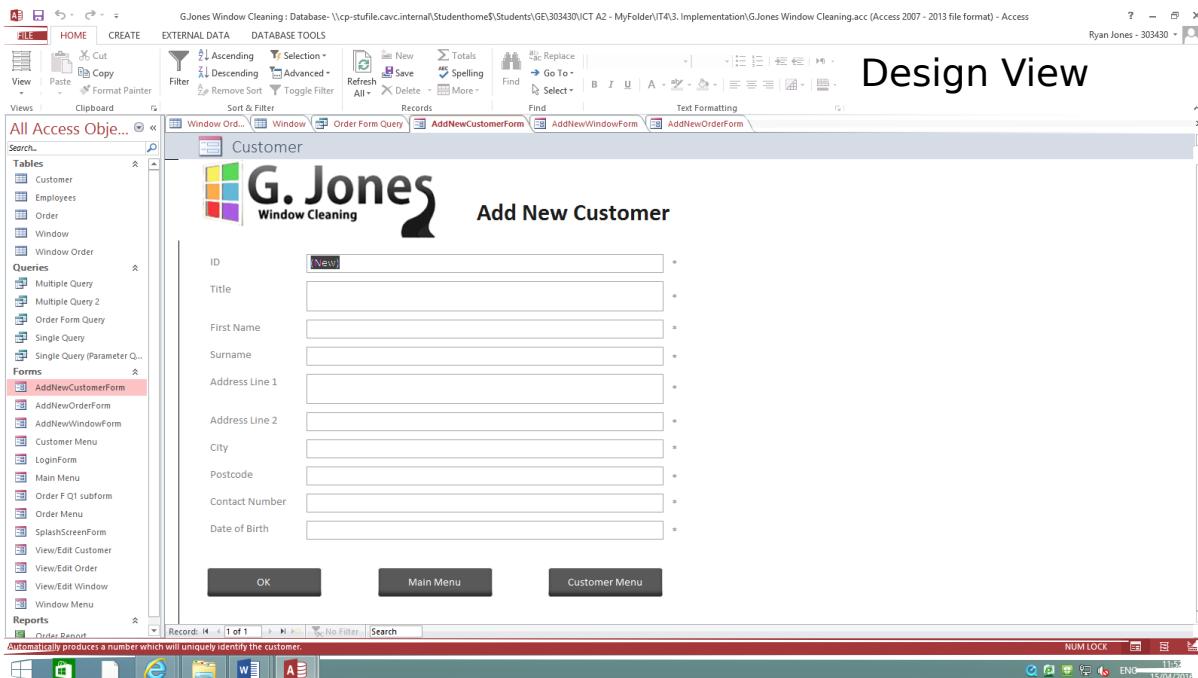
using the

expression builder.

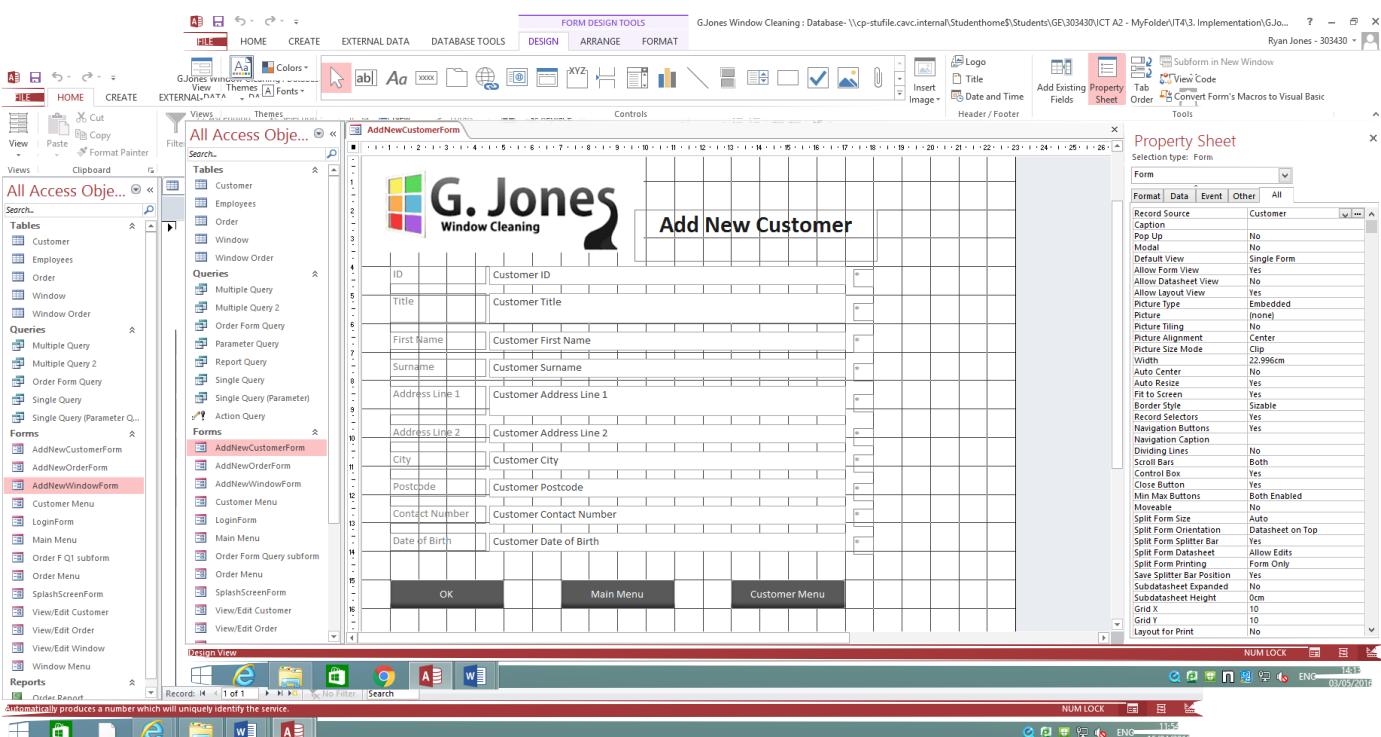
Two Forms

1. Add New Customer

Implementation

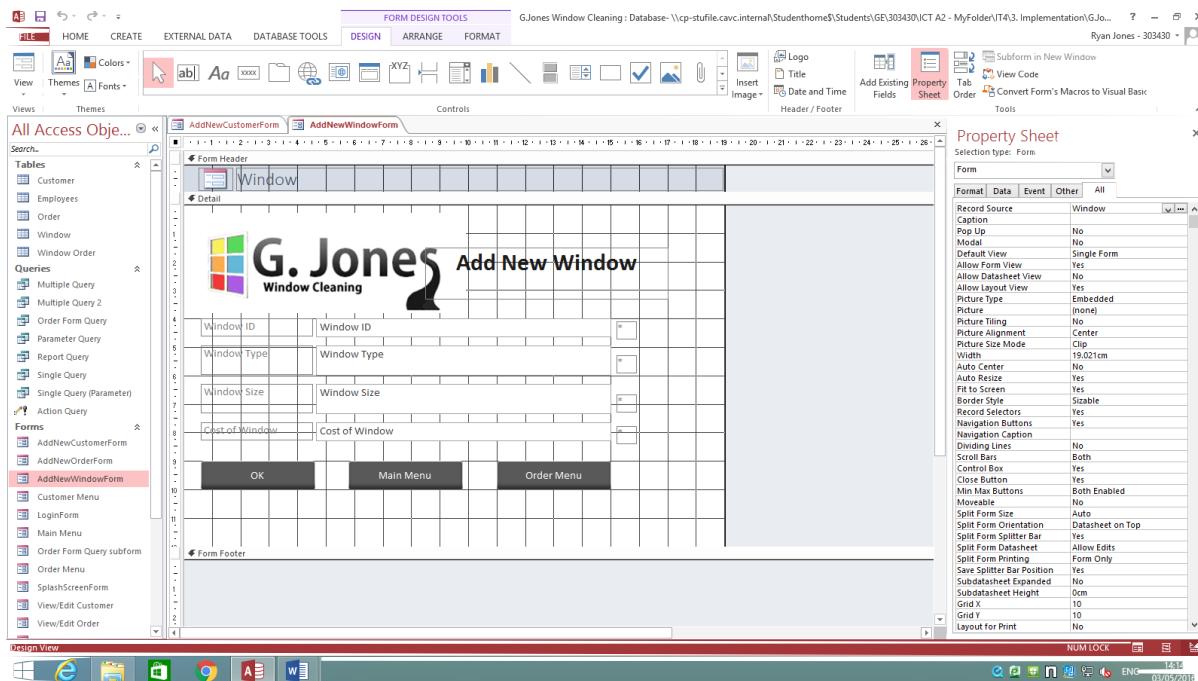


2. Add New Window



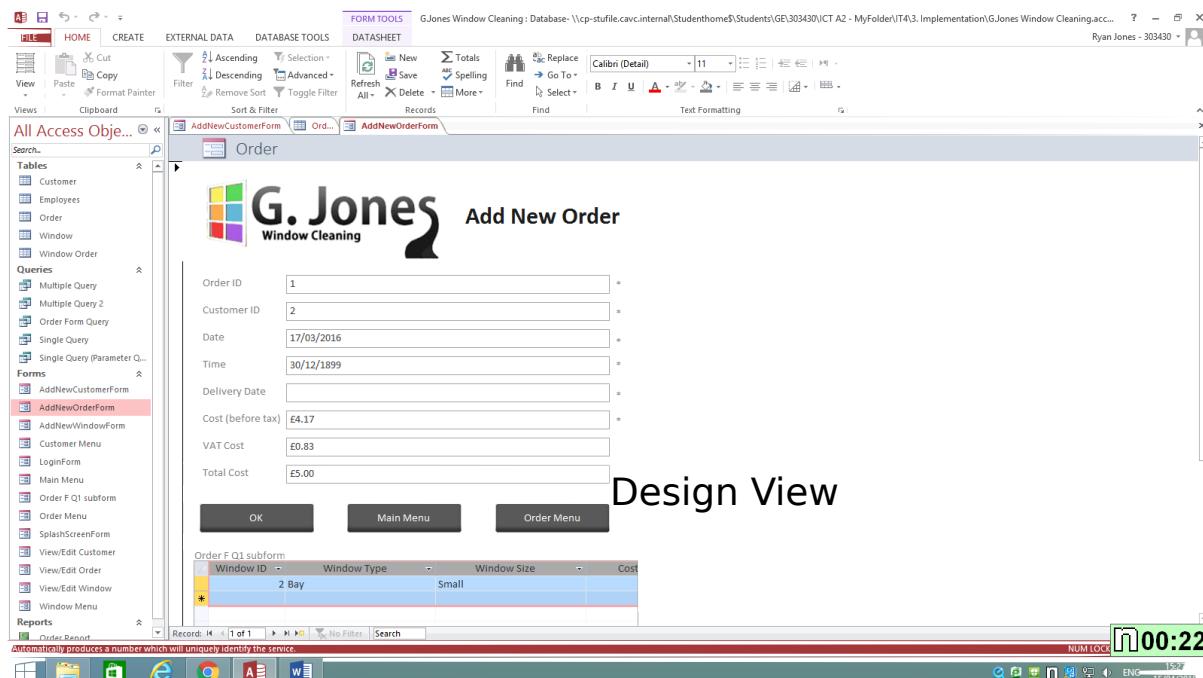
Design view

Implementation

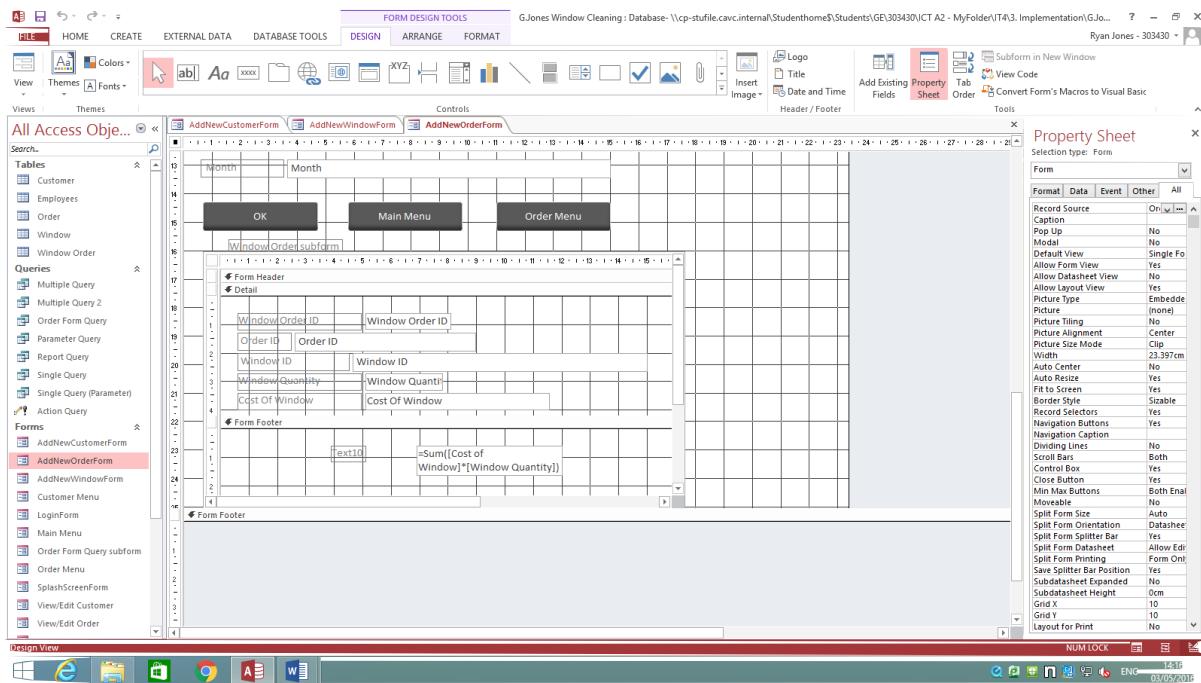


Form with Sub Form

1. Add New Order



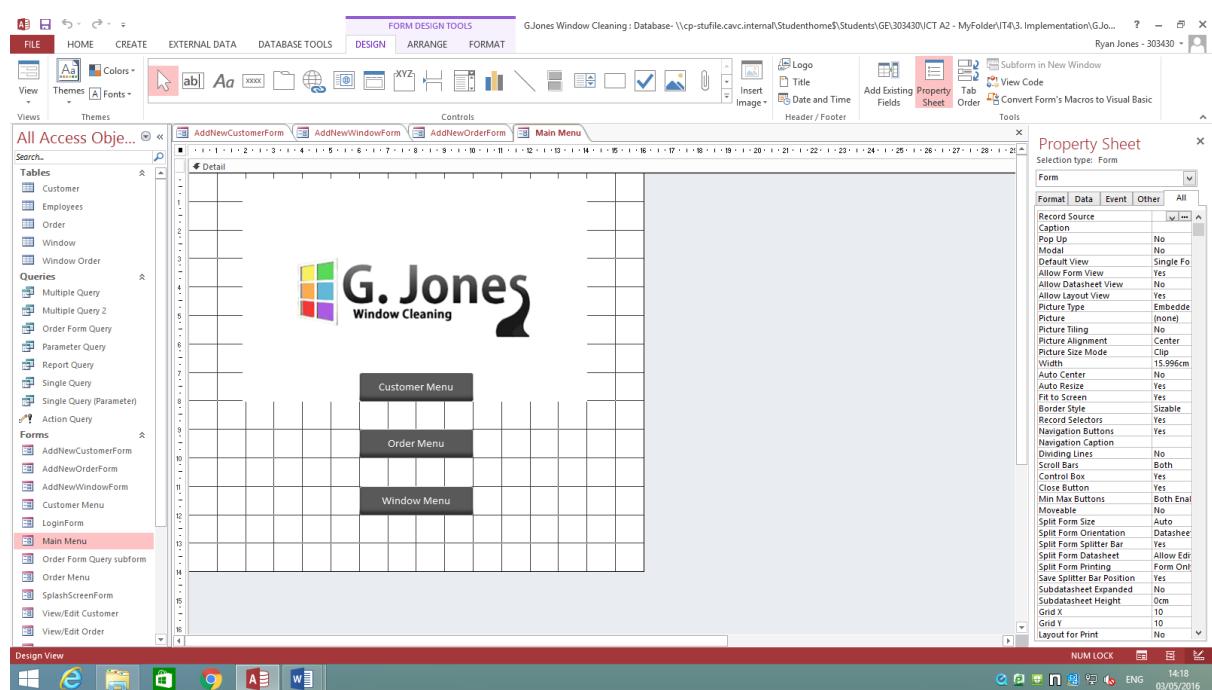
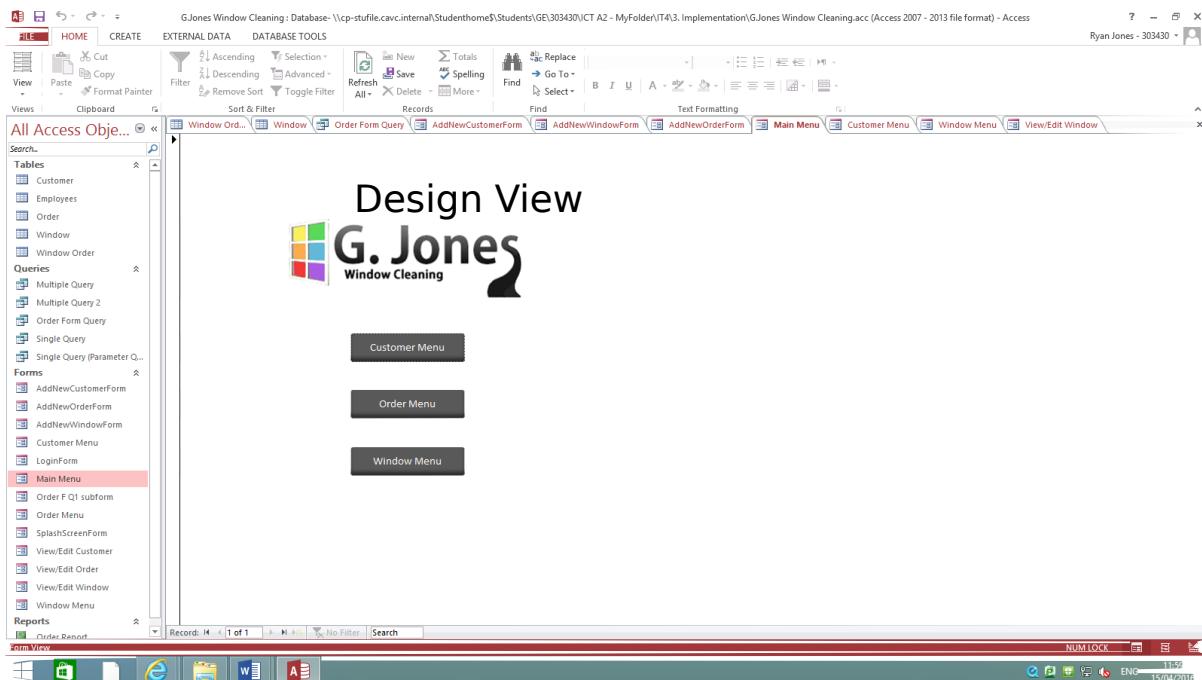
Implementation



User Friendly Interface

1. Main Menu Form (menu driven interface)

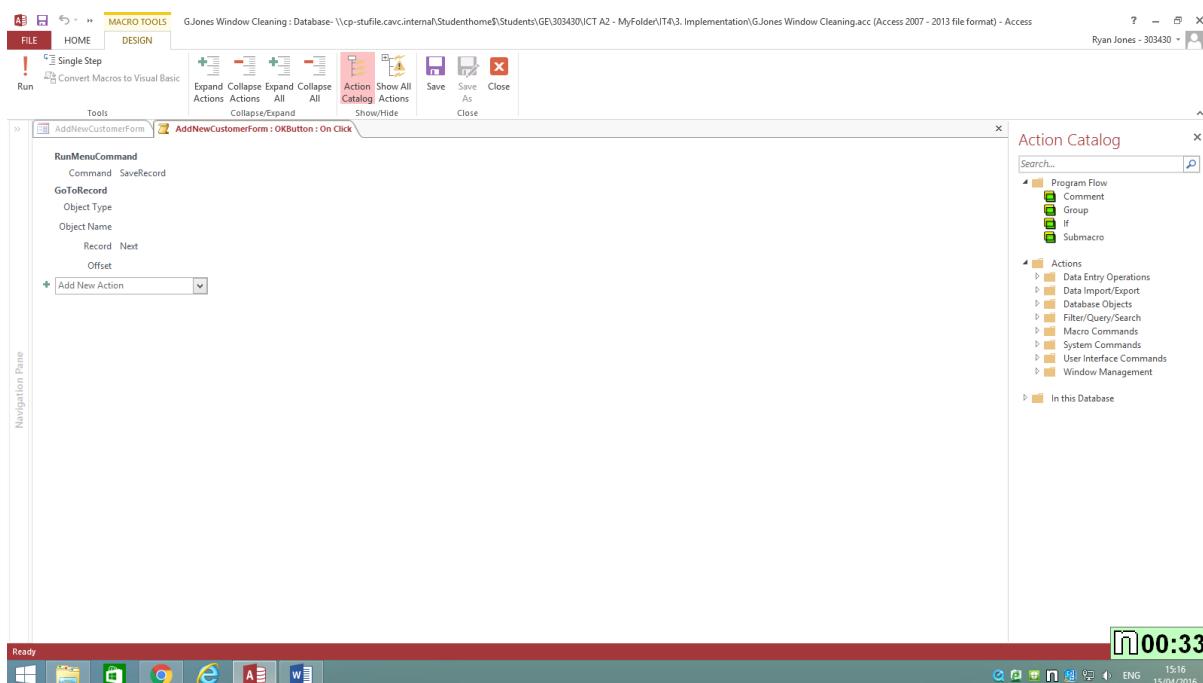
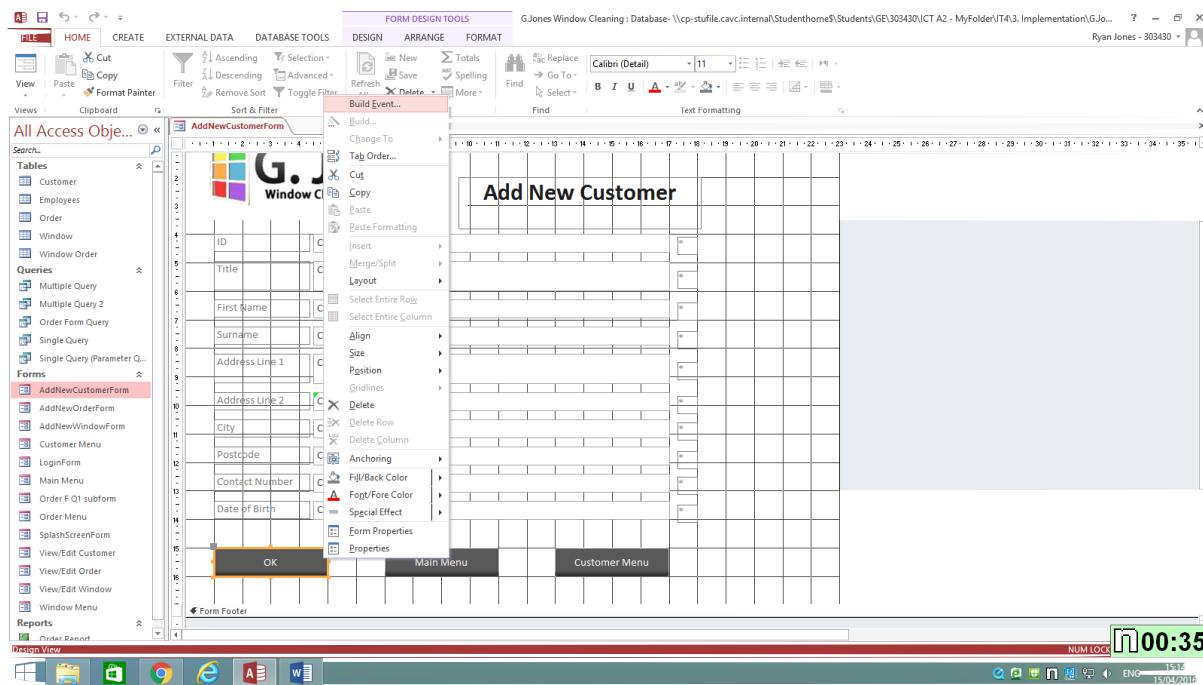
Implementation



Macros

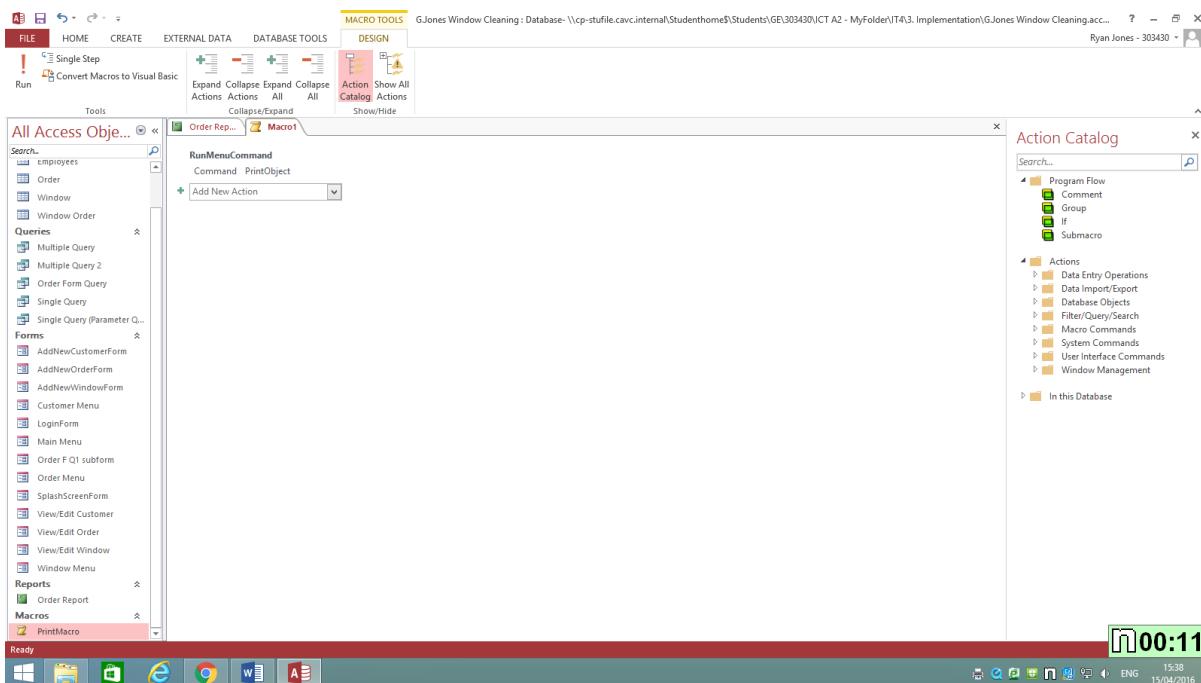
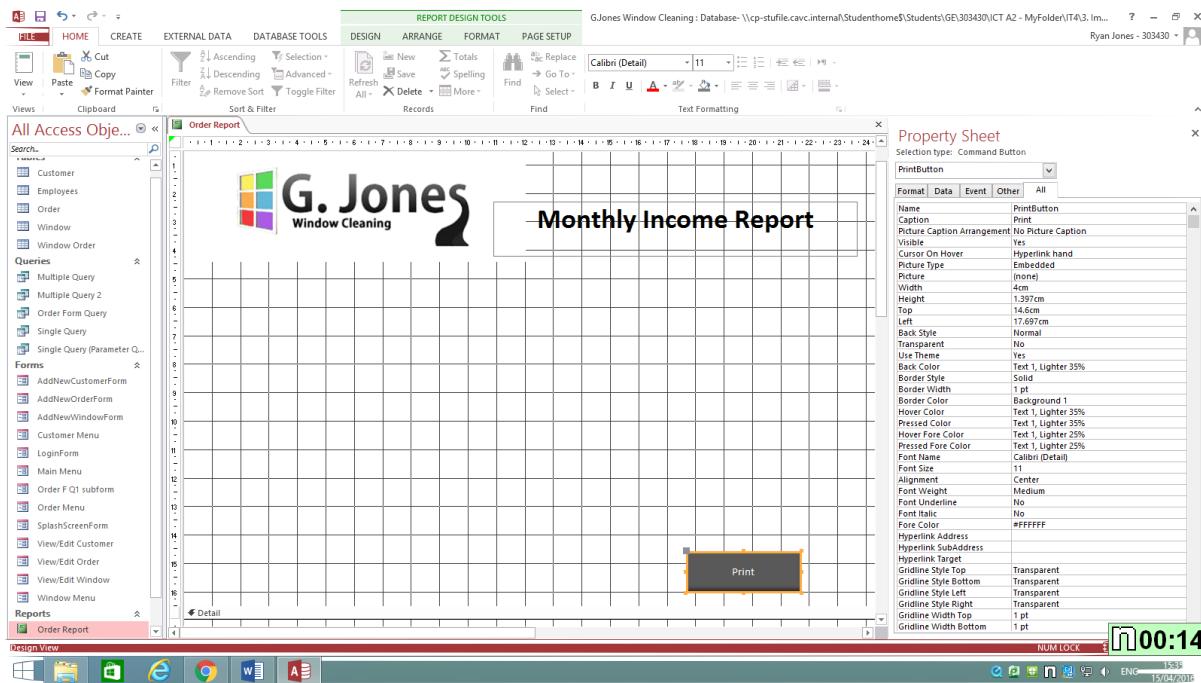
1. OK button to add a new customer record (this saves the record and updates the customer table).

Implementation

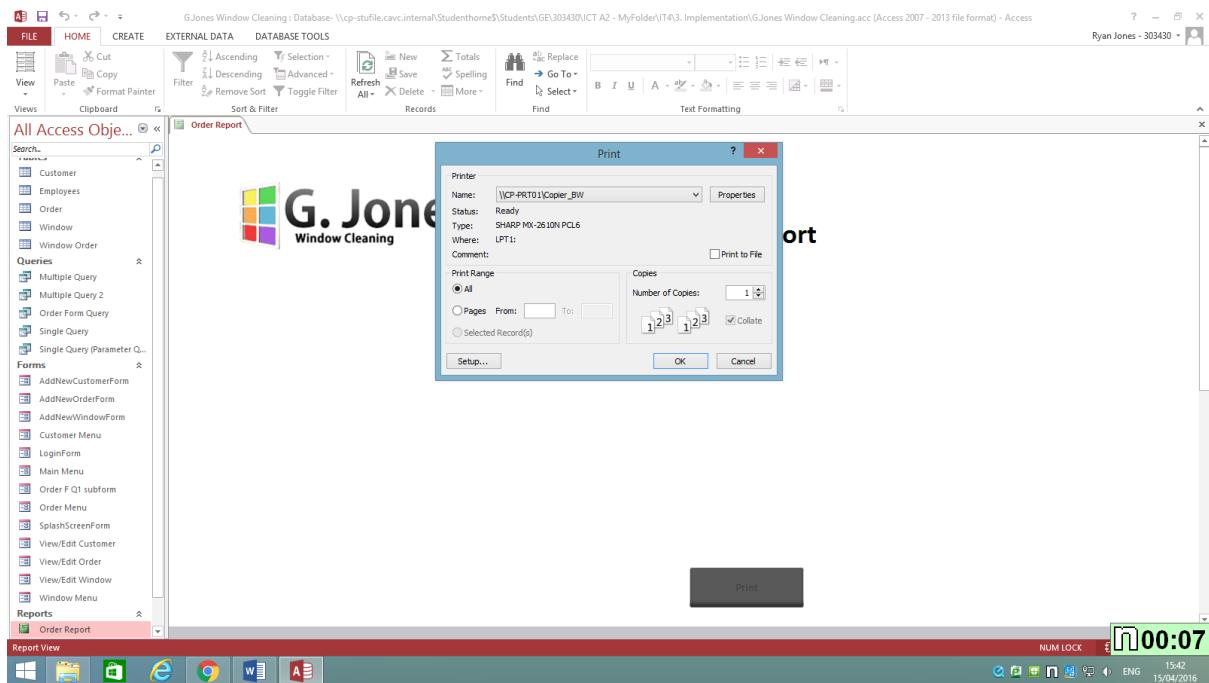


2. Print macro on the order report, so that when I click the print button it will print out the report.

Implementation



Implementation



Implementation

Queries

1. Single table query.

The screenshot shows the Microsoft Access 2013 interface. The top ribbon is visible with tabs like FILE, HOME, CREATE, EXTERNAL DATA, and DATABASE TOOLS. The DESIGN tab is selected. The main area shows a query named 'Window' with the following structure:

Field	Table	Sort	Show	Criteria
Window Size	Window		<input checked="" type="checkbox"/>	'Small'

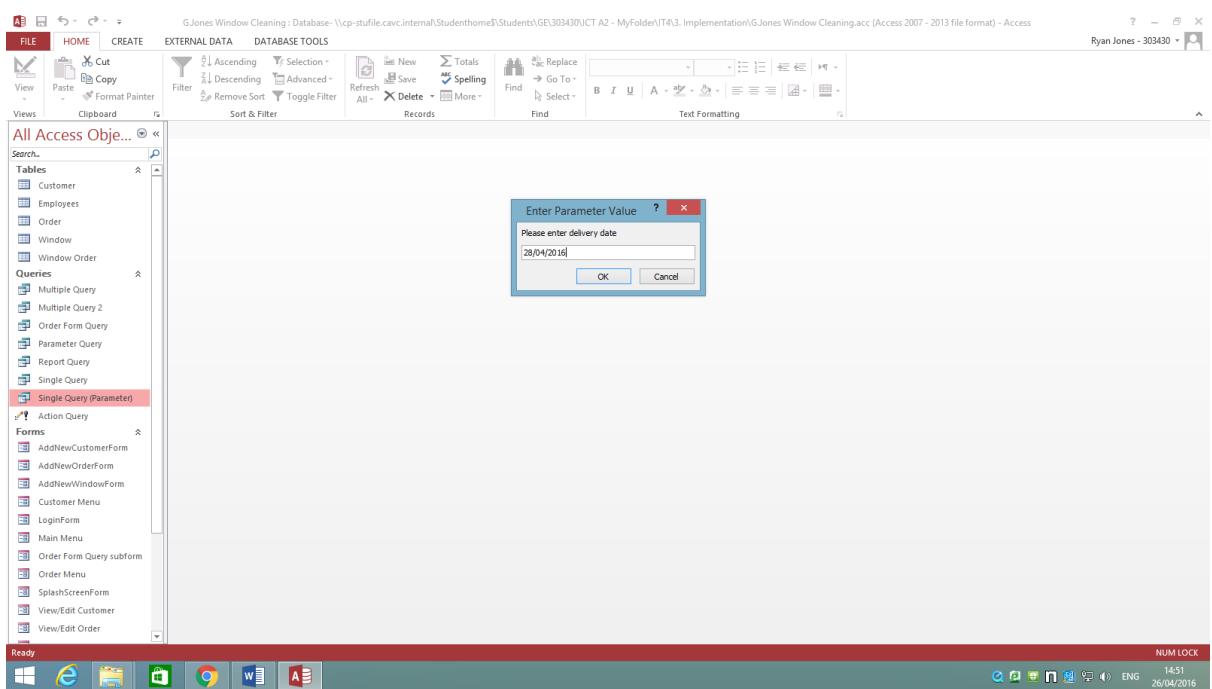
The results pane displays the following data:

Window ID	Window Type	Window Size	Cost Of Window	Stock
1	2 Door	Small	£15.00	20
2	5 Standar	Small	£20.00	30
*	(New)		£0.00	0

A message bar at the bottom states: "Allows user to input the size of the window, ranging from 'small', 'medium' and 'large'".

Implementation

2. Single Table (Parameter) Query.



Implementation

Screenshot of Microsoft Access 2013 showing a query results grid and the query builder interface.

Query Results Grid:

Order ID	Order Date	Order Time	Order Cost	Order Total Cost	Customer ID	Sales Person	Delivery Date
10	27/04/2016	11:30	£50.00	£60.00	18	Sarah Hills	28/04/2016
20	22/04/2016	13:00	£37.50	£45.00	19	John Jenkins	28/04/2016
*	(New)		£0.00	£0.00	0		

Query Builder (DESIGN View):

The query is defined as follows:

- Query Type:** Single Query (Parameter)
- Tables:** Order
- Fields:**
 - Order ID
 - Customer ID
 - Order Date
 - Order Time
 - Order Cost
 - Order Total Cost
 - VAT Cost
 - Delivery Date
 - Sales Person
 - Month
- Sort:**
 - Order ID
 - Order Date
 - Order Time
 - Order Cost
 - Order Total Cost
 - Customer ID
 - Sales Person
 - Delivery Date
- Criteria:** Please enter delivery

Screenshot of Microsoft Access 2013 showing the query builder interface in DESIGN view.

Query Builder (DESIGN View):

The query is defined as follows:

- Query Type:** Single Query (Parameter)
- Tables:** Order
- Fields:**
 - Order ID
 - Customer ID
 - Order Date
 - Order Time
 - Order Cost
 - Order Total Cost
 - VAT Cost
 - Delivery Date
 - Sales Person
 - Month
- Sort:**
 - Order ID
 - Order Date
 - Order Time
 - Order Cost
 - Order Total Cost
 - Customer ID
 - Sales Person
 - Delivery Date
- Criteria:** Please enter delivery

Implementation

3. Multiple Query

The screenshot shows the Microsoft Access 2013 interface in 'DESIGN' mode. A 'Multiple Query' is being created, joining the 'Window' and 'Order' tables. The 'Customer' table is selected in the 'Tables' pane. The 'Customer ID' field is selected in both the 'Customer' table's list and the 'Order' table's list. The 'Customer' table is highlighted in yellow.

The screenshot shows the Microsoft Access 2013 interface in 'HOME' mode, displaying the results of a 'Multiple Query'. The results are a list of doors with their details: Window Type, Order Date, Window Size, Cost Of Window, and Customer ID. The results are sorted by Window Type and Order Date. The 'Customer' table is selected in the 'Tables' pane. The 'Customer ID' field is selected in the 'Customer' table's list. The 'Customer' table is highlighted in yellow.

Implementation

4. Multiple Query 2

The screenshot shows two windows of Microsoft Access running side-by-side.

Left Window (Design View):

- Query Type:** DESIGN
- Tables:** Customer, Order, Window Order
- Customer Table Fields:** Customer ID, Customer Title, Customer First I, Customer Surname, Customer Address
- Order Table Fields:** Order ID, Customer ID, Order Date, Order Time, Order Cost
- Window Order Table Fields:** Window Order ID, Order ID, Window ID, Window Quantity
- Relationships:** Customer is linked to Order via Customer ID. Order is linked to Window Order via Order ID.
- Query Results Grid:**

Customer ID	Customer Surname	Order ID	Window ID	Window Quantity	Order Total Cost	Customer Contact Number

Right Window (Results View):

- Query Name:** Multiple Query 2
- Table:** Customer
- Fields:** Customer ID, Customer Surname, Order ID, Window ID, Window Quantity, Order Total Cost, Customer Contact Number
- Data:**

Customer ID	Customer Surname	Order ID	Window ID	Window Quantity	Order Total Cost	Customer Contact Number
13	Little	13	2	3	£60.00	01726384756
21	Watts	17	3	5	£160.00	02736482777
18	Gleeson	18	2	4	£60.00	02837465844
19	Wilson	20	2	4	£45.00	01746283753
18	Gleeson	22	2	4	£60.00	02837465844
18	Gleeson	22	2	3	£60.00	02837465844
18	Gleeson	18	3	5	£60.00	02837465844

5. Parameter Query

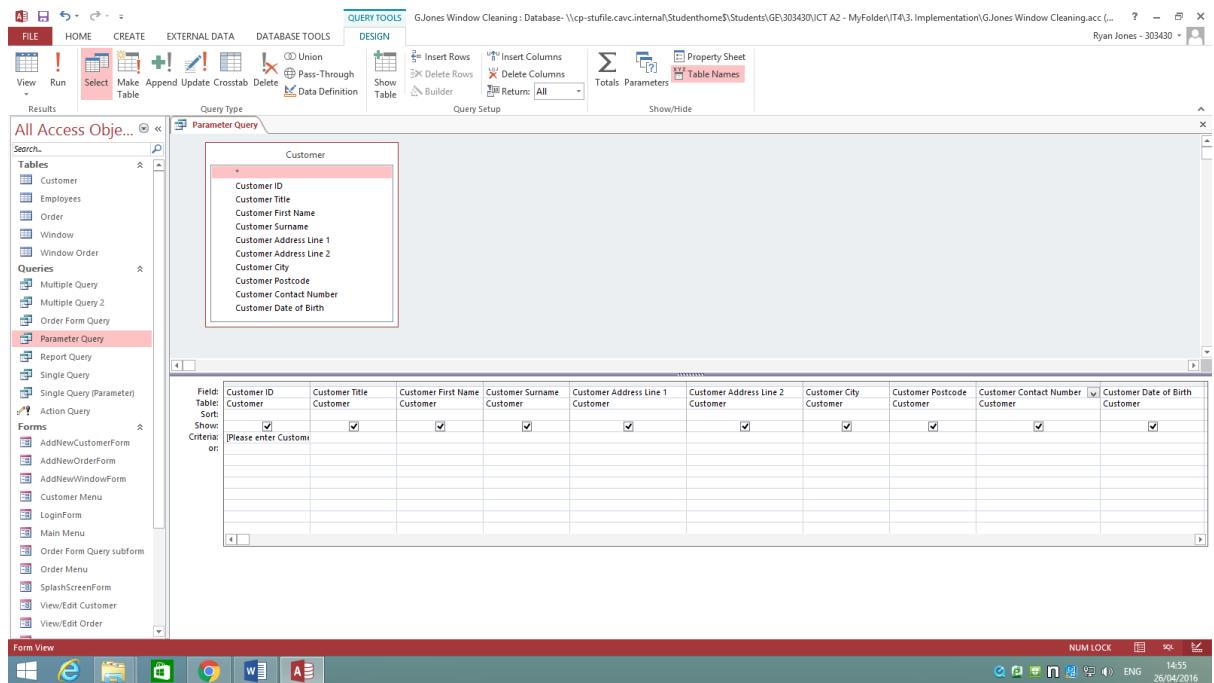
The screenshot shows two instances of Microsoft Access running side-by-side.

Top Window: The title bar reads "G.Jones Window Cleaning : Database- \\cp-stuffle.cavc.internal\Studenthome\\$Students\GE\303430\ICT A2 - MyFolder\IT4\3. Implementation\G.Jones Window Cleaning.acc (Access 2007 - 2013 file format) - Access". The ribbon tabs are FILE, HOME, and CREATE. The left pane shows the "All Access Objekte" navigation pane with "Parameter Query" selected. A modal dialog titled "Enter Parameter Value" is open, asking "Please enter Customer ID" with the value "1" entered. The main pane shows a table with columns: Customer ID, Customer Title, Customer First Name, Customer Surname, Customer Address Line 1, Customer Address Line 2, Customer City, Customer Postcode, and Customer Contact Number.

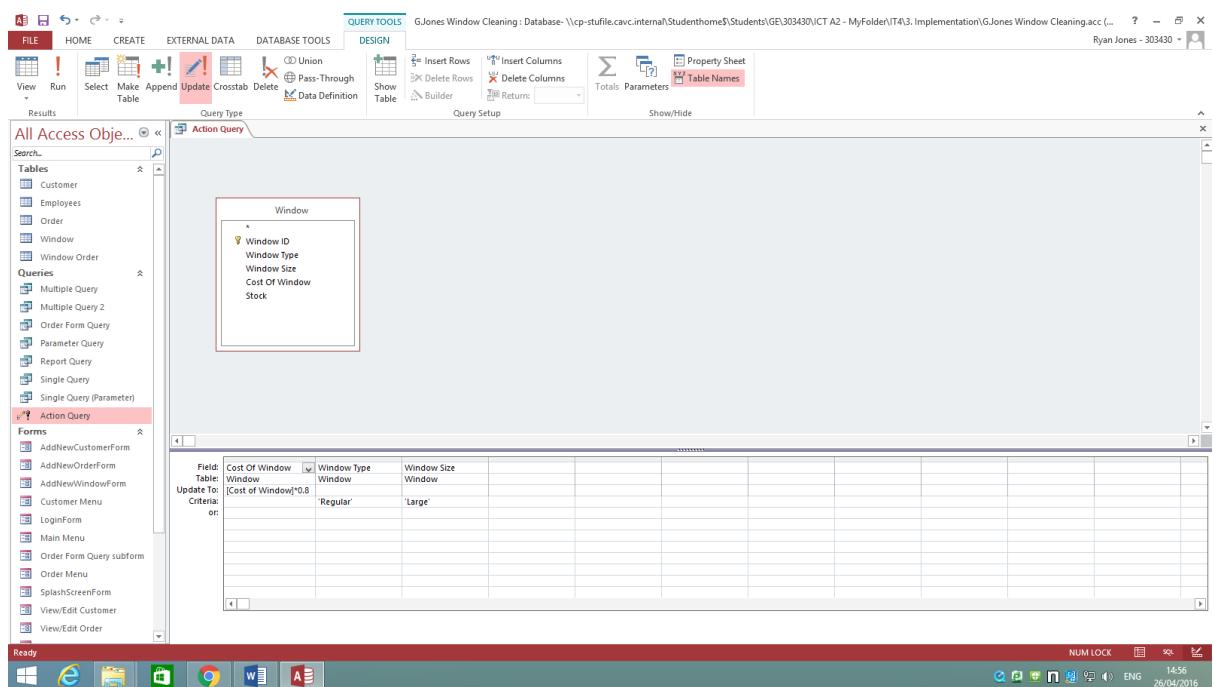
Customer ID	Customer Title	Customer First Name	Customer Surname	Customer Address Line 1	Customer Address Line 2	Customer City	Customer Postcode	Customer Contact Number
(New)	Miss	Laura	Wilson	88 Park Road	Cardiff	Cardiff	CF88 9DX	01746283753

Bottom Window: The title bar is identical. The ribbon tabs are FILE, HOME, and DATABASE TOOLS. The left pane shows the "All Access Objekte" navigation pane with "Parameter Query" selected. The main pane shows the same table as the top window, but the "Customer ID" column is highlighted in yellow. A status bar at the bottom of the screen says "Automatically produces a number for the customer ID (unique identifier) and increments it."

Implementation



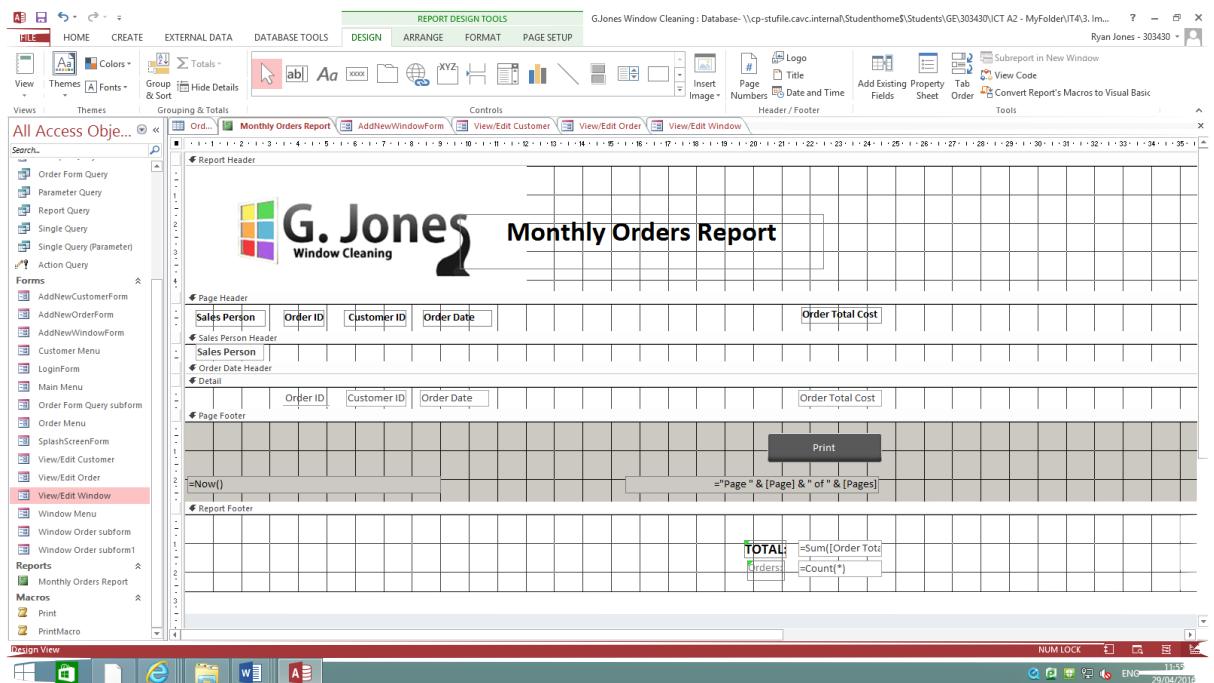
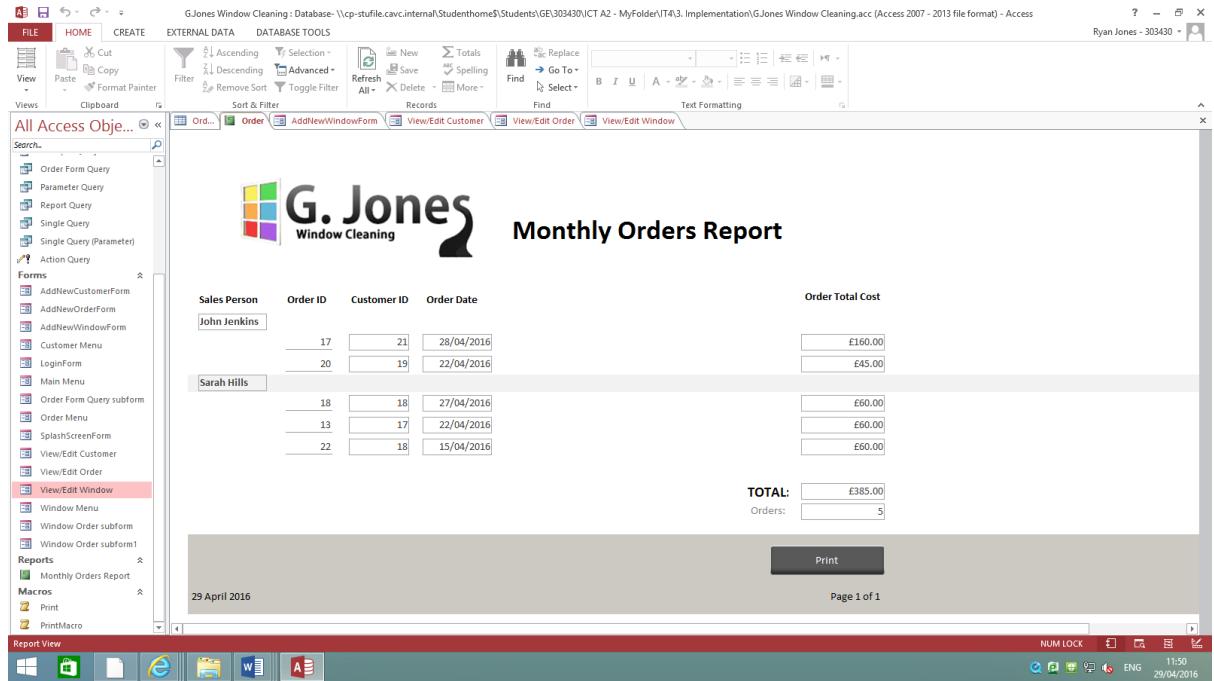
6. Action Query



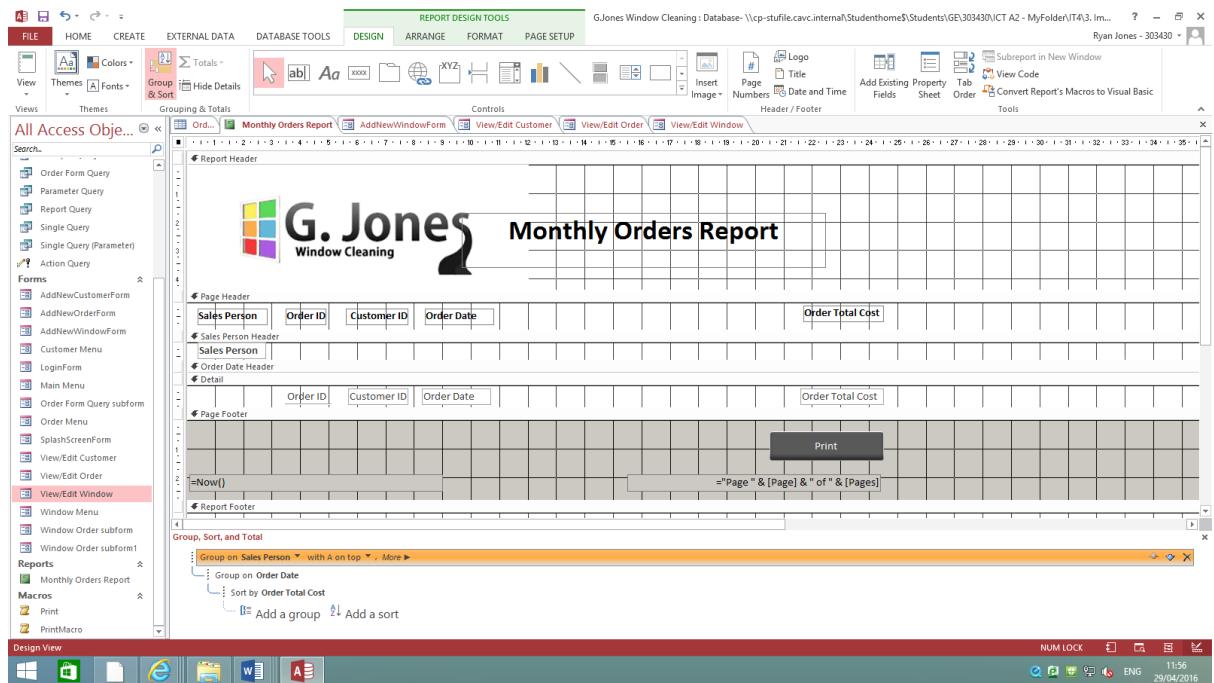
Implementation

Report

1. Monthly Orders Report

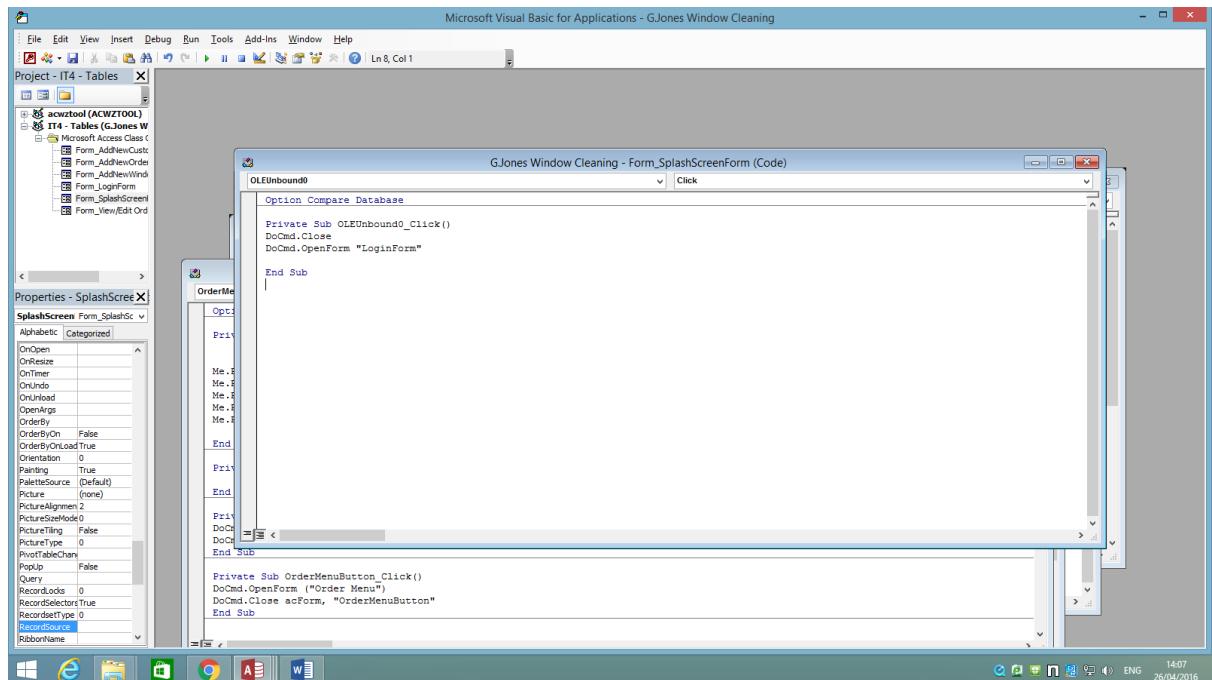


Implementation



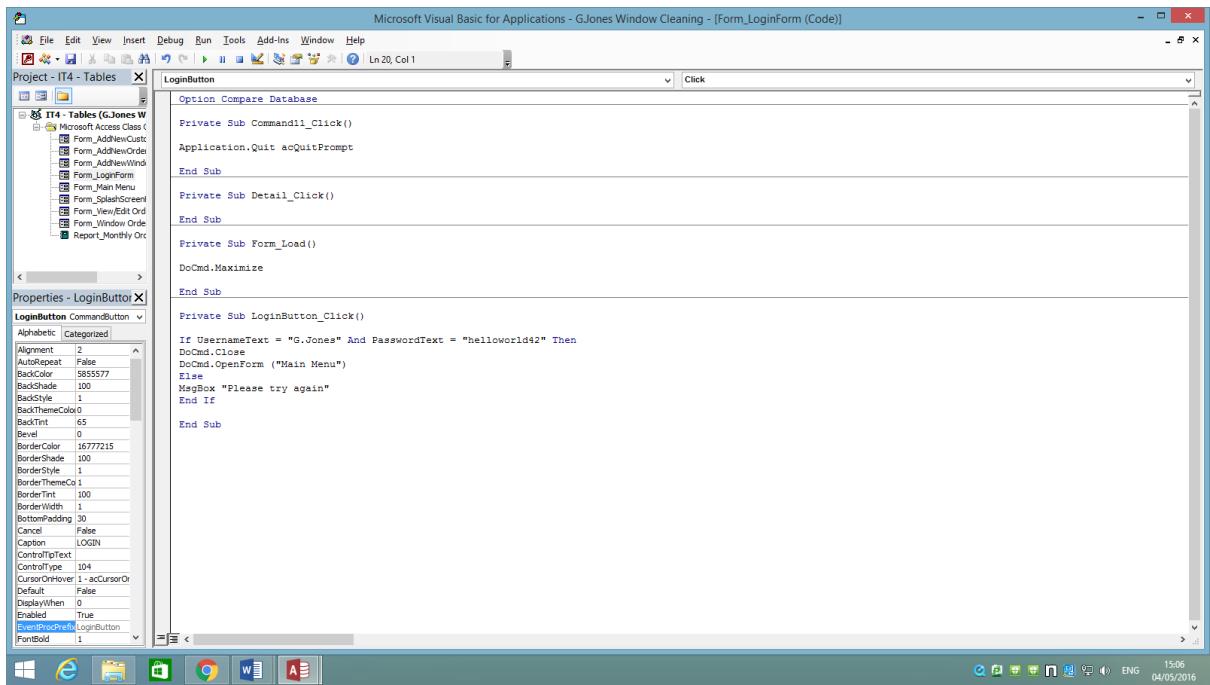
Code

1. Splash Screen



Implementation

2. Login



The screenshot shows the Microsoft Visual Basic for Applications (VBA) editor window. The title bar reads "Microsoft Visual Basic for Applications - G.Jones Window Cleaning - [Form_LoginForm (Code)]". The code in the editor is:

```

Option Compare Database

Private Sub Command1_Click()
    Application.Quit acQuitPrompt
End Sub

Private Sub Detail_Click()
End Sub

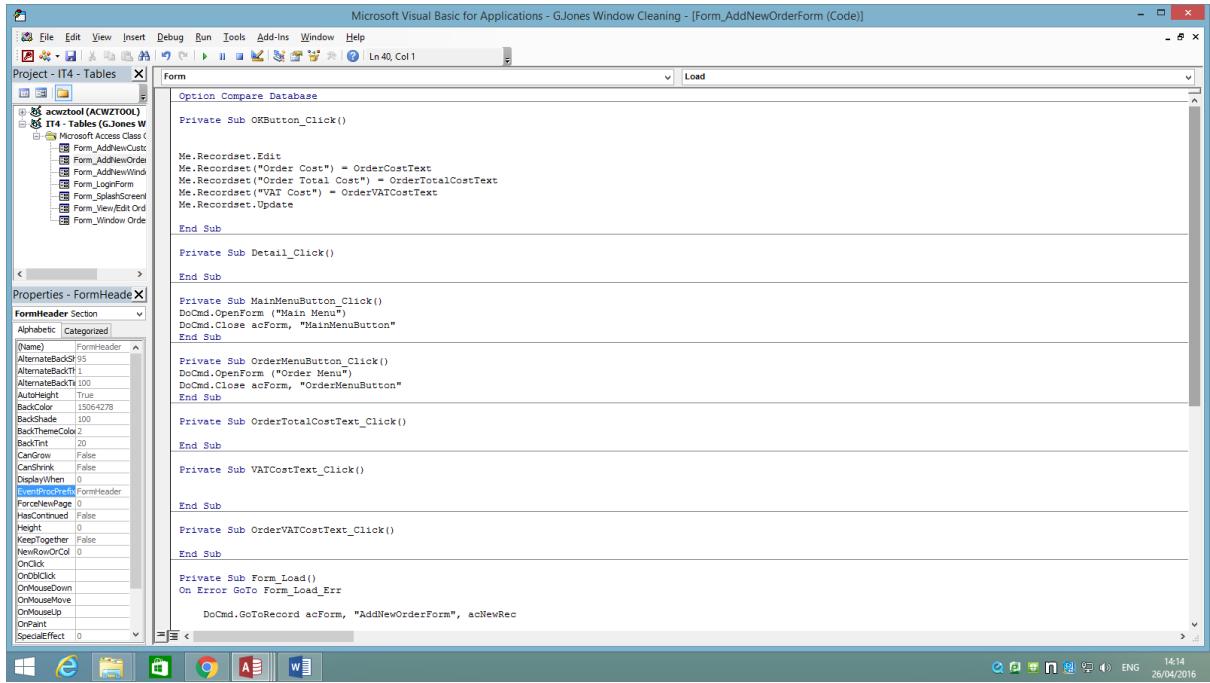
Private Sub Form_Load()
    DoCmd.Maximize
End Sub

Private Sub LoginButton_Click()
    If UsernameText = "G.Jones" And PasswordText = "HelloWorld42" Then
        DoCmd.Close
        DoCmd.OpenForm ("Main Menu")
    Else
        MsgBox "Please try again"
    End If
End Sub

```

The left side of the screen shows the Project Explorer with "IT4 - Tables (G.Jones W)" selected, containing various form objects like Form_AddNewCust, Form_AddNewOrder, etc. A Properties window is open for the "LoginButton" command button, showing its various properties such as Alignment, AutoRepeat, BackColor, BackShade, Bevel, BorderColor, BorderStyle, BorderWidth, BottomPadding, Cancel, Caption, ControlTipText, CursorType, Default, DisplayWhen, Enabled, EventProcPrefix, FontBold, etc.

3. Add New Order Form



The screenshot shows the Microsoft Visual Basic for Applications (VBA) editor window. The title bar reads "Microsoft Visual Basic for Applications - G.Jones Window Cleaning - [Form_AddNewOrderForm (Code)]". The code in the editor is:

```

Option Compare Database

Private Sub OKButton_Click()
    Me.Recordset.Edit
    Me.Recordset("Order Cost") = OrderCostText
    Me.Recordset("Order Total Cost") = OrderTotalCostText
    Me.Recordset("VAT Cost") = OrderVATCostText
    Me.Recordset.Update
End Sub

Private Sub Detail_Click()
End Sub

Private Sub MainMenuItem_Click()
    DoCmd.OpenForm ("Main Menu")
    DoCmd.Close acForm, "MainMenuItem"
End Sub

Private Sub OrderMenuItem_Click()
    DoCmd.OpenForm ("Order Menu")
    DoCmd.Close acForm, "OrderMenuItem"
End Sub

Private Sub OrderTotalCostText_Click()
End Sub

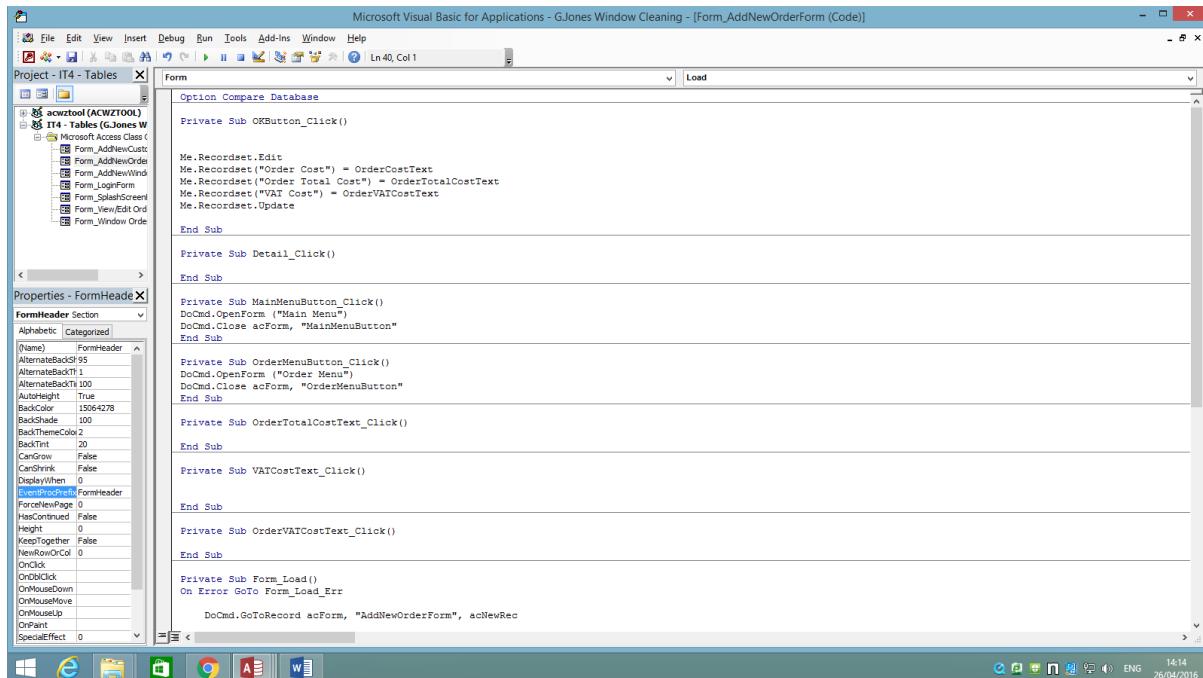
Private Sub VATCostText_Click()
End Sub

Private Sub Form_Load()
    On Error GoTo Form_Load_Err
    DoCmd.GoToRecord acForm, "AddNewOrderForm", acNewRec
End Sub

```

The left side of the screen shows the Project Explorer with "IT4 - Tables (G.Jones W)" selected, containing various form objects like Form_AddNewCust, Form_AddNewOrder, etc. A Properties window is open for the "FormHeader" section of the form, showing its properties such as Name, AlternateBack0, AlternateBack1, AlternateBack2, AutoHeight, BackColor, BackShade, BackThemeColor, BackTint, CanGrow, CanShrink, DoubleBuffered, ForceNewPage, HasContinued, Height, KeepTogether, KeepWithOrCol, OnClick, OnDoubleClick, OnMouseDown, OnMouseMove, OnMouseUp, OnPaint, SpecialEffect, etc.

Implementation



```

Microsoft Visual Basic for Applications - G.Jones Window Cleaning - [Form_AddNewOrderForm (Code)]
Project - IT4 - Tables
Form - Option Compare Database
Private Sub OKButton_Click()
    Me.Recordset.Edit
    Me.Recordset("Order Cost") = OrderCostText
    Me.Recordset("Order Total Cost") = OrderTotalCostText
    Me.Recordset("VAT Cost") = OrderVATCostText
    Me.Recordset.Update
End Sub

Private Sub Detail_Click()
End Sub

Private Sub MainMenuButton_Click()
    DoCmd.OpenForm ("Main Menu")
    DoCmd.Close acForm, "MainMenuButton"
End Sub

Private Sub OrderMenuButton_Click()
    DoCmd.OpenForm ("Order Menu")
    DoCmd.Close acForm, "OrderMenuButton"
End Sub

Private Sub OrderTotalCostText_Click()
End Sub

Private Sub VATCostText_Click()
End Sub

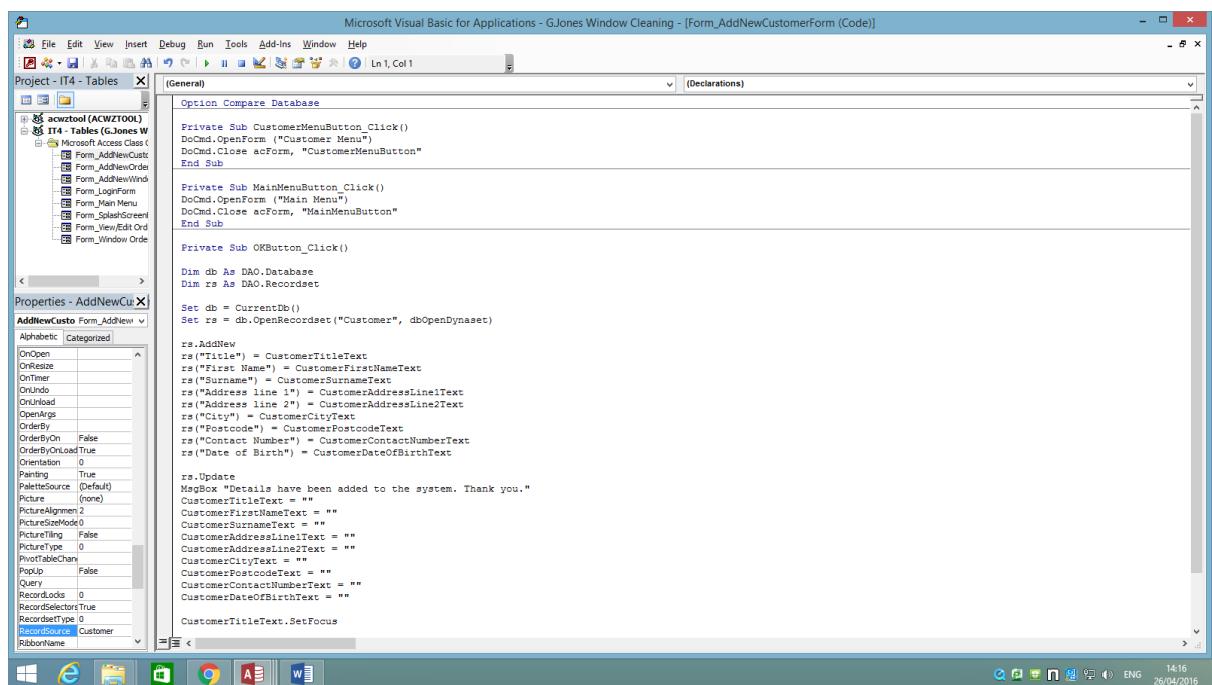
Private Sub OrderVATCostText_Click()
End Sub

Private Sub Form_Load()
On Error GoTo Form_Load_Err
    DoCmd.GoToRecord acForm, "AddNewOrderForm", acNewRec
End Sub

Form_Load_Err:
End Sub

```

4. Add New Customer Form



```

Microsoft Visual Basic for Applications - G.Jones Window Cleaning - [Form_AddNewCustomerForm (Code)]
Project - IT4 - Tables
Form - Option Compare Database
Private Sub CustomerMenuButton_Click()
    DoCmd.OpenForm ("Customer Menu")
    DoCmd.Close acForm, "CustomerMenuButton"
End Sub

Private Sub MainMenuButton_Click()
    DoCmd.OpenForm ("Main Menu")
    DoCmd.Close acForm, "MainMenuButton"
End Sub

Private Sub OKButton_Click()
    Dim db As DAO.Database
    Dim rs As DAO.Recordset
    Set db = CurrentDb()
    Set rs = db.OpenRecordset("Customer", dbOpenDynaset)
    rs.AddNew
    rs("Title") = CustomerTitleText
    rs("First Name") = CustomerFirstNameText
    rs("Surname") = CustomerSurnameText
    rs("Address line 1") = CustomerAddressLine1Text
    rs("Address line 2") = CustomerAddressLine2Text
    rs("City") = CustomerCityText
    rs("Postcode") = CustomerPostcodeText
    rs("Contact Number") = CustomerContactNumberText
    rs("Date of Birth") = CustomerDateOfBirthText
    rs.Update
    MsgBox "Details have been added to the system. Thank you."
    CustomerTitleText = ""
    CustomerFirstNameText = ""
    CustomerSurnameText = ""
    CustomerAddressLine1Text = ""
    CustomerAddressLine2Text = ""
    CustomerCityText = ""
    CustomerPostcodeText = ""
    CustomerContactNumberText = ""
    CustomerDateOfBirthText = ""
    CustomerTitleText.SetFocus
End Sub

```

Implementation

The screenshot shows the Microsoft Visual Basic for Applications (VBA) code editor window. The title bar reads "Microsoft Visual Basic for Applications - GJones Window Cleaning - [Form_AddNewCustomerForm (Code)]". The code editor displays VBA code for a form named "AddNewCustomerForm". The code handles the "MainMenu_Click" event, which opens a main menu form and closes the current form. It also handles the "OKButton_Click" event, which adds new customer data to a database and displays a message box. The properties window on the left shows various properties for the "AddNewCustomerForm" object, including its name, caption, and other settings. The status bar at the bottom indicates the date and time as "26/04/2016 14:16".

```
Private Sub MainMenu_Click()
    DoCmd.OpenForm "Main Menu"
    DoCmd.Close acForm, "MainMenuButton"
End Sub

Private Sub OKButton_Click()
    Dim db As DAO.Database
    Dim rs As DAO.Recordset

    Set db = CurrentDb()
    Set rs = db.OpenRecordset("Customer", dbOpenDynaset)

    rs.AddNew
    rs("Title") = CustomerTitleText
    rs("First Name") = CustomerFirstNameText
    rs("Surname") = CustomerSurnameText
    rs("Address line 1") = CustomerAddressLine1Text
    rs("Address line 2") = CustomerAddressLine2Text
    rs("City") = CustomerCityText
    rs("Postcode") = CustomerPostcodeText
    rs("Contact Number") = CustomerContactNumberText
    rs("Date of Birth") = CustomerDateOfBirthText

    rs.Update
    MsgBox "Details have been added to the system. Thank you."
    CustomerTitleText = ""
    CustomerFirstNameText = ""
    CustomerSurnameText = ""
    CustomerAddressLine1Text = ""
    CustomerAddressLine2Text = ""
    CustomerCityText = ""
    CustomerPostcodeText = ""
    CustomerContactNumberText = ""
    CustomerDateOfBirthText = ""

    CustomerTitleText.SetFocus
    rs.Close
    Set rs = Nothing
End Sub
```

Ryan Jones

IT4 Testing



Testing

Test No.	Test Type	Test Data	Expected Result	Actual Result
1.	Add New Customer	Mr, William, Jones, 45 St. David's Street, Barry, Cardiff, CF88 9LD, 07582637785, 15/06/1985.	Saved into the Customer Table.	See print screen 1-2.
2.	Add New Order	20, 04/05/2016, 13:45, 07/05/2016, Sarah Hills, May. Sub-form: 3, 4, 23.	Saved in the Order Table.	See print screen 3-4.
3.	Add New Window	Slider, Medium, £35.00, 15.	Saved in the Window Table.	See print screen 5-6.
4.	Single Query 1 / View Small Windows	N/A	I expect to view all windows types that have a size small. Including their type, ID, stock and cost.	Correct data is displayed. See print screen 7.
5.	Single Query 2 (parameter) / View Delivery date order(s)	Delivery date = 28/04/2016	I expect to view all order details for two order records on the 28/04/2016.	Correct data is showing. All order fields and two separate order records. See print screen 8-9.

Testing

6.	Multiple Query / View Door Windows	N/A	I expect to view all windows that have the 'Door' type and the date they were ordered, as well the customer ID. See print screen 10.	Correct data is being displayed, showing all records of 'Door' orders along with the date of order and customer ID. See print screen 10.
7.	Multiple Query 2 / View Customer Details and Order	N/A	I expect to view all orders, along with customer details, such as ID, surname and contact number, as well as the window ID, order ID window quantity, and order total cost.	Correct data is shown, including all fields as expected. See print screen 11.
8.	Parameter Query / View Customer	Customer ID = 21	I expect to view all of the customer data for one particular customer ID.	Correct data is shown, including all customer fields for the right customer ID. See print screen 12-13.
9.	Action Query / Update Window Cost	N/A	I expect to see the cost of 'Standard' windows in size 'Large' to be reduced by	Data was correctly updated. 20% decrease in standard + large

Testing

			20%.	windows. See print screen 14-16.
10.	View/Edit Customer	32 Greenwich Street, CF12 9GK.	I expect that the customer with ID 17 will have his address line 1 and postcode changed.	Data was correctly edited, the customer's address line 1 and postcode changed. See print screen 17-19.
11.	View/Edit Order	Delivery date: 26/04/2016	I expect that the delivery date of an order will change from 25/04/2016 to 26/04/2016.	Data is correctly updated, now showing the delivery date for this order as 26/04/2016. See print screen 20-22.
12.	View/Edit Window	Stock: 12	I expect that the stock of the window will be changed from 20 to 12.	Data has been correctly edited and the stock of the window is now 12 instead of 20. See print screen 13-25.
13.	Test calculated field in sub-form	Window ID: 3 Window Quantity: 5	I expect that the total cost of the order should be £150 + 20% = £180	Calculation produced correct cost. See print screen 26-28.
14.	Data Validation 1	Window Quantity:	Accepted	See print screen 29-

Testing

	- Normal Data	4		30.
15.	Data Validation 1 -Invalid Data	Window Quantity: 101	"Invalid Quantity"	See print screen 31-32.
16.	Data Validation 1 - Extreme Data 1	Window Quantity: 99	Accepted	See print screen 33-34.
17.	Data Validation 1 - Extreme Data 2	Window Quantity: 0	Accepted	See print screen 35-36.
18.	Data Validation 2 – Normal Data	Postcode: CF72 9HD	Accepted	See print screen 37-38.
19.	Data Validation 2 - Invalid Data	Postcode: CF91-7WD	"Incorrect Format"	See print screen 39-40.
20.	Data Validation 2 - Extreme Data 1	Postcode: AA99 9AA	Accepted	See print screen 41-42.
21.	Data Validation 2 - Extreme Data 2	Postcode: ZZ00 0ZZ	Accepted	See print screen 43-44.
22.	Test Navigation of User Interface (Command Buttons)	N/A	All commands to navigate the system are working properly.	See lecturer's written confirmation .
23.	Test visual basic 1 – Splash screen pop up.	N/A	I expect the Splash screen to pop up in a separate window when I select the form, then when I click the window I	See print screen 45-48

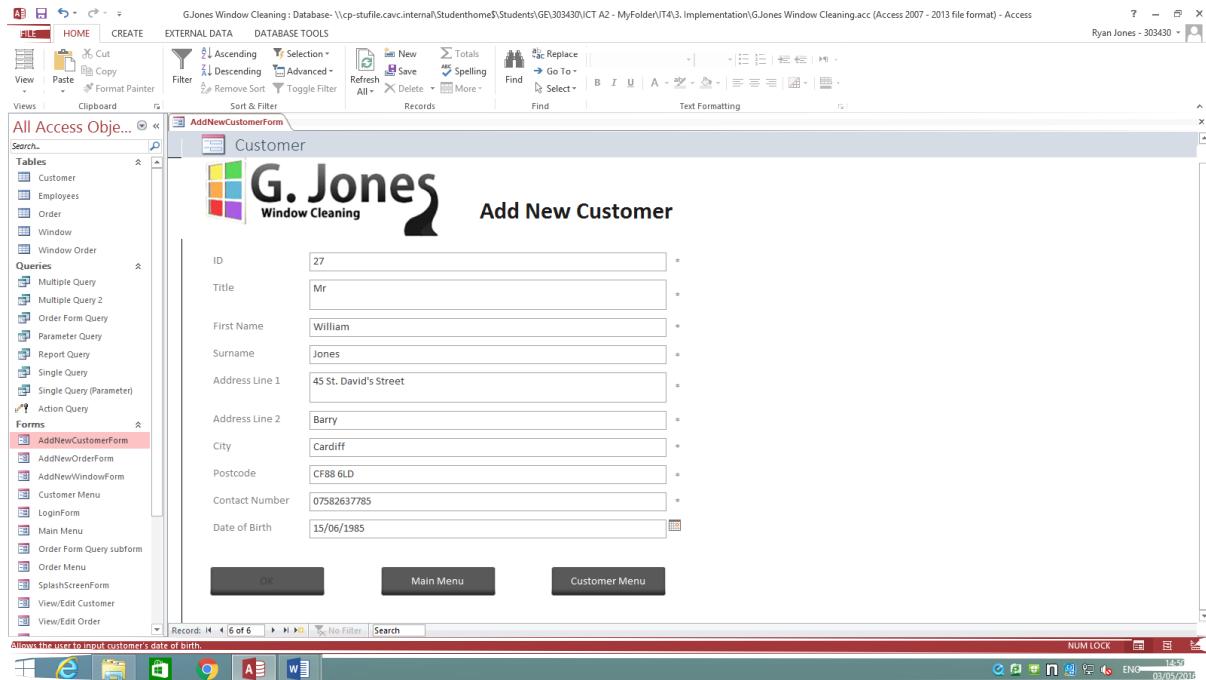
Testing

			expect it to close and take me to the login form.	
24.	Test visual basic 2 – Close database	N/A	I expect to see the whole database close when I click the 'Close' button.	See print screen 49-50.
25.	Report print test	N/A	I expect that when I select the 'Print' button on my report it will print out.	See print screen 51-53.
26.	Test Security 1 (correct password and username)	Username: G.Jones Password: Helloworld42	Database will open.	See print screen 54-55
27.	Test Security 2 (incorrect password and username)	Any random password that is incorrect.	Error message reading "Please try again"	See print screen 56.

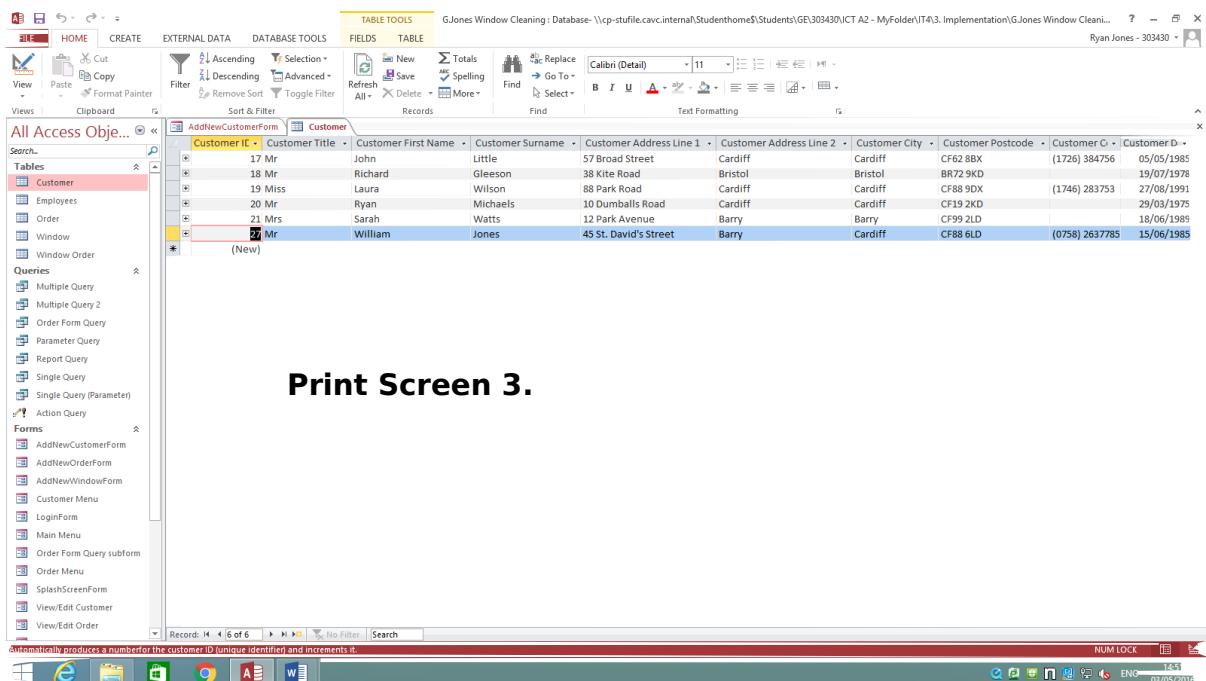
Testing

Print Screen 1.

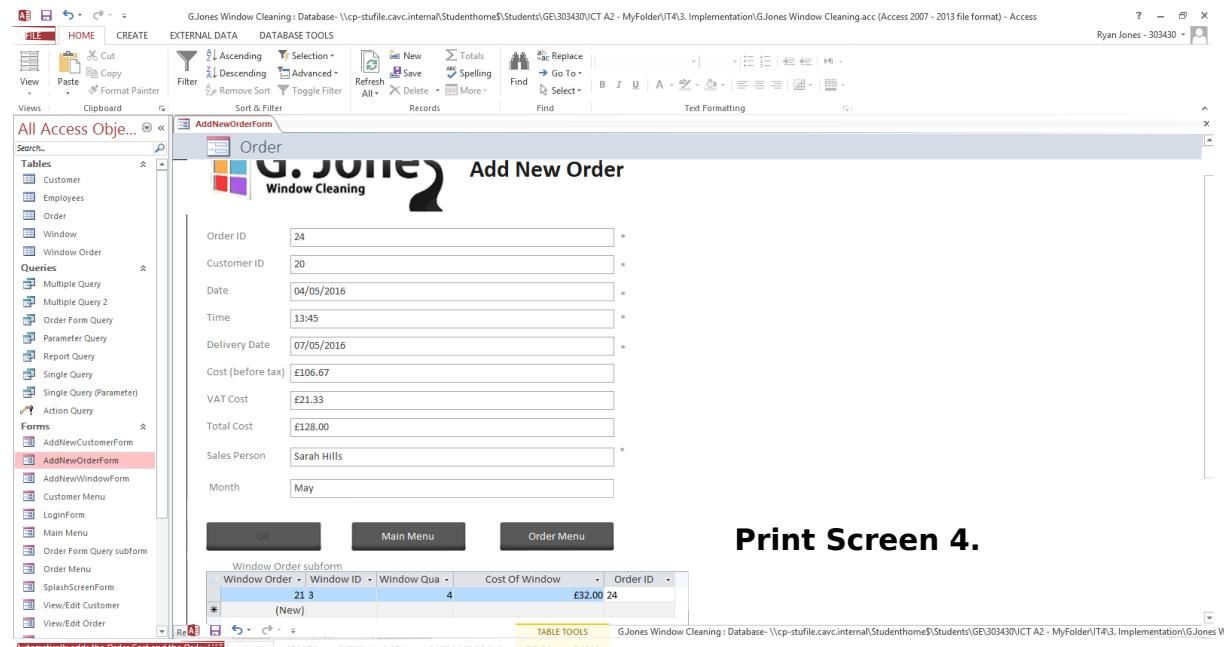
Print Screen 2.



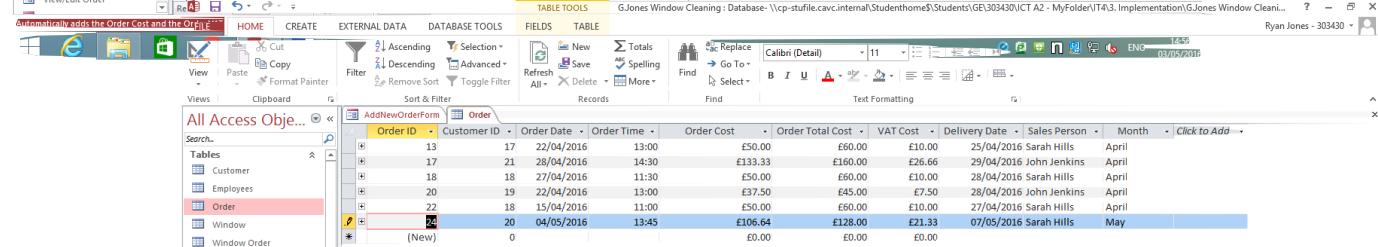
Print Screen 3.



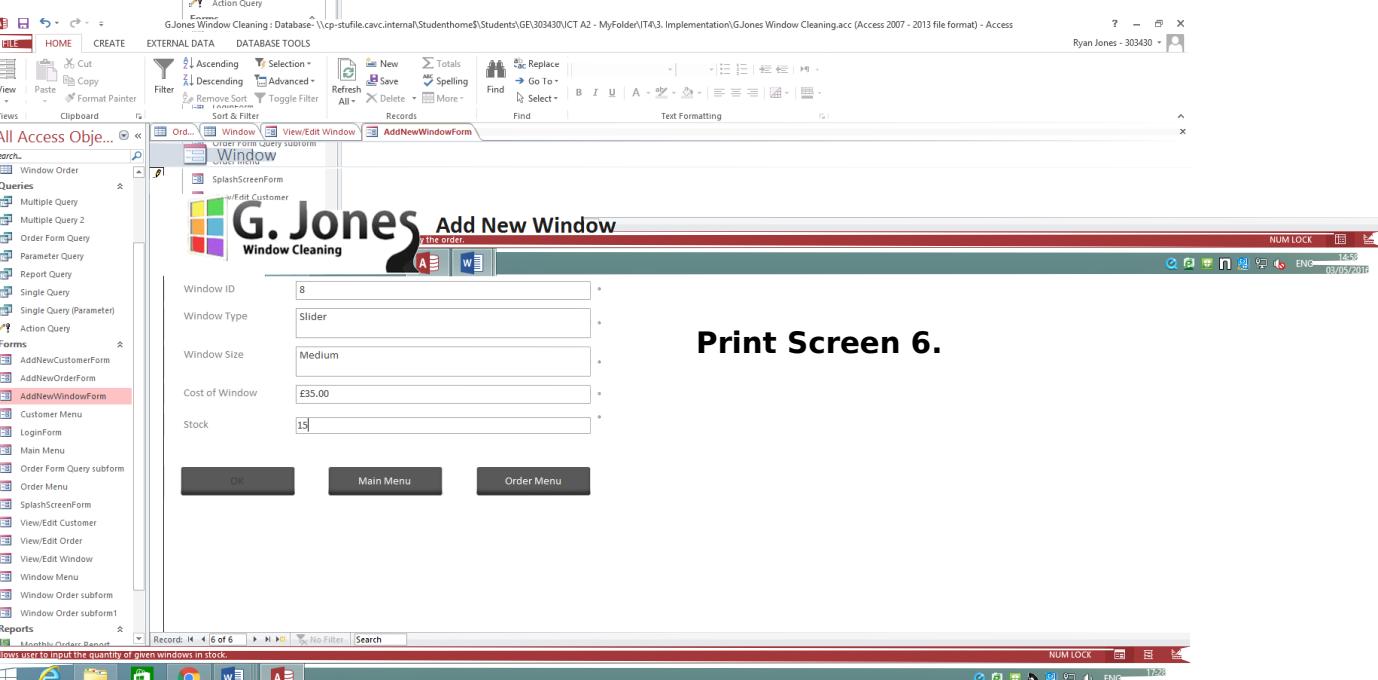
Testing



Print Screen 4.



Print Screen 5.



Print Screen 6.

Testing

The screenshot shows the Microsoft Access interface with a query results grid titled "Window". The grid contains the following data:

Window ID	Window Type	Window Size	Cost Of Window	Stock
2 Door	Small		£15.00	20
3 Standard	Large		£36.00	87
4 Door	Medium		£40.00	56
5 Standard	Small		£20.00	30
6 Double-hung	Medium		£50.00	15
8 Slider	Medium		£35.00	15
*	(New)		£0.00	0

A "Field List" pane on the right shows "No fields available to be added to the current view."

Print Screen 7.

The screenshot shows the Microsoft Access interface with a query results grid titled "Window". The grid contains the following data:

Window ID	Window Type	Field	Cost Of Window	Stock
Small	2 Door	Small	£15.00	20
Small	5 Standard	Small	£20.00	30
*	(New)		£0.00	0

A "Field List" pane on the right shows "No fields available to be added to the current view."

Print Screen 8.

Testing

Print Screen 9.

The screenshot shows the Microsoft Access interface. A parameter dialog box is open, prompting for a "Please enter delivery date" with the value "28/04/2016". In the background, a query results grid displays data from the "Order" table. The columns include Order ID, Order Date, Order Time, Order Cost, Order Total Cost, Customer ID, Sales Person, and Delivery Date. One row is highlighted with a red border, showing Order ID 18, Order Date 27/04/2016, and so on.

Print Screen 10.

Print Screen 11.

The screenshot shows the Microsoft Access interface with two multiple query results grids. The top grid displays data for windows, with columns including Window Type, Order Date, Window Size, Cost Of Window, and Customer ID. The bottom grid displays data for customers, with columns including Customer ID, Customer Surname, Order ID, Window ID, Window Quantity, Order Total Cost, and Customer Contact Number. Both grids show several rows of data.

Print Screen 12.

Testing

The screenshot shows the Microsoft Access interface with a Parameter Query dialog box open. The dialog box asks for a "Customer ID" and has the value "21" entered. The main query results table shows a single record for Customer ID 21, Mrs. Sarah Watts, with address details.

Customer ID	Customer Title	Customer First Name	Customer Surname	Customer Address Line 1	Customer Address Line 2	Customer City	Customer Postcode	Customer Contact Number
21	Mrs	Sarah	Watts	12 Park Avenue		Barry	CF99 2LD	(1783) 9377234

Print Screen 13.

The screenshot shows the Microsoft Access interface with a Parameter Query dialog box open. The dialog box asks for a "Customer ID" and has the value "21" entered. The main query results table shows a single record for Customer ID 21, Mrs. Sarah Watts, with address details.

Customer ID	Customer Title	Customer First Name	Customer Surname	Customer Address Line 1	Customer Address Line 2	Customer City	Customer Postcode	Customer Contact Number
21	Mrs	Sarah	Watts	12 Park Avenue		Barry	CF99 2LD	(1783) 9377234

Print Screen 14.

The screenshot shows the Microsoft Access interface with a table open. A warning message box is displayed, stating: "You are about to run an update query that will modify data in your table. Are you sure you want to run this type of action query? For information on how to prevent this message from displaying every time you run an action query, click Help." The table contains data for window types and their costs.

Window ID	Window Type	Window Size	Cost Of Window	Stock
2	Door	Small	£15.00	20
3	Standard	Large	£45.00	87
4	Door	Medium	£40.00	56
5	Standard	Small	£20.00	30
6	Double-hung	Medium	£50.00	0
			£0.00	0

Print Screen 15.

The screenshot shows the Microsoft Access interface with a warning message box open. The message states: "You are about to run an update query that will modify data in your table. Are you sure you want to run this type of action query? For information on how to prevent this message from displaying every time you run an action query, click Help." The message box has "Yes", "No", and "Help" buttons.

Print Screen 16.

Testing

Print Screen 17.

Window ID	Window Type	Window Size	Cost Of Window	Stock	Click to Add
2 Door	Small	£15.00	20		
3 Standard	Large	£36.00	87		
4 Door	Medium	£40.00	56		
5 Standard	Small	£20.00	30		
6 Double-hung	Medium	£50.00	0		
(New)		£0.00	0		

Print Screen 18.

Customer ID	Customer Title	Customer First Name	Customer Surname	Customer Address Line 1	Customer Address Line 2	Customer City	Customer Postcode	Customer Contact Number	Customer Date of Birth
17	Mr	John	Little	57 Broad Street		Cardiff	CF62 8BX	(1726) 3847523	05/05/1985
18	Mr	Richard	Gleeson	38 Kite Road	Bristol	BRT2 9KD	(1827) 4778265	19/07/1978	
19	Miss	Laura	Wilson	88 Park Road	Cardiff	CF68 9DX	(1746) 2837532	27/08/1991	
20	Mr	Ryan	Michaels	10 Dumballs Road	Cardiff	CF19 2KD	(0736) 1827364	29/03/1975	
21	Mrs	Sarah	Watts	12 Park Avenue	Barry	CF99 2LD	(1783) 9377234	18/06/1985	
27	Mr	William	Jones	45 St. David's Street	Barry	CF68 8LD	(0758) 2637785	15/06/1985	
(New)									

Print Screen 19.

Allows the user to input the first line of customer's address.

Customer ID	17	Save
Customer Title	Mr	Delete
Customer First Name	John	
Customer Surname	Little	
Customer Address Line 1	52 Greenwich Street	
Customer Address Line 2	Cardiff	
Customer City	Cardiff	
Customer Postcode	CF12 9GK	
Customer Contact Number	17263847523	
Customer Date of Birth	05/05/1985	

Testing

The screenshot shows a Microsoft Access database window. The title bar reads "G.Jones Window Cleaning : Database- \\cp-stufile.cavc.internal\Studenthome\\$\Students\GE303430\ICT A2 - MyFolder\IT43. Implementation\G.Jones Window Clean...". The ribbon tabs are HOME, CREATE, EXTERNAL DATA, DATABASE TOOLS, FIELDS, and TABLE. The TABLE TOOLS tab is selected. The main area displays a table named "Customer" with the following data:

Customer ID	Customer Title	Customer First Name	Customer Surname	Customer Address Line 1	Customer Address Line 2	Customer City	Customer Postcode	Customer Country	Customer Date
17	Mr	John	Little	32 Greenwich Street		Cardiff	CF12 9GK	(1726)	3847523
18	Mr	Richard	Gleeson	38 Kite Road	Bristol	BRT72 9KD	(1827)	4778265	05/05/1985
19	Miss	Laura	Wilson	88 Park Road	Cardiff	CF88 9DX	(1746)	2837532	27/08/1991
20	Mr	Ryan	Michaels	10 Dumballs Road	Cardiff	CF19 2KD	(0736)	1827364	29/03/1975
21	Mrs	Sarah	Watts	12 Park Avenue	Barry	CF99 2LD	(1783)	9377234	18/06/1985
27	Mr	William	Jones	45 St. David's Street	Barry	CF88 6LD	(0758)	2637785	15/06/1985

Print Screen 20.

The screenshot shows a Microsoft Access database window. The title bar reads "G.Jones Window Cleaning : Database- \\cp-stufile.cavc.internal\Studenthome\\$\Students\GE303430\ICT A2 - MyFolder\IT43. Implementation\G.Jones Window Cleaning.acc (Access 2007 - 2013 file format) - Access". The ribbon tabs are HOME, CREATE, EXTERNAL DATA, DATABASE TOOLS, FIELDS, and TABLE. The TABLE TOOLS tab is selected. The main area displays a table named "Order" with the following data:

Order ID	Customer ID	Order Date	Order Time	Order Cost	Order Total Cost	VAT Cost	Delivery Date	Sales Person	Month
13	17	22/04/2016	13:00	£50.00	£60.00	£10.00	25/04/2016	Sarah Hills	April
17	21	28/04/2016	14:30	£133.33	£160.00	£26.66	29/04/2016	John Jenkins	April
18	18	27/04/2016	11:30	£50.00	£60.00	£10.00	28/04/2016	Sarah Hills	April
20	19	22/04/2016	13:00	£37.50	£45.00	£7.50	28/04/2016	John Jenkins	April
22	18	15/04/2016	11:00	£50.00	£60.00	£10.00	27/04/2016	Sarah Hills	April
24	20	04/05/2016	13:45	£105.64	£128.00	£21.33	07/05/2016	Sarah Hills	May
	0			£0.00	£0.00	£0.00			

Print Screen 21.

The screenshot shows a Microsoft Access form titled "View/Edit Order". The title bar reads "G.Jones Window Cleaning : Database- \\cp-stufile.cavc.internal\Studenthome\\$\Students\GE303430\ICT A2 - MyFolder\IT43. Implementation\G.Jones Window Cleaning.acc (Access 2007 - 2013 file format) - Access". The form has fields for Order ID (13), Order Date (22/04/2016), Order Time (30/12/1899), Order Cost (£50.00), Order Total Cost (£60.00), Customer ID (17), Delivery Date (26/04/2016), Sales Person (Sarah Hills), and Month (April). It includes Save, Delete, and Report buttons. At the bottom are Order Menu and Main Menu buttons.

Print Screen 22.

Testing

The screenshot shows the Microsoft Access application interface. The ribbon at the top has tabs for FILE, HOME, CREATE, EXTERNAL DATA, and DATABASE TOOLS. The FILE tab is selected. The main area displays a table named 'Order' with the following data:

	Order ID	Customer ID	Order Date	Order Time	Order Cost	Order Total Cost	VAT Cost	Delivery Date	Sales Person	Month	Click to Add
1	13	17	22/04/2016	13:00	£50.00	£60.00	£10.00	26/04/2016	Sarah Hills	April	
2	17	21	28/04/2016	14:30	£133.33	£160.00	£26.66	29/04/2016	John Jenkins	April	
3	18	18	27/04/2016	11:30	£50.00	£60.00	£10.00	28/04/2016	Sarah Hills	April	
4	20	19	22/04/2016	13:00	£37.50	£45.00	£7.50	28/04/2016	John Jenkins	April	
5	22	18	15/04/2016	11:00	£50.00	£60.00	£10.00	27/04/2016	Sarah Hills	April	
6	24	20	04/05/2016	13:45	£106.64	£128.00	£21.33	07/05/2016	Sarah Hills	May	
	*	(New)	0		£0.00	£0.00	£0.00				

The ribbon also includes sections for FIELDS and TABLE, and various tools like Filter, Refresh, Sort & Filter, and Text Formatting.

Print Screen 23.

Print Screen 24.

Print Screen 25.

Testing

Print Screen 26.

Window ID	Window Type	Window Size	Cost Of Window	Stock	Click to Add
2 Door	Small	£15.00		12	
3 Standard	Large	£36.00		87	
4 Door	Medium	£40.00		56	
5 Standard	Small	£20.00		30	
6 Double-hung	Medium	£50.00		15	
8 Slider	Medium	£35.00		15	
(New)		£0.00		0	

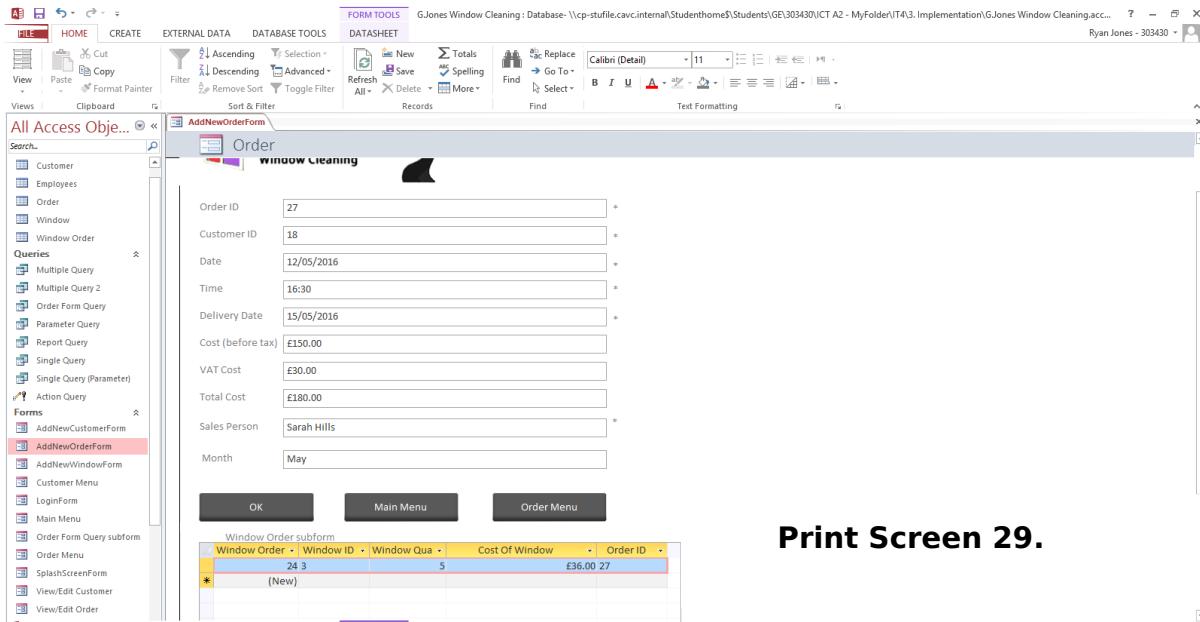
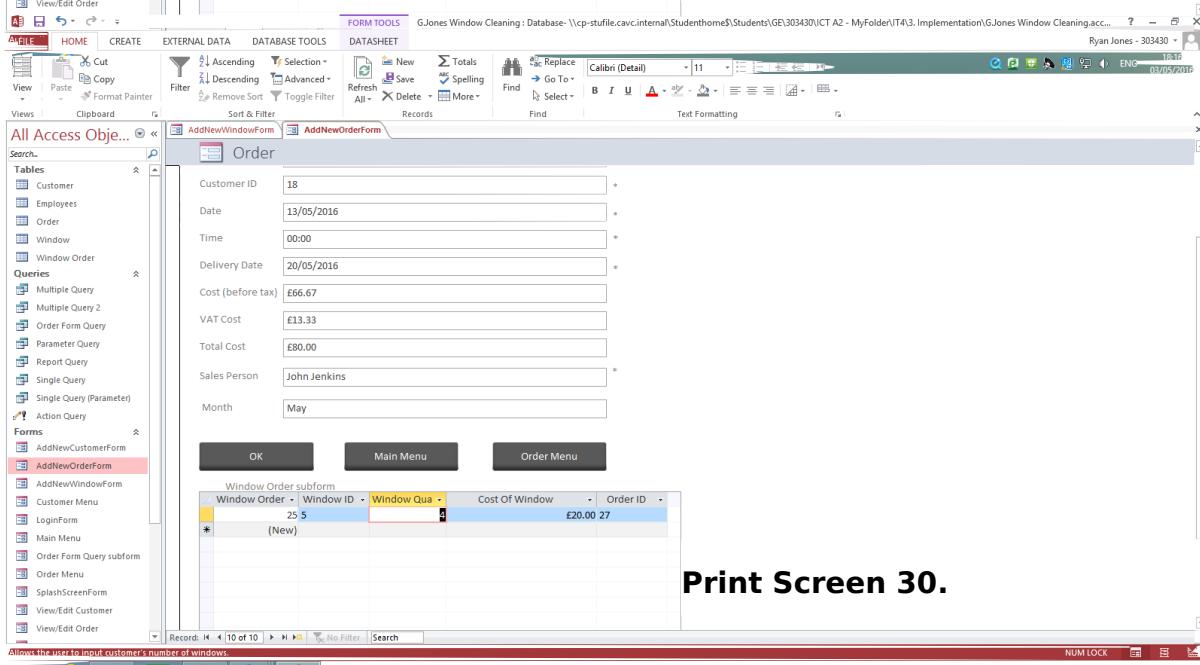
Print Screen 27.

The screenshot shows the Microsoft Access 'Design View' for the 'Add New Order' form. The form contains several text input fields and some calculated values. At the bottom, there is a subform labeled 'Window Order subfrm'. The formula for the 'Total Cost' field is highlighted:

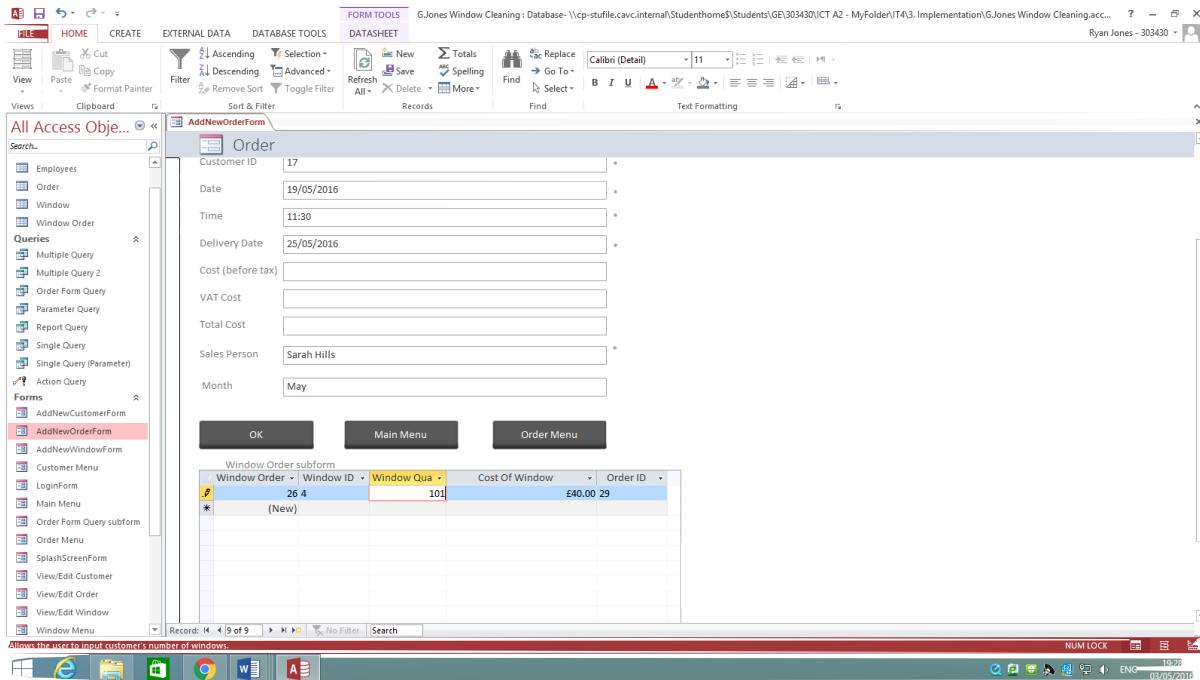
```
[Total Cost] = [Window Order subform].[Form]![Text1]
```

Print Screen 28.

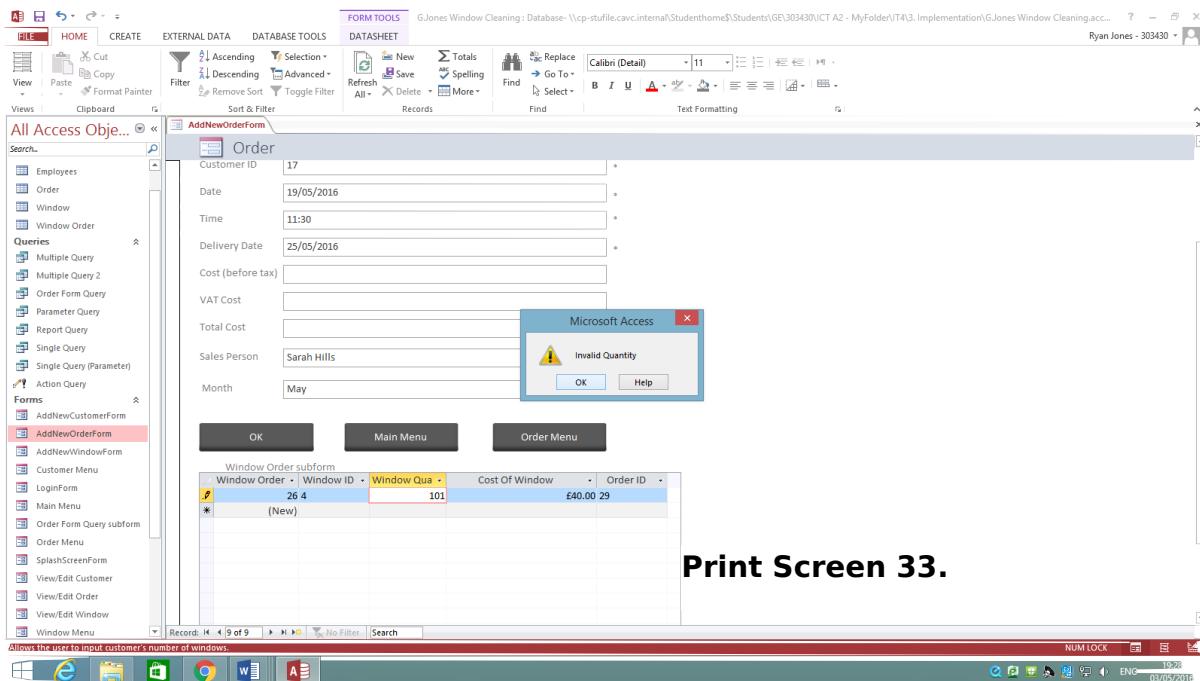
Testing

**Print Screen 29.****Print Screen 30.****Print Screen 31.**

Testing



Print Screen 32.

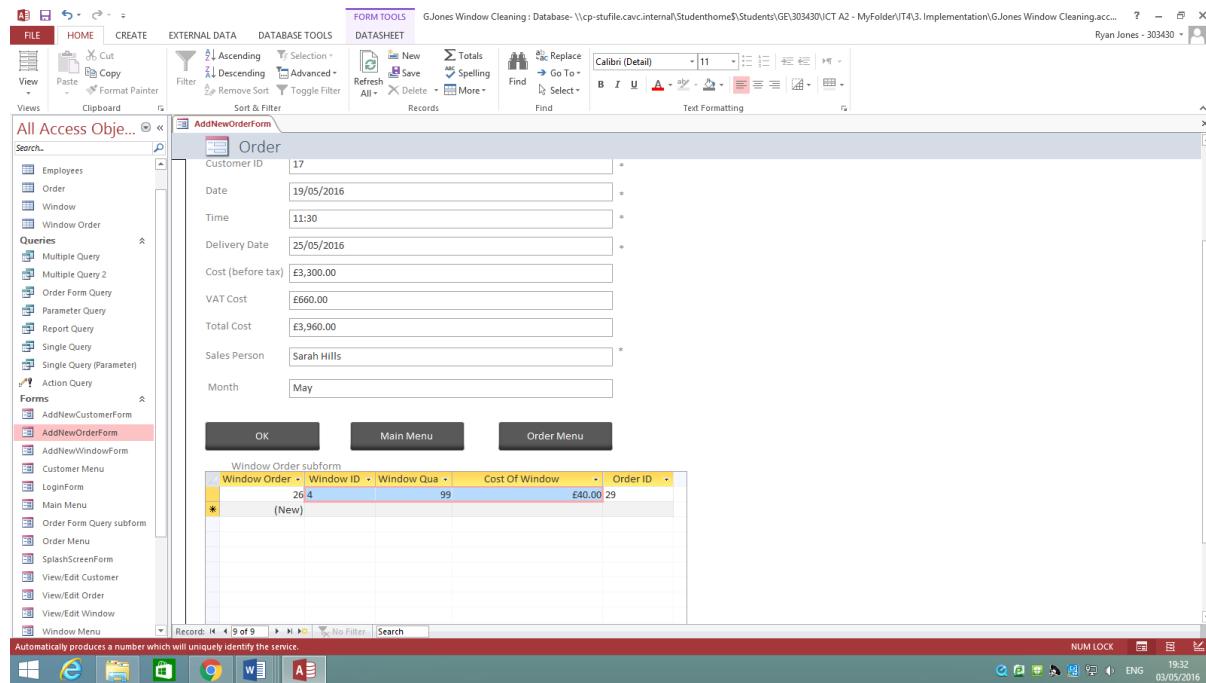


Print Screen 33.

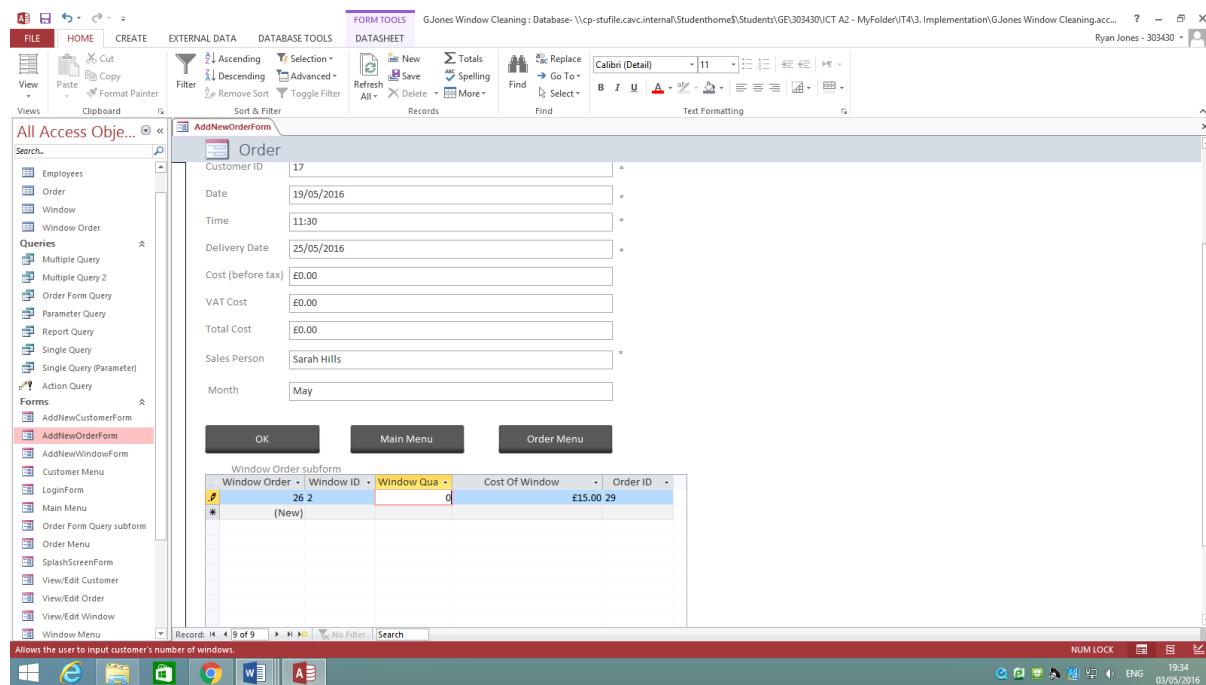
Testing

Print Screen 34.

(Accepted)



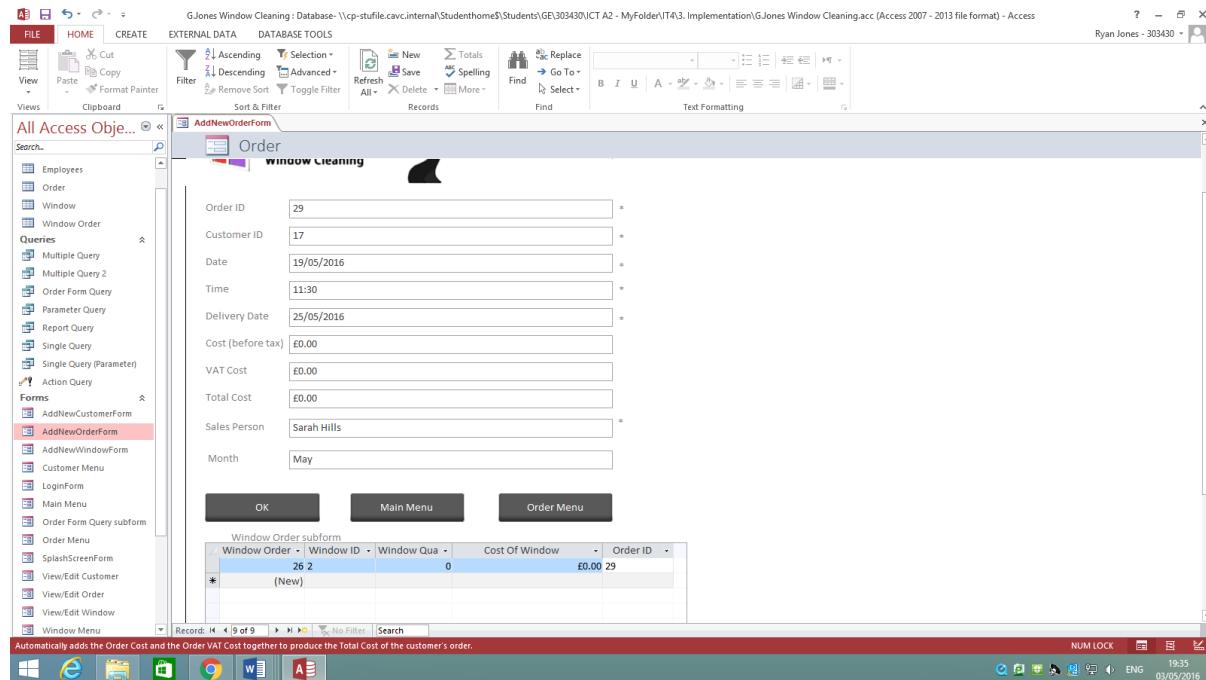
Print Screen 35.



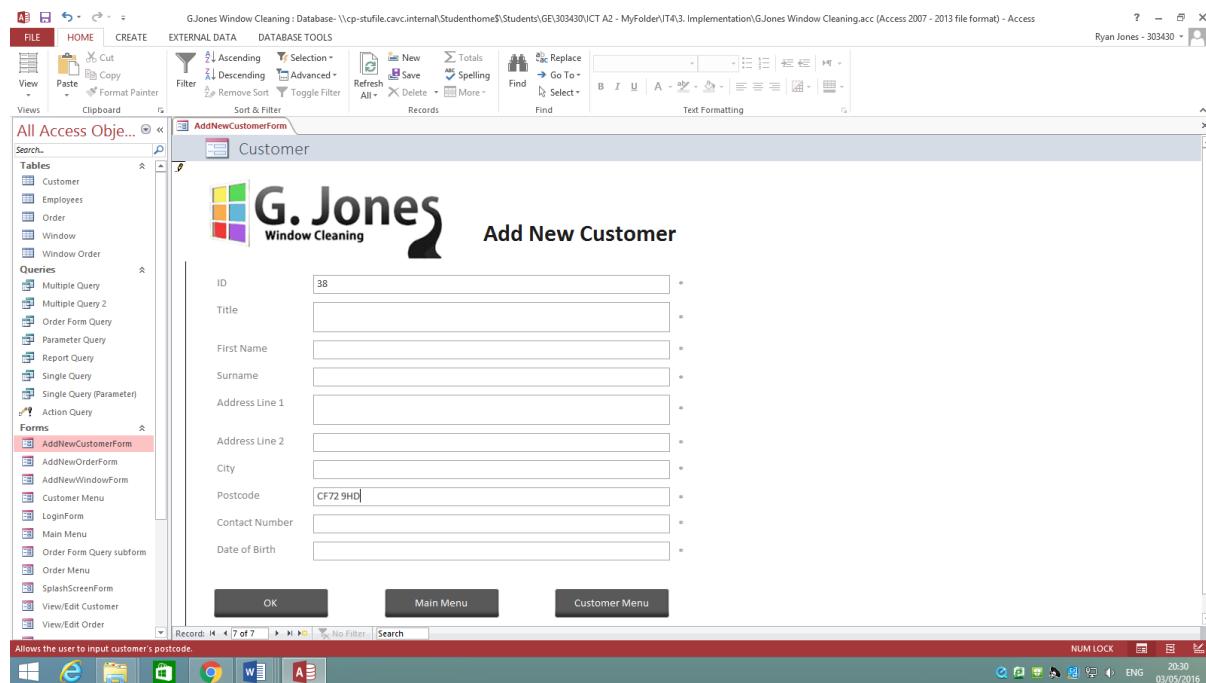
Testing

Print Screen 36.

(Accepted)



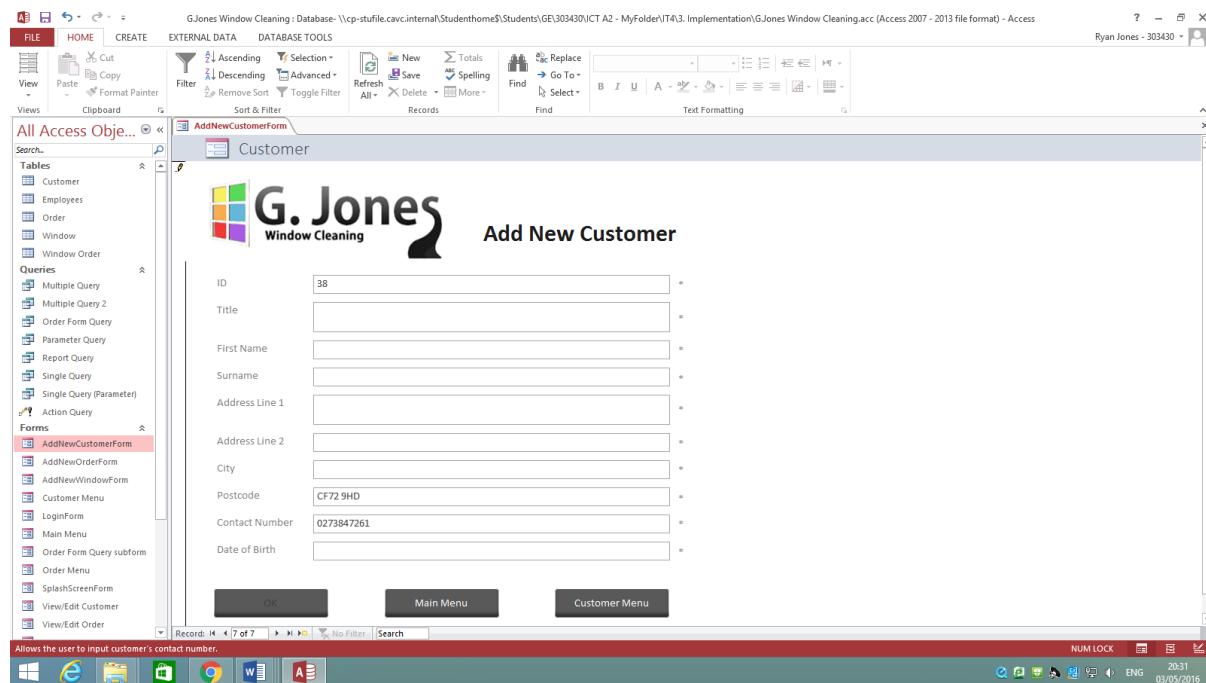
Print Screen 37.



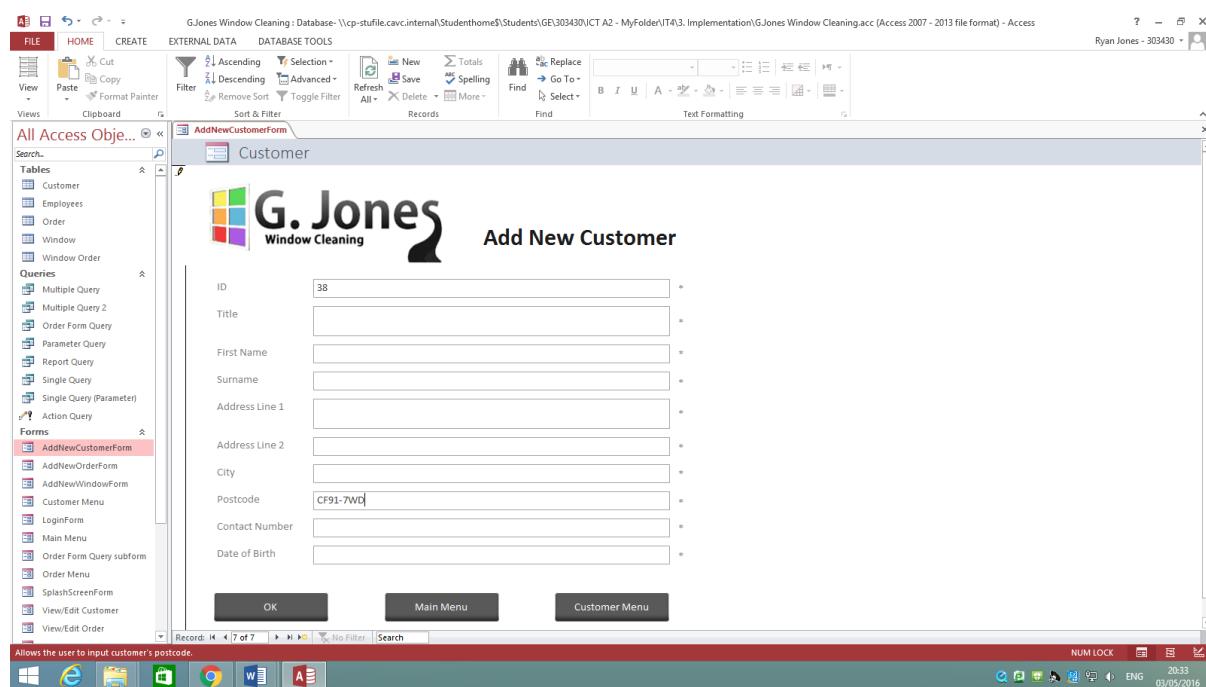
Testing

Print Screen 38.

(Accepted)

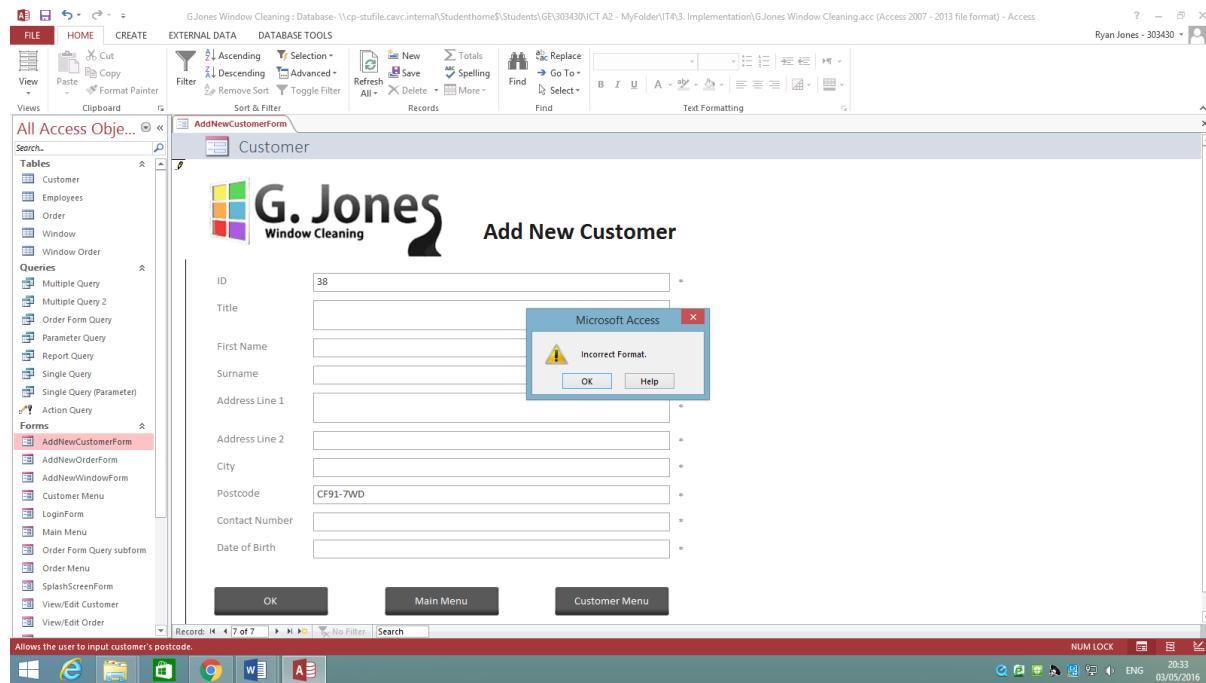


Print Screen 39.

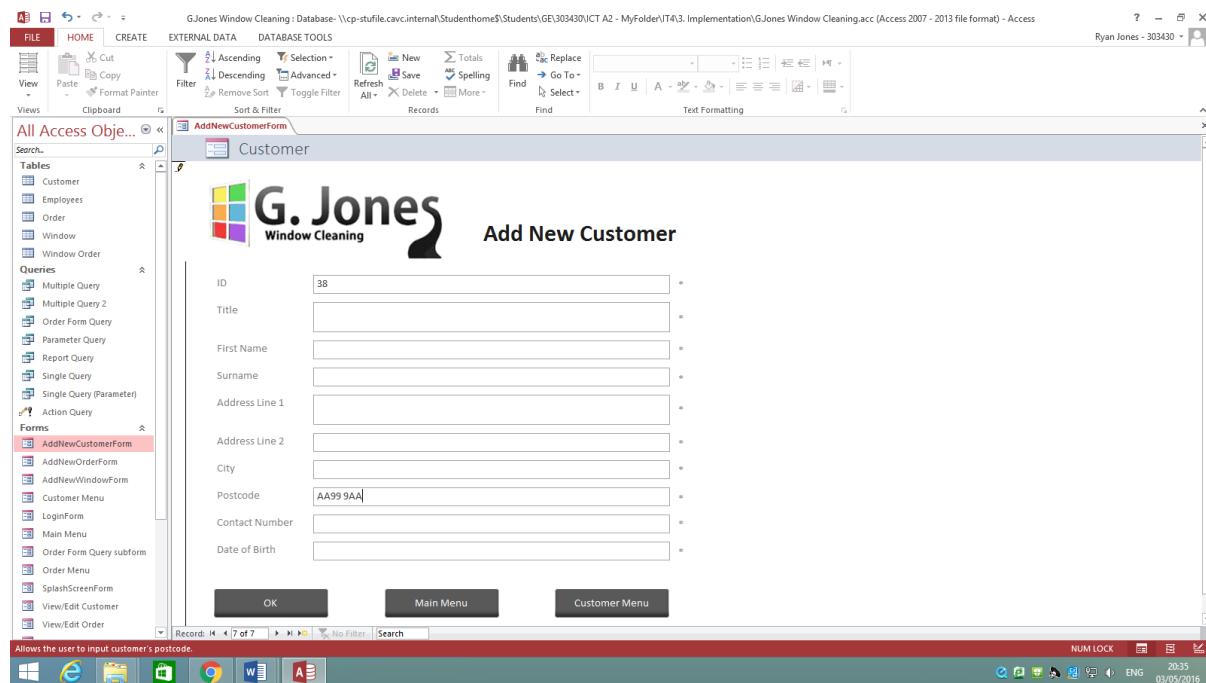


Testing

Print Screen 40.



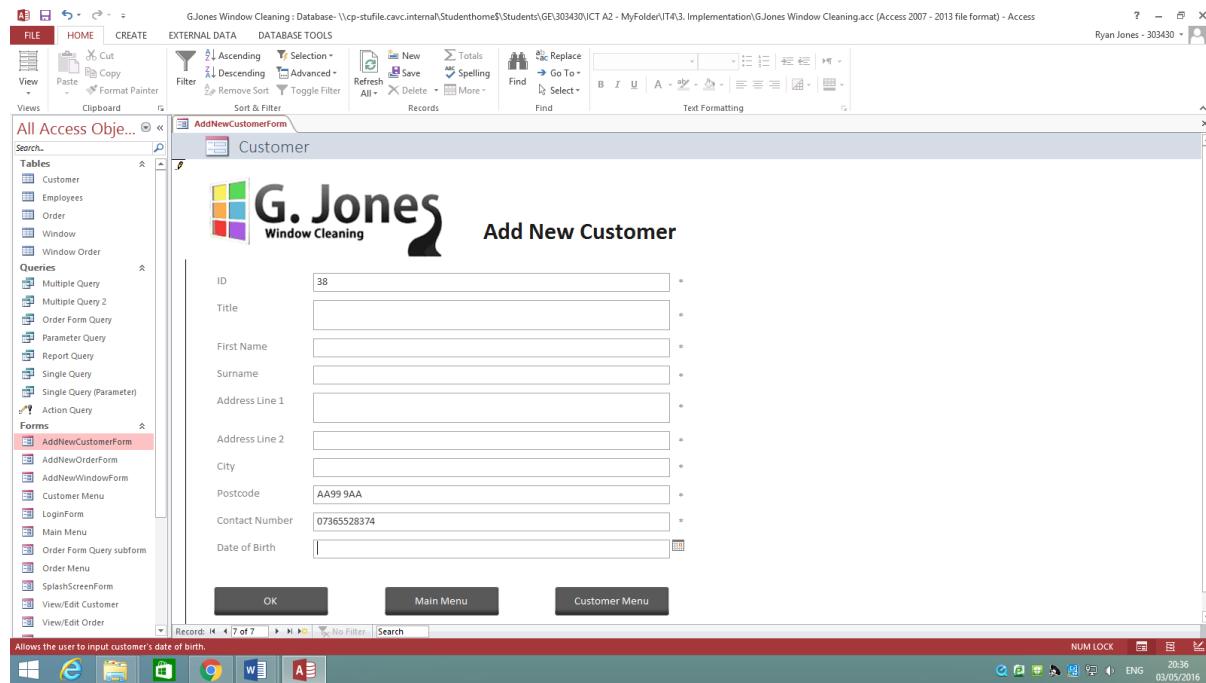
Print Screen 41.



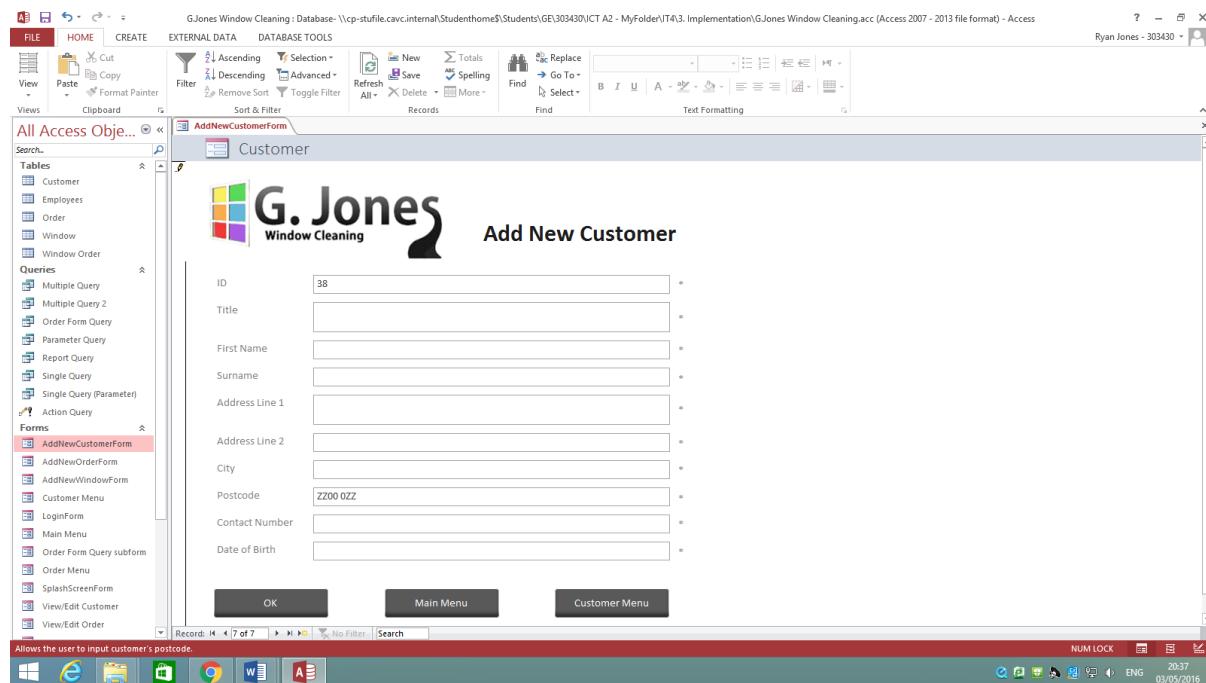
Testing

Print Screen 42.

(Accepted)



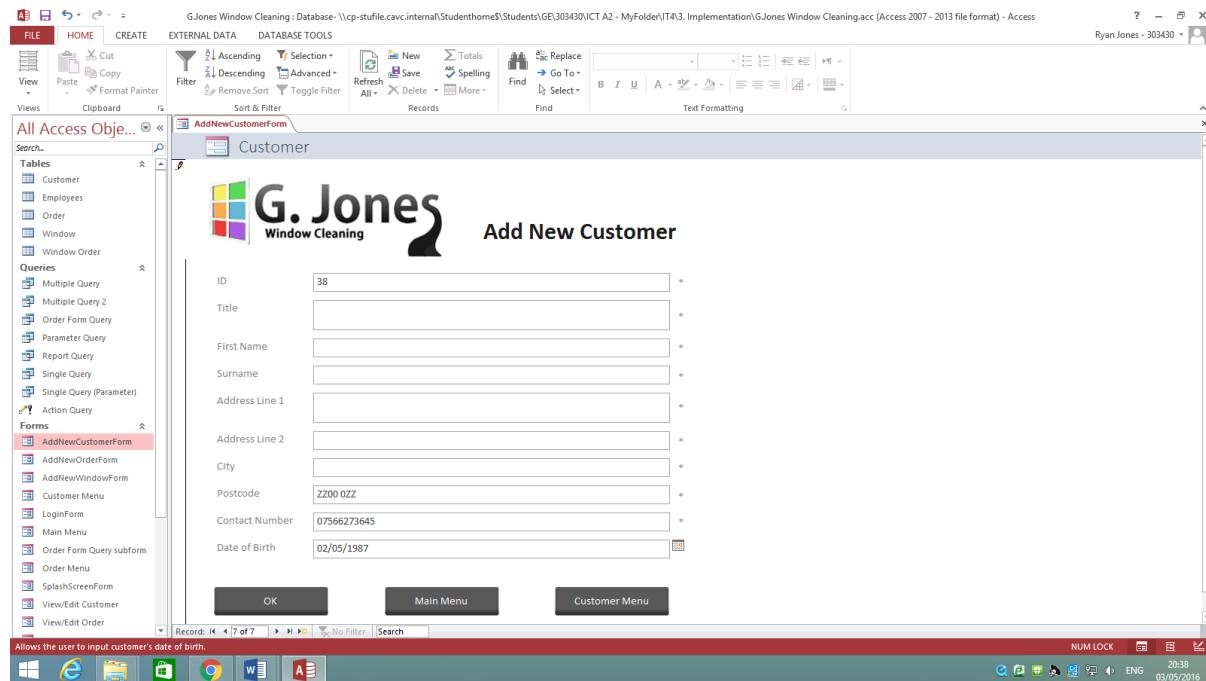
Print Screen 43.



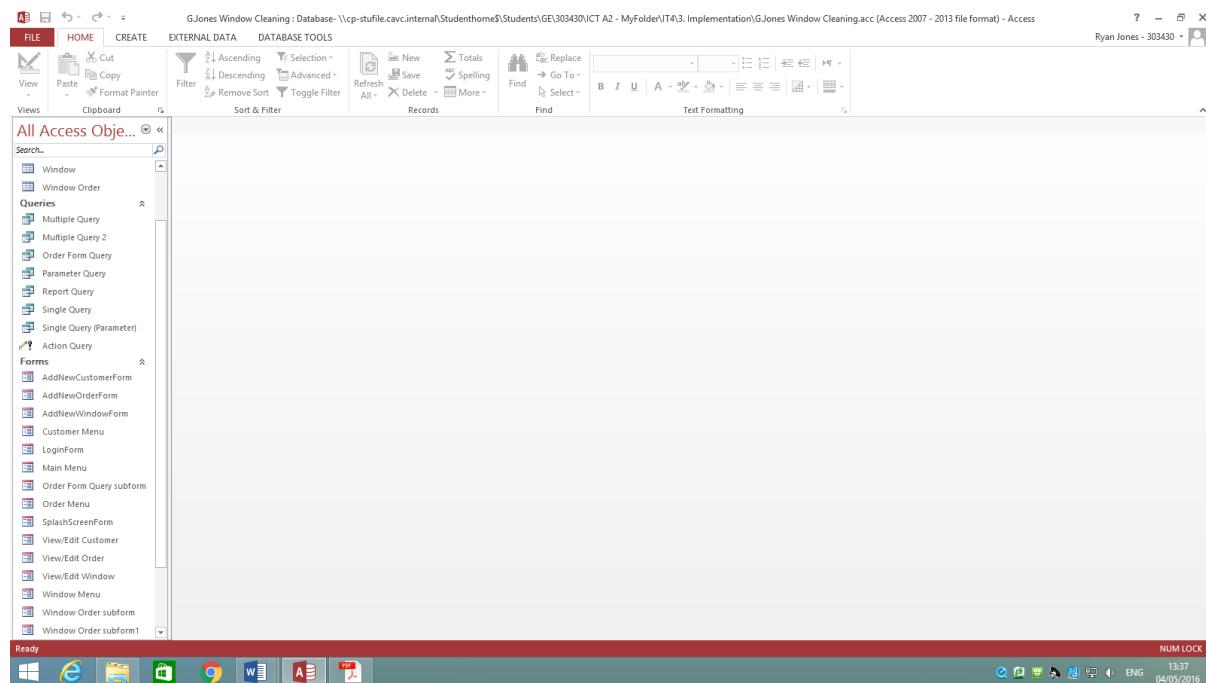
Testing

Print Screen 44.

(Accepted)

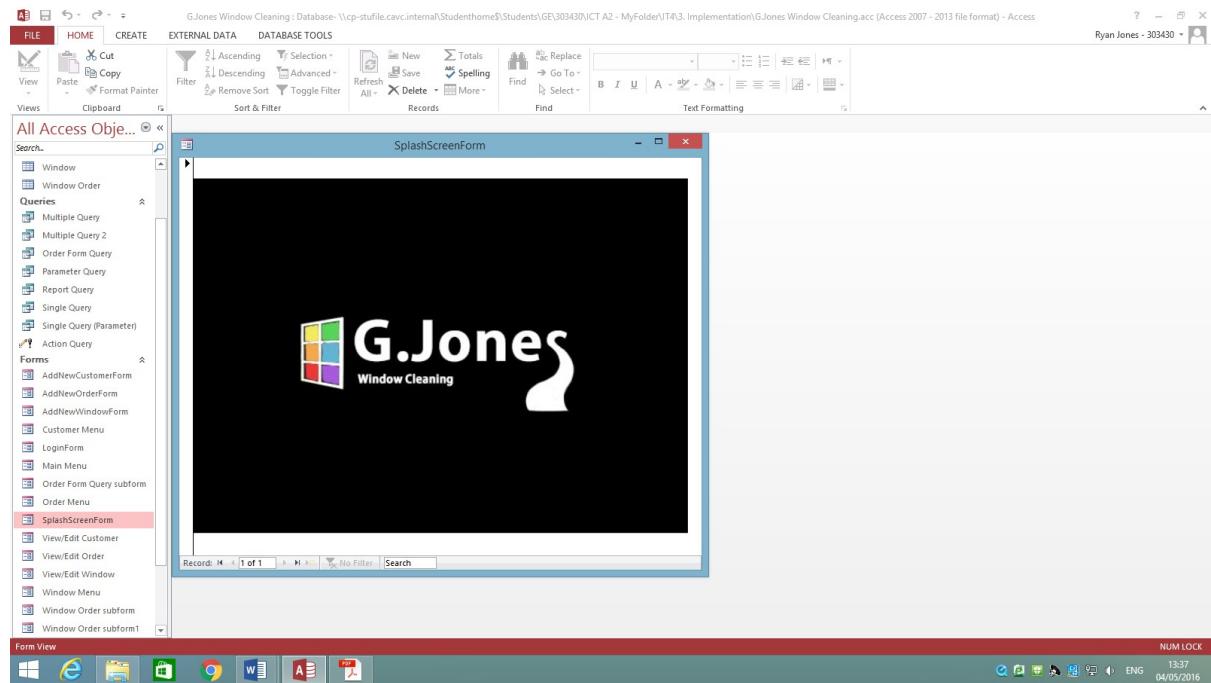


Print Screen 45.

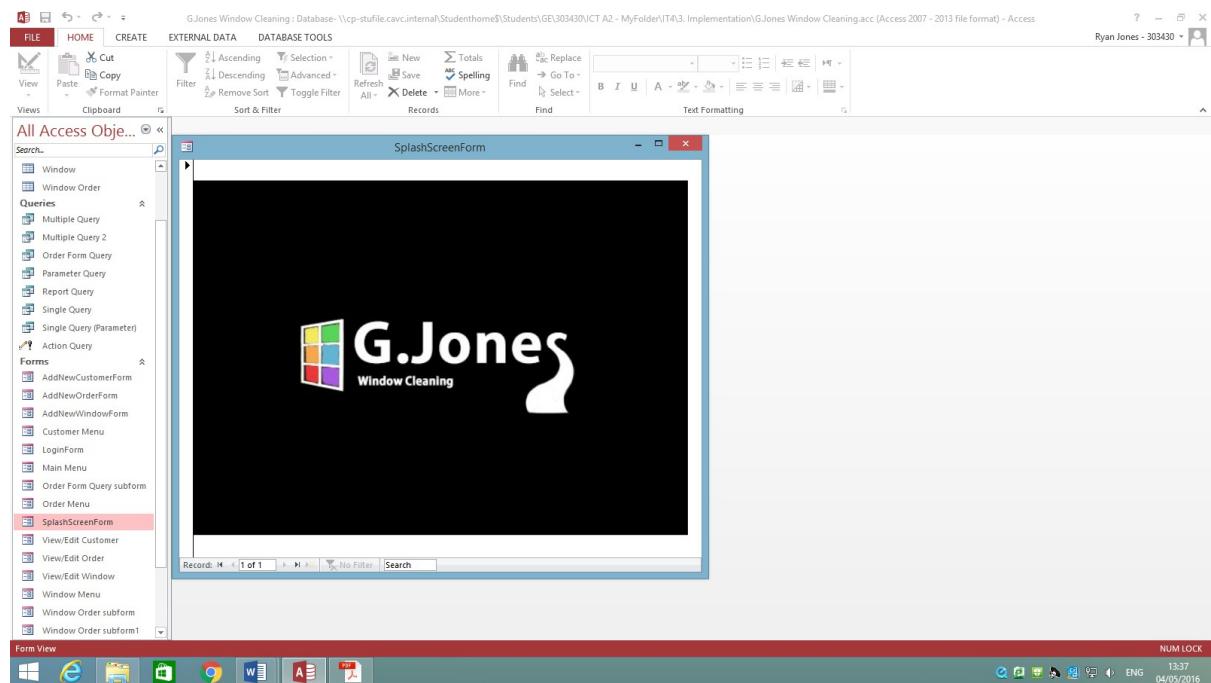


Testing

Print Screen 46.



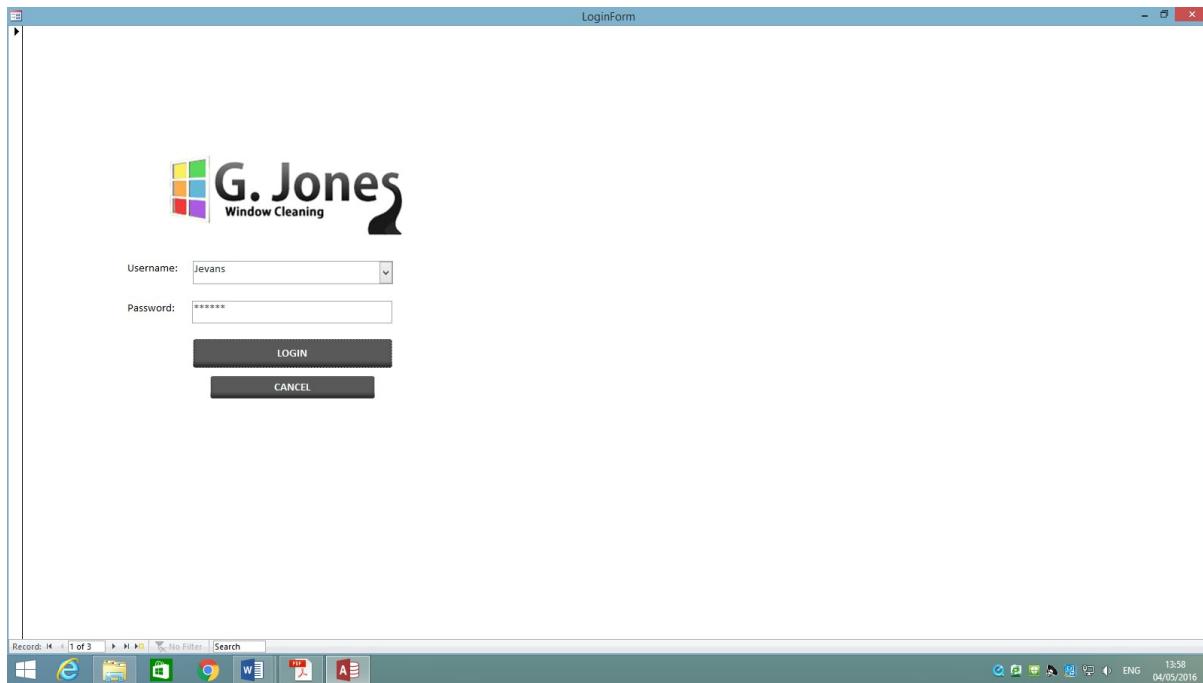
Print Screen 47.



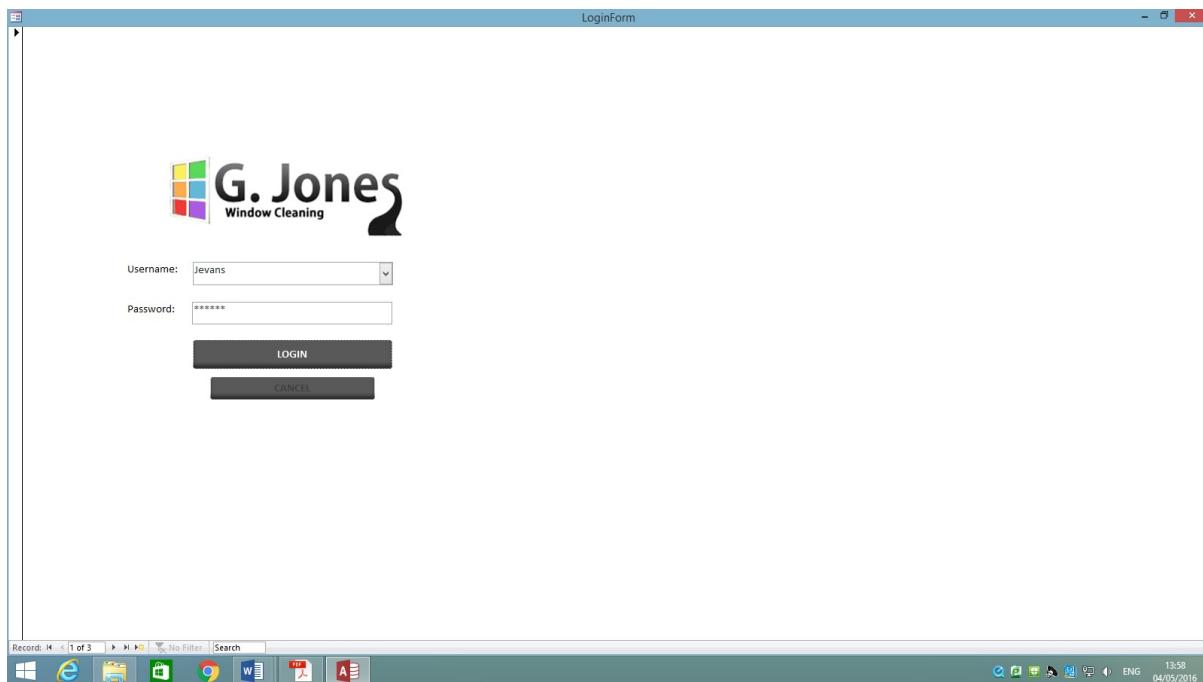
Testing

Print Screen 48.

(Upon click)



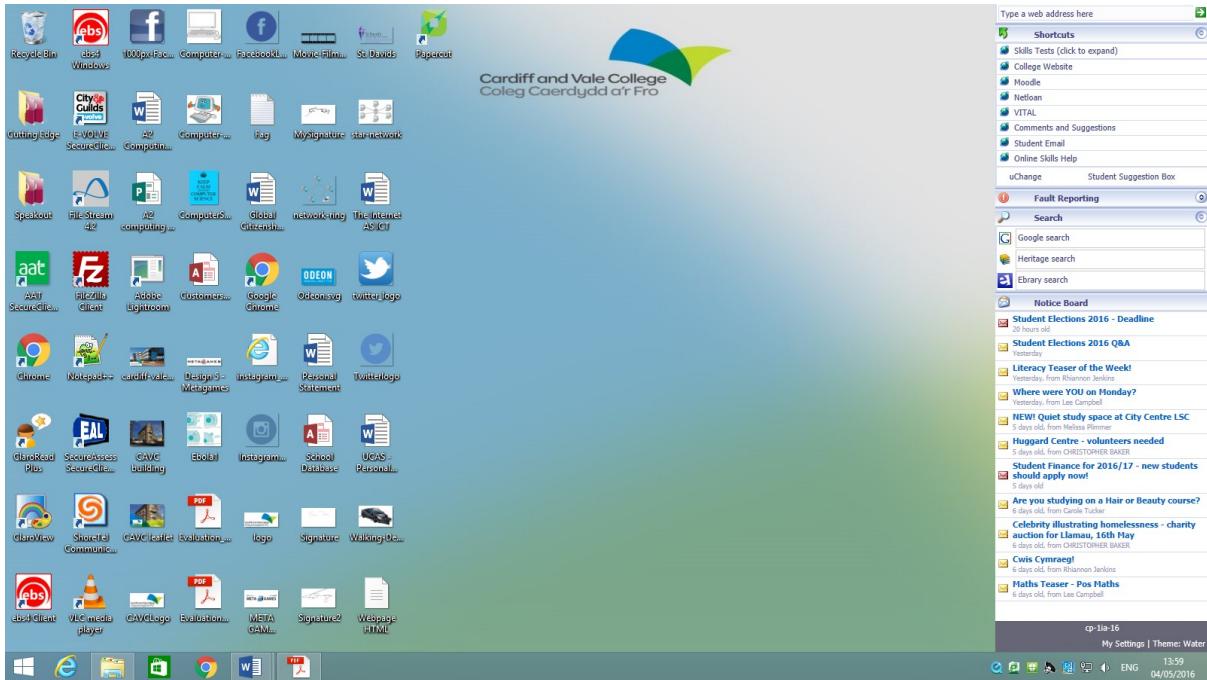
Print Screen 49.



Testing

Print Screen 50.

(System closes upon clicking Close)

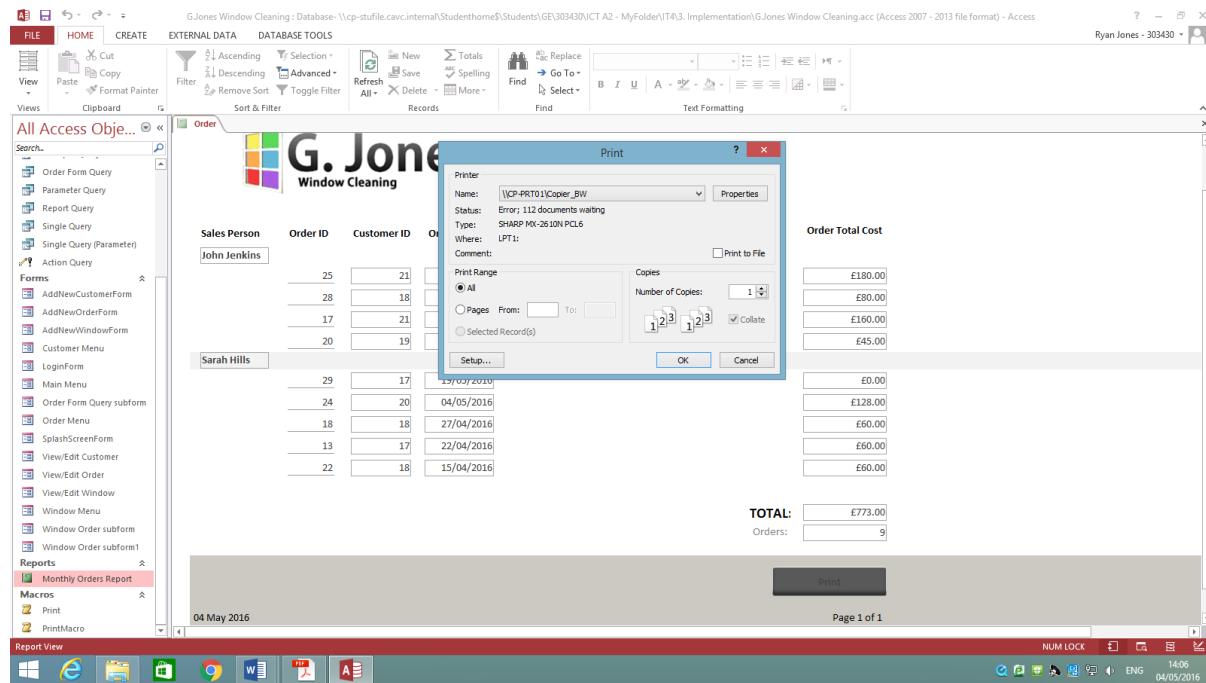


Print Screen 51.

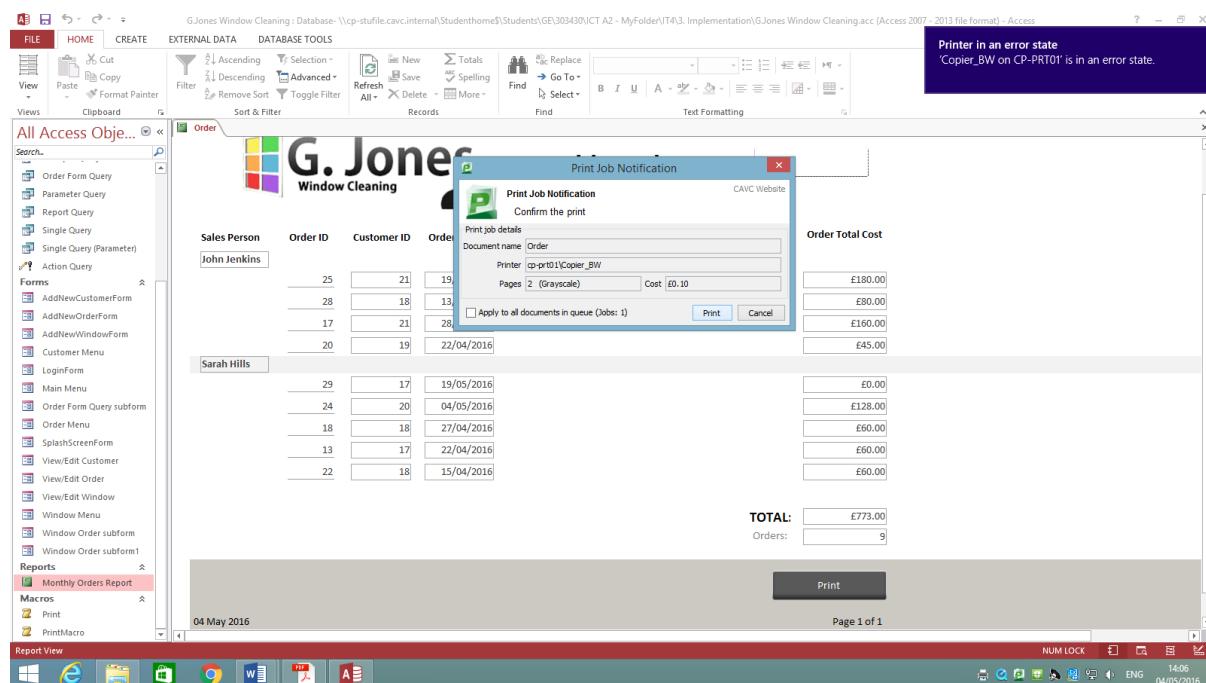
Sales Person	Order ID	Customer ID	Order Date	Order Total Cost
John Jenkins	25	21	19/05/2016	£180.00
	28	18	13/05/2016	£80.00
	17	21	28/04/2016	£160.00
	20	19	22/04/2016	£45.00
Sarah Hills	29	17	19/05/2016	£0.00
	24	20	04/05/2016	£128.00
	18	18	27/04/2016	£60.00
	13	17	22/04/2016	£60.00
	22	18	15/04/2016	£60.00
				TOTAL: £773.00
			Orders: 9	

Testing

Print Screen 52.

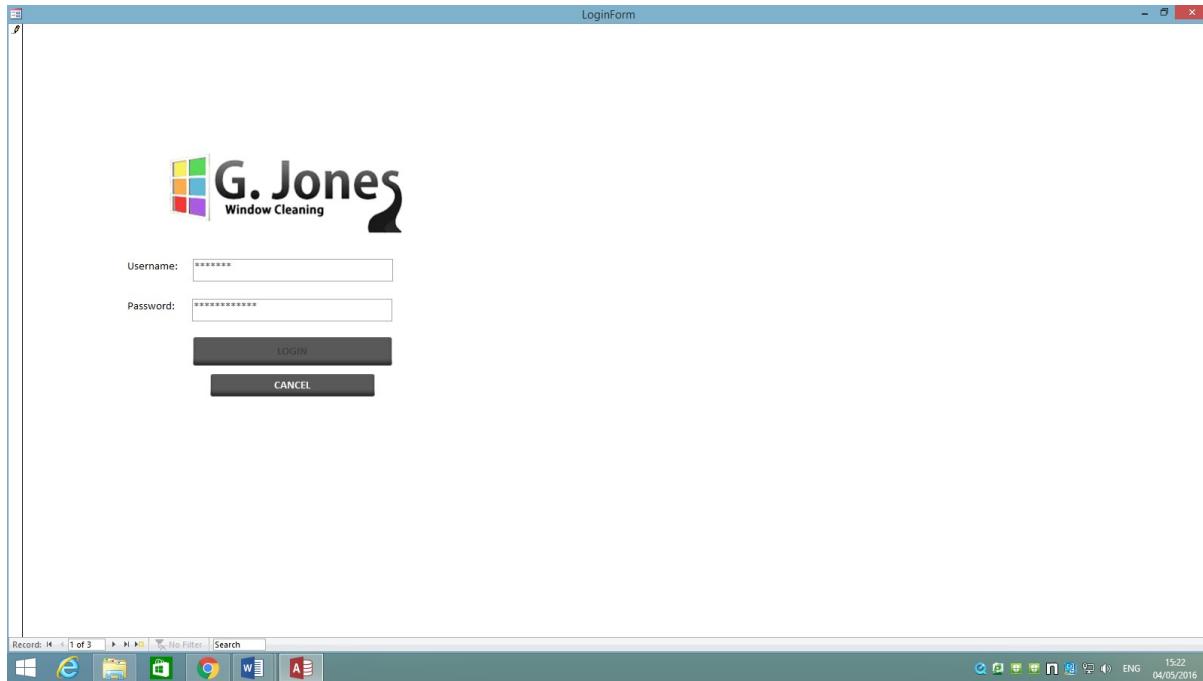


Print Screen 53.

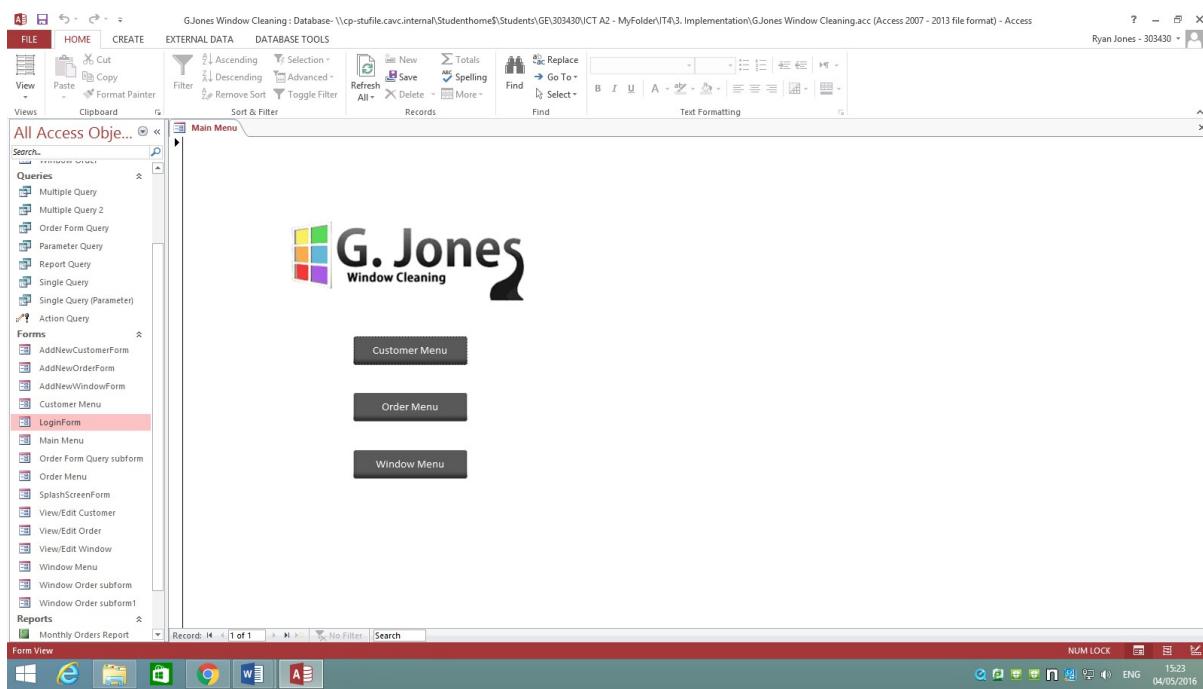


Testing

Print Screen 54.

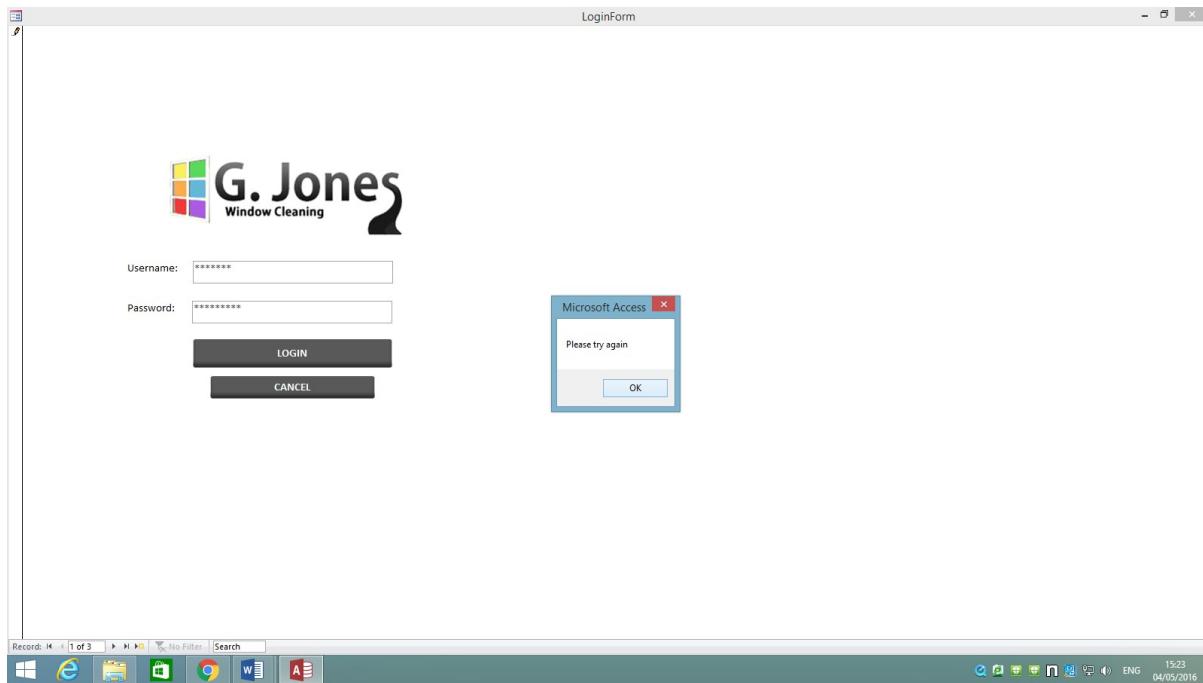


Print Screen 55.



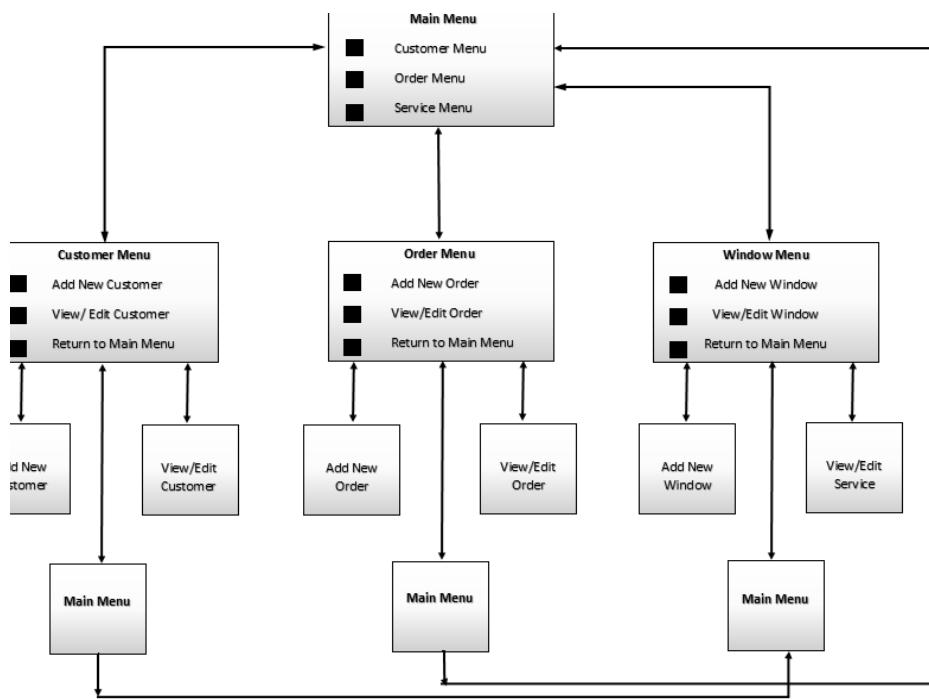
Testing

Print Screen 56.



Testing

Below is a diagram of a navigational structure of the database, showing how to navigate from one form to another.



Ryan Jones

IT4

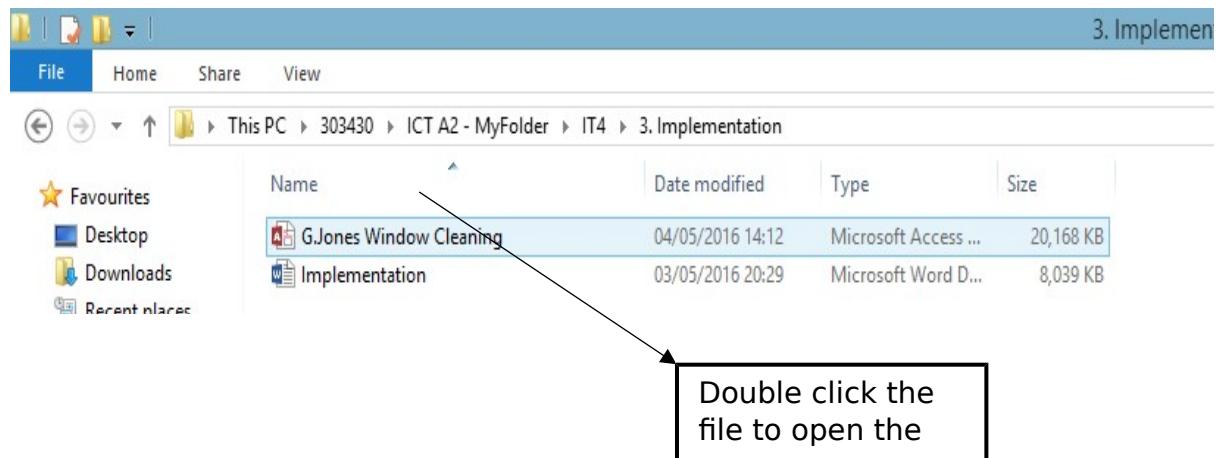
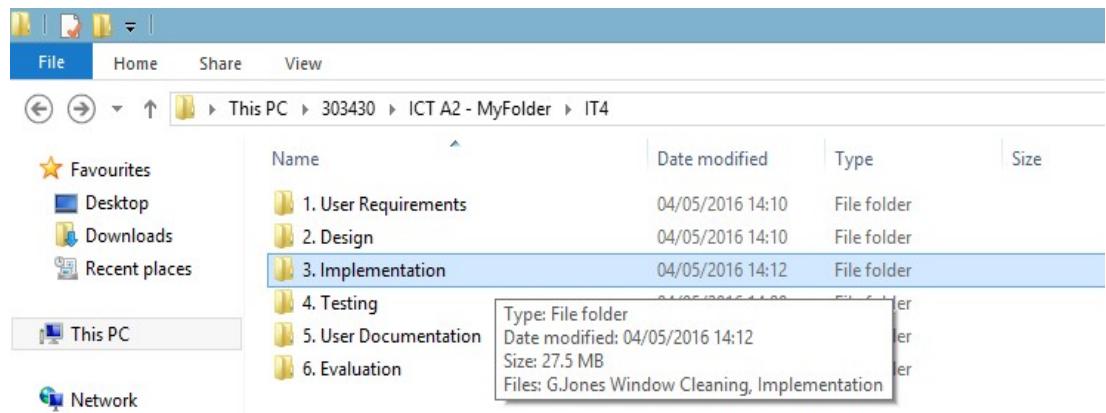
User Documentation



User Documentation

Where to find the Database:

In order to find the database the user must go to their documents from the start button and find the database. In this case, we will be going from documents into two separate folders to find out database. The user will find the database in either their documents or in a folder that it is stored in. We will find the database within the folder 'Implementation', which is inside 'A2 ICT', within documents (see image below).



User Documentation

How to start the Database:

Now you've found the database, you will be able to open and start up the database by double clicking on the file; this is going to start the database up and display the splash screen of the company's logo (in black instead of the usual white logo). From here, the user will have to click on the display. Once the user has clicked on the logo they will be greeted with a login screen. The user will have to input a username and password in order to gain access to the database (see image below).



Click the logo to go to the login



User Documentation

Database Security:

In order to ensure that the database is secure, it has been implemented with a password and username login system. This is used so that only authorised access is allowed, as once inside the database the user can make changes to the data, some of which is personal data of customers. The password and username for the system can be obtained from the manager or system manager. The system will keep a permanent record of the system password and username so that if an employee ever forgets the password it is possible to find it by simply calling the system manager.



Enter username and password to gain access to the

Username:

Password:

User Documentation

If the password and username have been correctly entered then the Main Menu



Customer Menu

Order Menu

Window Menu

Microsoft Access

Please try again

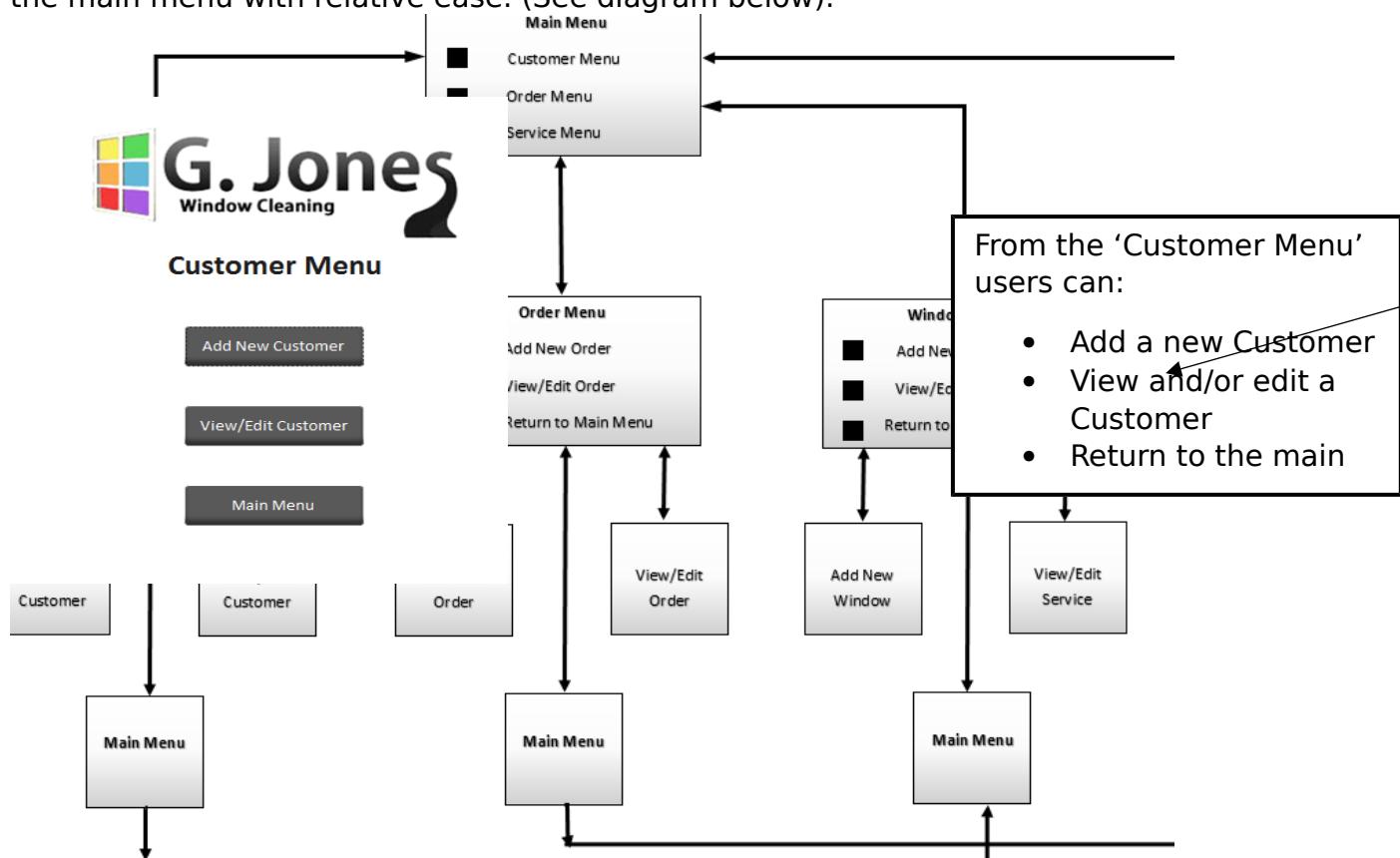


If the password and/or username have been entered incorrectly then an error

User Documentation

How to navigate the User Interface:

When the correct username and password have been entered the user will be logged into the system and the main menu will display, whereby the user can access the 'Customer Menu', 'Order Menu' and 'Window Menu'. Through these sub-menus the user will be able to navigate all the different forms and return to the main menu with relative ease. (See diagram below).



User Documentation



Order Menu

Add New Order

View/Edit Order

Main Menu

From the 'Order Menu' users can:

- Add a new order
- View and/or edit an order

From the 'Window Menu' users can:

- Add a new window
- View and/or edit a window



Window Menu

Add New Window

View/Edit Window

Main Menu

How to Add:

Customer record

To add a new customer record to the database you first have to open the 'Add New Customer' form, which can be found in the 'Customer Menu'. Once you've clicked on the 'Add New Customer' button you will be taken to the form shown below.

The screenshot shows a software interface for 'G. Jones Window Cleaning'. At the top left is the company logo with four colored squares (yellow, orange, blue, purple) followed by the text 'G. Jones' and 'Window Cleaning'. To the right of the logo is the title 'Add New Custom'. Below the title is a form with the following fields:

Date	<input type="text" value="([New])"/>
Title	<input type="text"/>
First Name	<input type="text"/>
Surname	<input type="text"/>
Address Line 1	<input type="text"/>
Address Line 2	<input type="text"/>
City	<input type="text"/>
Postcode	<input type="text"/>
Contact Number	<input type="text"/>
Date of Birth	<input type="text"/>

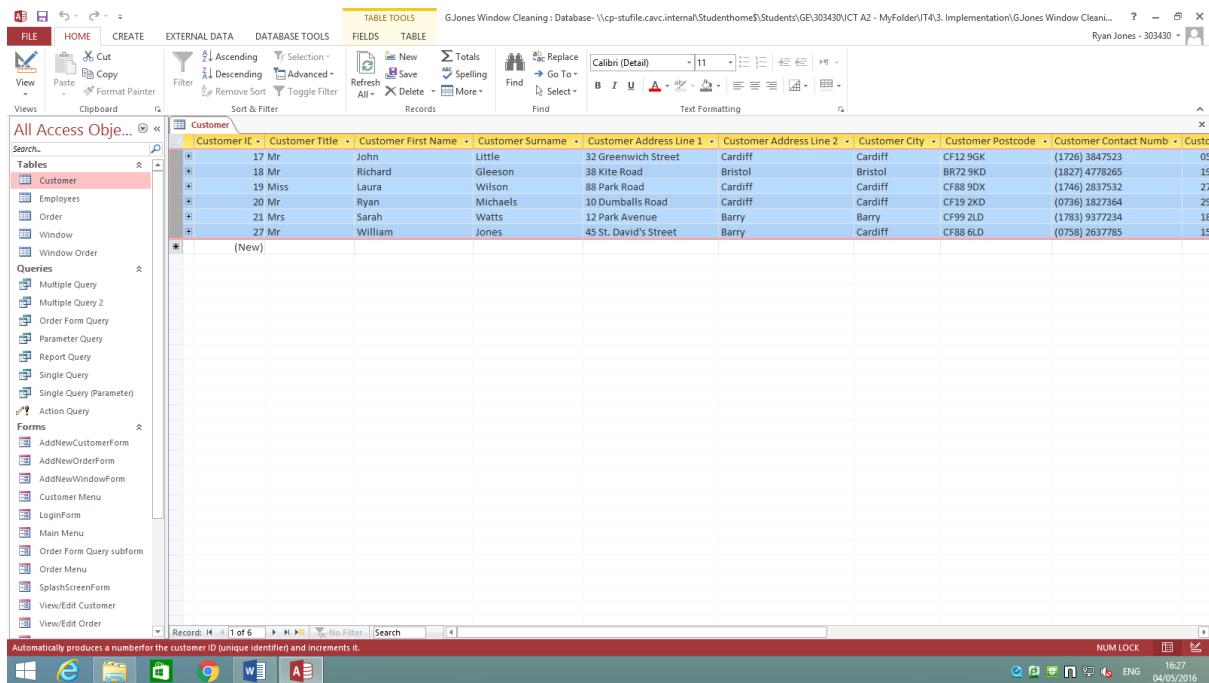
At the bottom of the form are three buttons: 'OK', 'Main Menu', and 'Customer Menu'. A callout box with an arrow points to the 'OK' button, containing the text: 'Click this button to save the customer record to the database.'

From here you are able to fill in the form with all the window details to create a customer record, which will automatically be given an ID number, which will be used to access existing customer details later on. The form includes the following fields:

User Documentation

- Customer ID
- Customer Title
- Customer First Name
- Customer Surname
- Customer Address Line 1
- Customer Address Line 2
- Customer City
- Customer Postcode
- Customer Contact Number
- Customer Date of Birth

When all the fields are filled out you need to click on the 'OK' macro button, this will automatically save all the fields and create a customer record in the database. (See below).



How to Add:

Order Record

User Documentation

When you want to add a new order to the database you first have to open the 'Add New Order' form. You can do this by selecting the 'Add New Order' button on the 'Order Menu'.

The screenshot shows the 'Add New Order' form. At the top left is the company logo 'G. Jones Window Cleaning'. The main title 'Add New Order' is centered above the input fields. The form contains the following fields:

- Order ID: (New) [Input Field]
- Customer ID: 0 [Input Field]
- Date [Input Field]
- Time [Input Field]
- Delivery Date [Input Field]
- Cost (before tax) [Input Field]
- VAT Cost [Input Field]
- Total Cost [Input Field]
- Sales Person [Input Field]
- Month [Input Field]

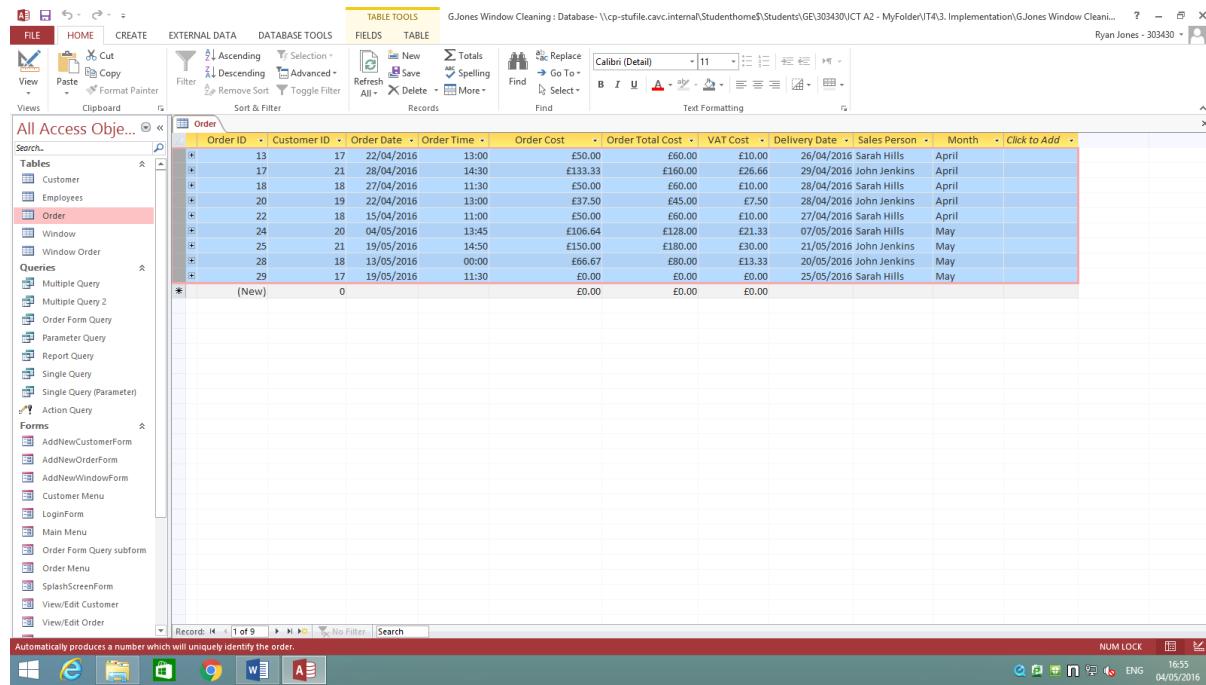
Below the form are three buttons: 'OK', 'Main Menu', and 'Order Menu'. A subform titled 'Window Order subform' is partially visible at the bottom. The 'Total Cost' field has a note: 'These fields will be automatically calculated'. A callout box points to the 'OK' button with the instruction: 'Click this button to save the order record to the database'.

From here you can fill in the form by entering data into all of the fields. The order will be given a unique ID which will be used in order to access details in the future. The form will include the following fields:

- Order ID
- Customer ID
- Order Date
- Order Time
- Order Cost
- Order Total Cost
- VAT Cost
- Delivery Date
- Sales Person
- Month
- Window ID
- Window Quantity
- Cost of Window

User Documentation

When all the fields are filled out you need to click on the 'OK' macro button, this will automatically save all the fields and create an order record in the database. (See below).



How to Add:

Window Record

User Documentation

To add a new window record to the database you first have to open the 'Add New Window' form, which can be found in the 'Order Menu'. Once you've clicked on the 'Add New Window' button you will be taken to the form shown below.

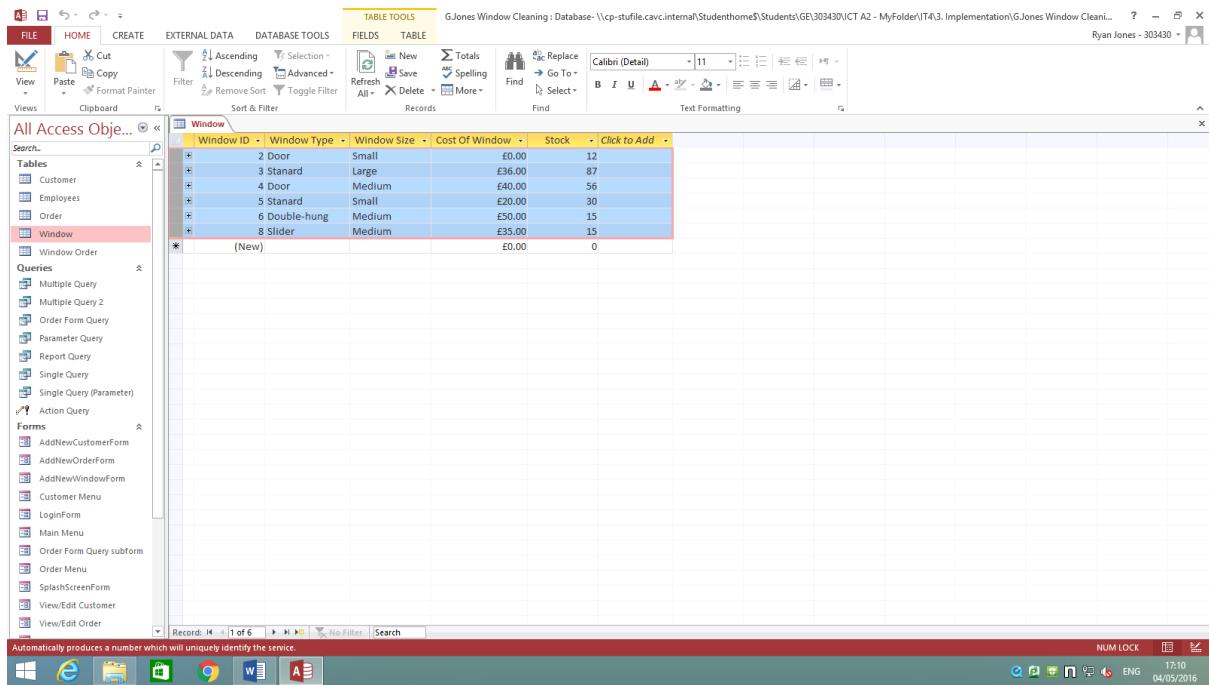
The screenshot shows a software interface for 'G. Jones Window Cleaning'. At the top left is the company logo, which consists of a stylized window frame icon followed by the text 'G. Jones' in a large serif font, with 'Window Cleaning' in a smaller sans-serif font below it. To the right of the logo, the title 'Add New Window' is displayed in a bold, dark font. Below the title is a horizontal line separating the header from the form fields. The form itself has five input fields: 'Window ID' (containing '[New]'), 'Window Type' (empty), 'Window Size' (empty), 'Cost of Window' (containing '£0.00'), and 'Stock' (containing '0'). At the bottom of the form are three buttons: 'OK', 'Main Menu', and 'Order Menu'. A callout box with a black border and white text is positioned on the right side of the 'OK' button. It contains the instruction: 'Click this button to save the order record to the database'. An arrow points from the text in the callout box to the 'OK' button.

From here you are able to fill in the form with all the window details to create a window record, which will automatically be given an ID number, which will be used to access existing order details later on. The form includes the following fields:

- Window ID
- Window Type
- Window Size
- Cost of Window
- Stock

When all the fields are filled out you need to click on the 'OK' macro button, this will automatically save all the fields and create a window record in the database. (See below).

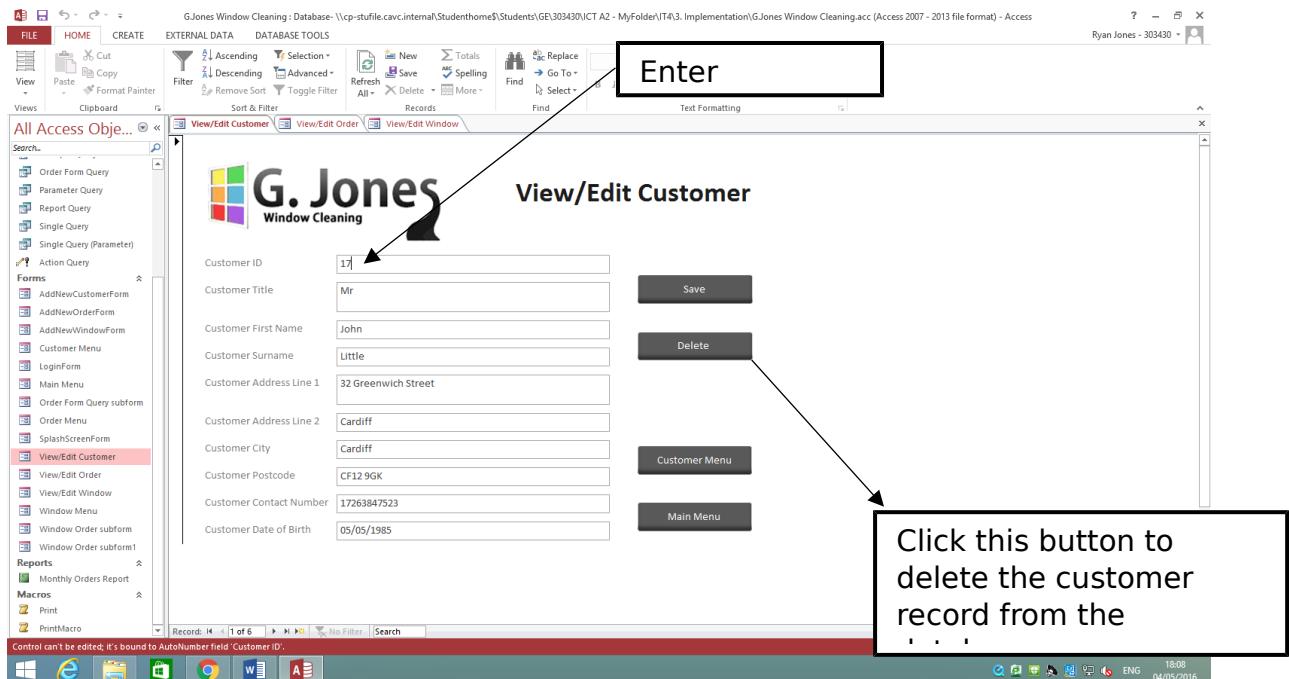
User Documentation



How to Delete:

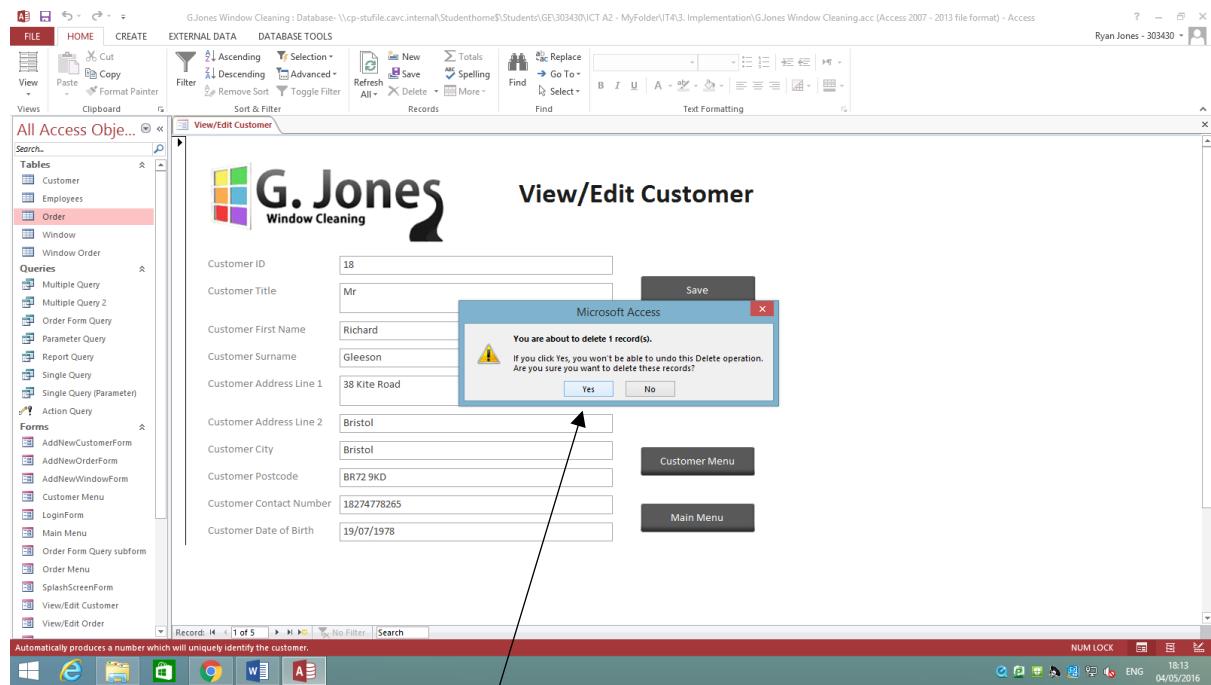
Customer Record

When you want to delete a customer's record you will need to open up the 'View/Edit Customer' form. This can be accessed via the 'Customer Menu' form. By inputting the customer ID you can display the rest of the fields of the customer.



User Documentation

From here you can then delete the record. This can be done by clicking on the 'Delete' button. Once you've clicked on the button an error message will appear and you will need to confirm that you want to delete the record. (See below)



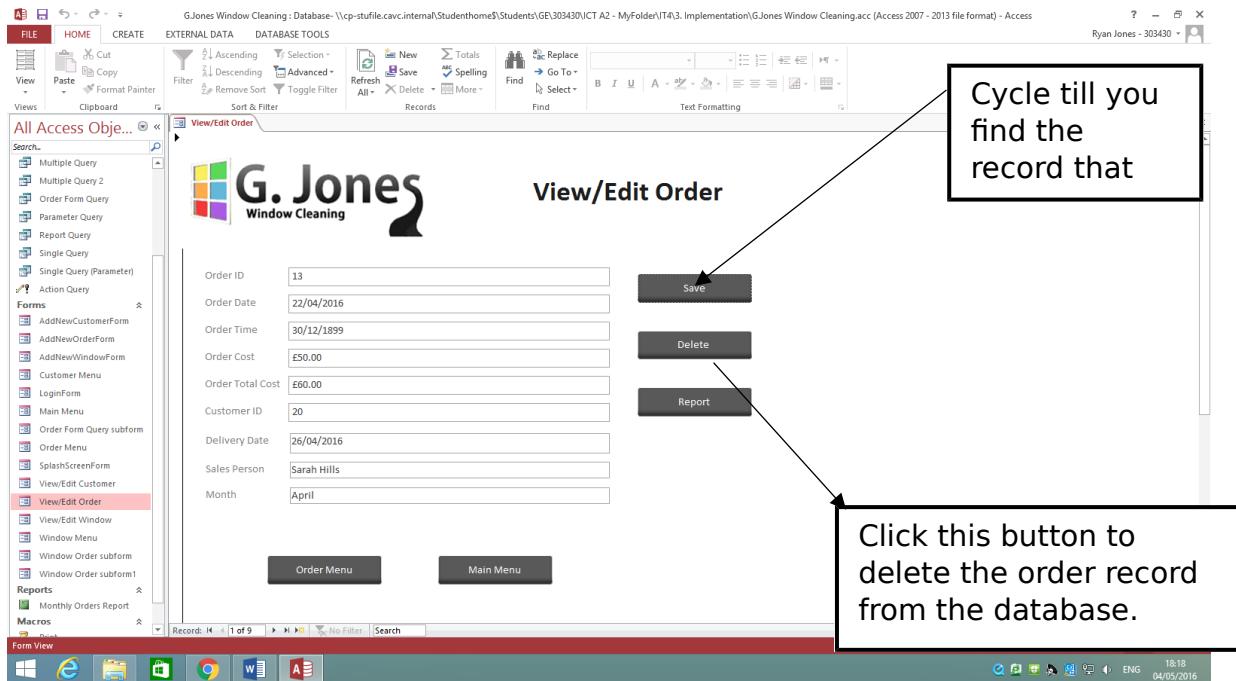
When you confirm that you want to delete the chosen record then all of the customer details will be removed from the

How to delete:

User Documentation

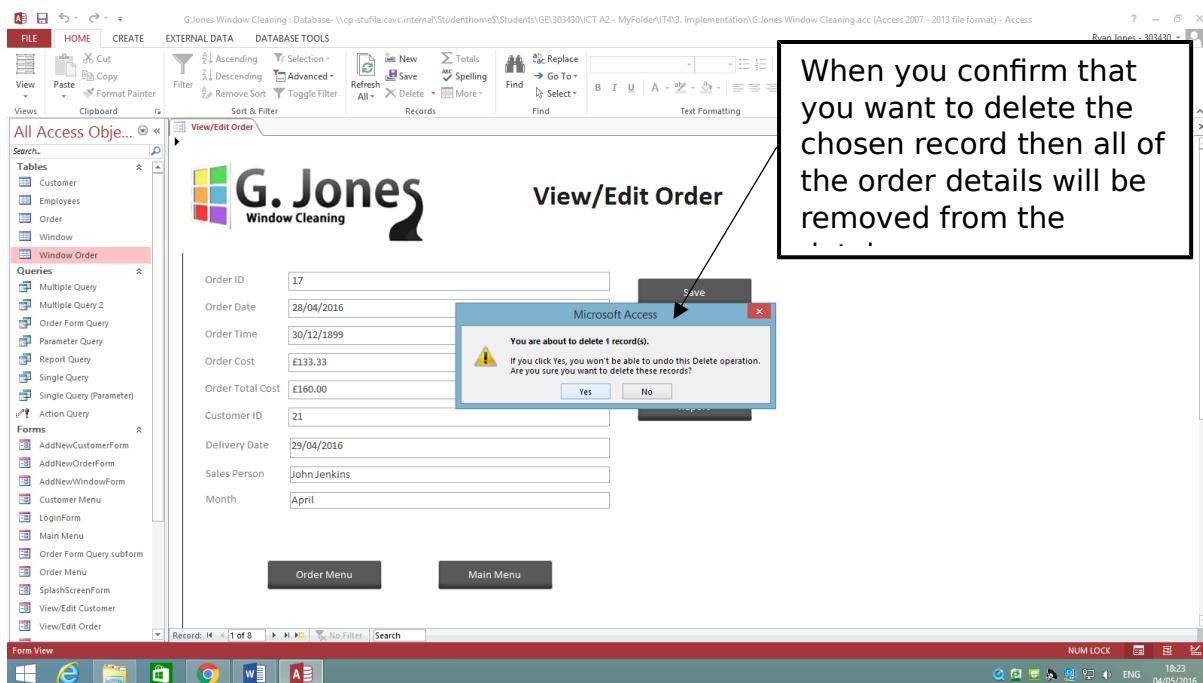
Order Record

When you want to delete an order record you will need to open up the 'View/Edit Order' form. This can be accessed via the 'Order Menu' form. By selecting the save button you can cycle through the records.



From here you can then delete the record. This can be done by clicking on the 'Delete' button. Once you've clicked on the button an error message will appear and you will need to confirm that you want to delete the record. (See below)

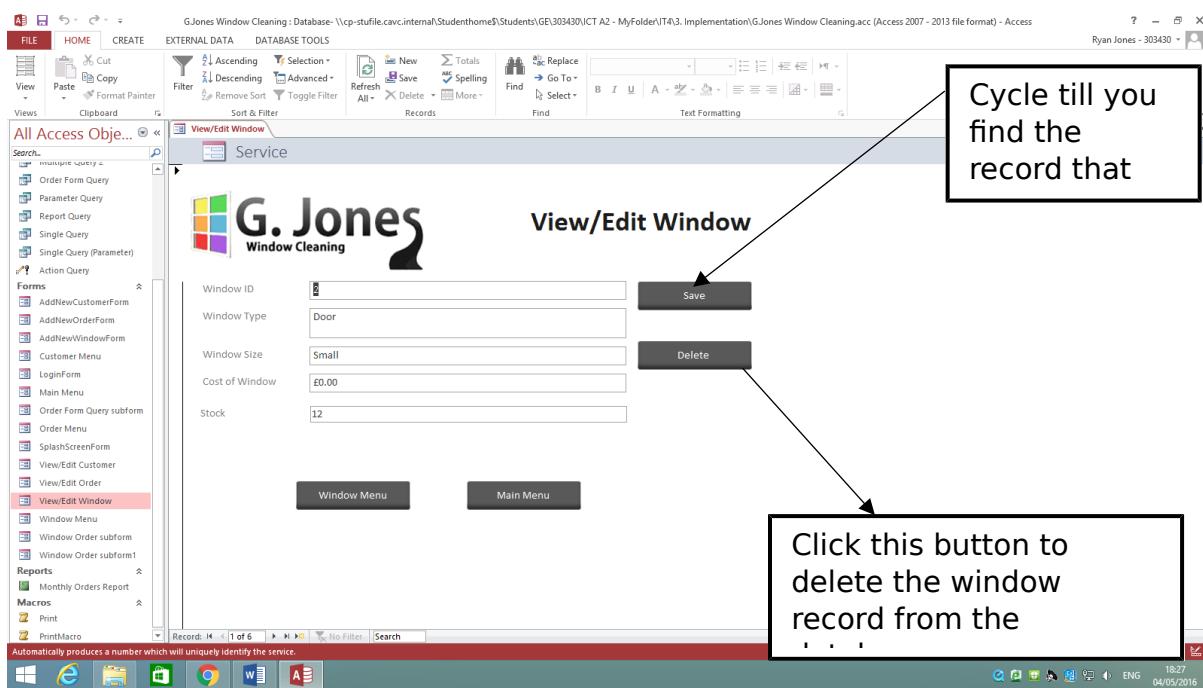
User Documentation



How to Delete:

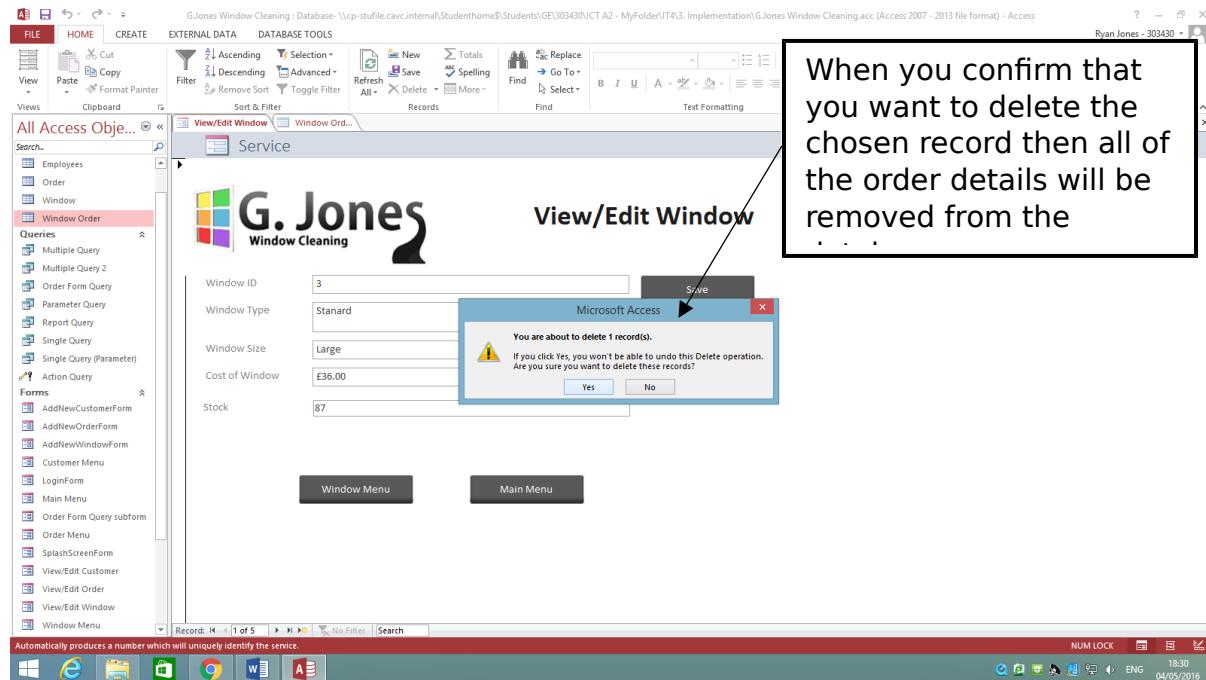
Window Record

When you want to delete a window record you will need to open up the 'View/Edit Window' form. This can be accessed via the 'Window Menu' form. By selecting the save button you can cycle through the records.



User Documentation

From here you can then delete the record. This can be done by clicking on the 'Delete' button. Once you've clicked on the button an error message will appear and you will need to confirm that you want to delete the window record. (See below)



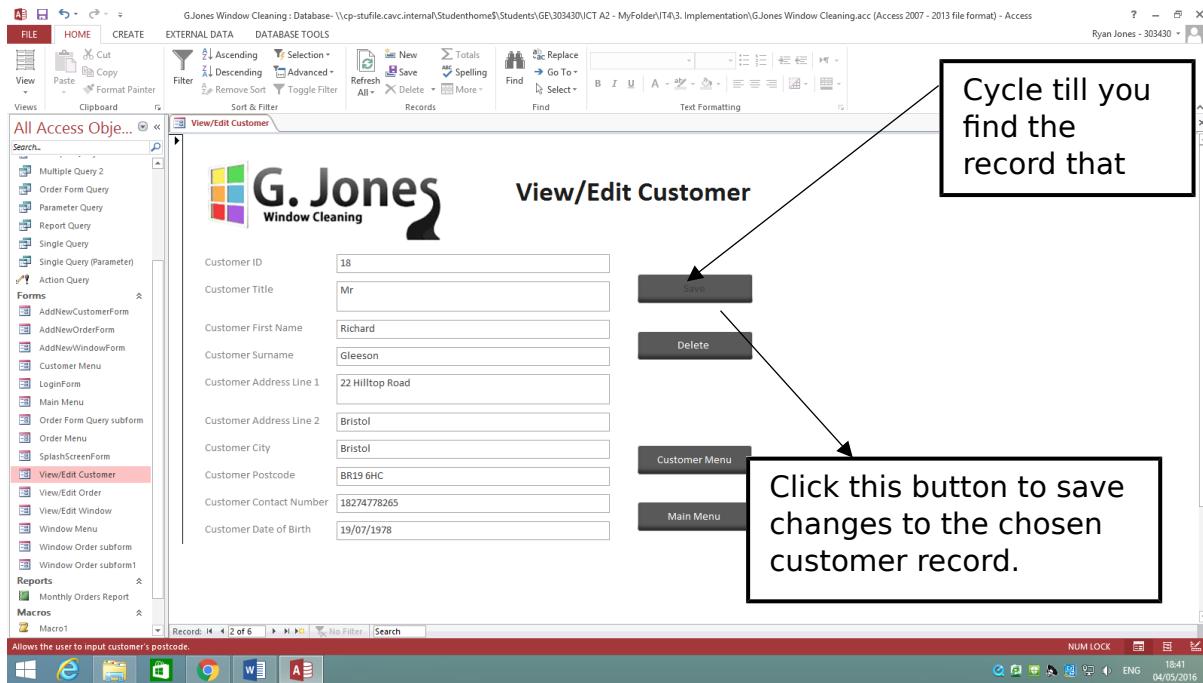
When you confirm that you want to delete the chosen record then all of the order details will be removed from the

User Documentation

How to Edit:

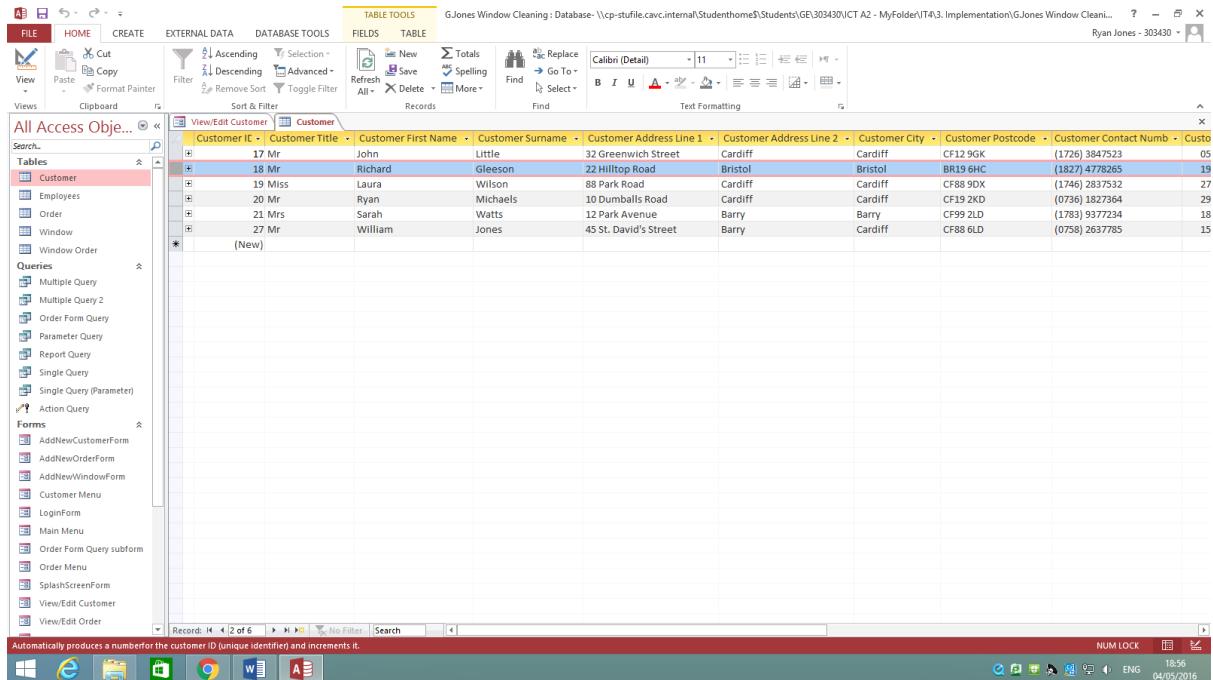
Customer Record

To edit a customer record which is already saved within the database then you firstly need to open the 'View/Edit Customer' form. This can accessed via the 'Customer Menu' form. By selecting the save button you can cycle through the records.



From here you can edit the customer record. A use of this edit feature is in the event that a customer has moved house and needs their address and postcode updated, as we do not want deliveries to be sent to the wrong address. The record and the relevant fields can easily be updated without having to create a new record. Once you've edited the record you can click the 'Save' button to update the customer record.

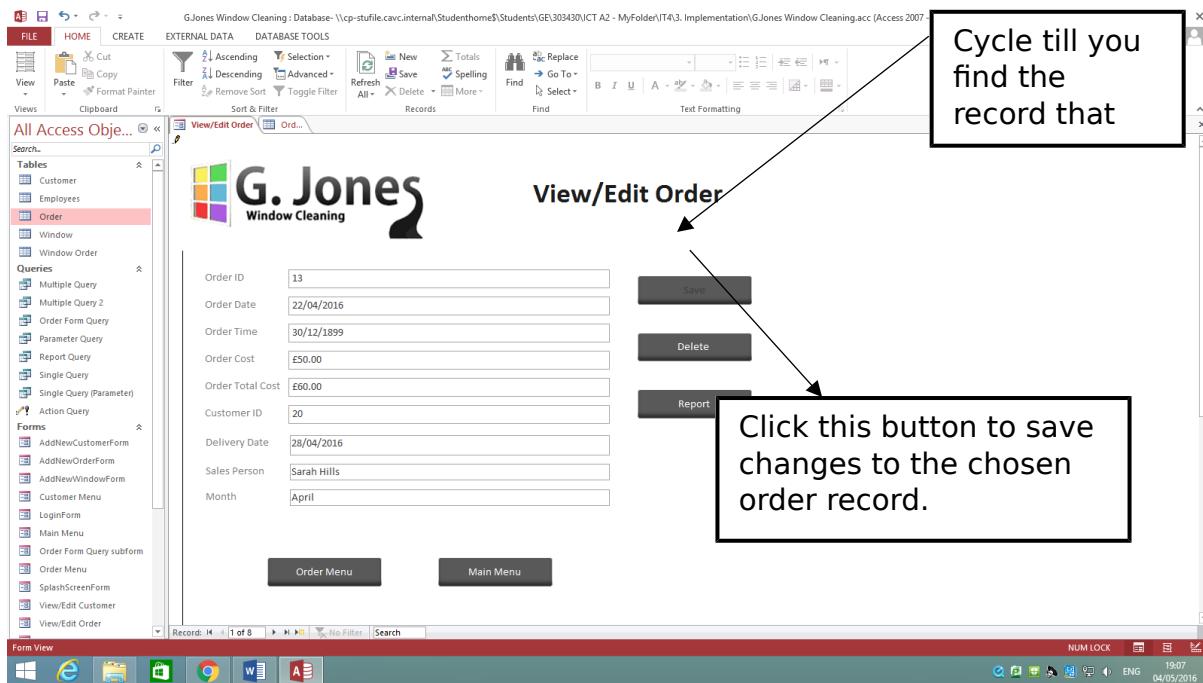
User Documentation



How to Edit:

Order Record

To edit an order record which is already saved within the database then you firstly need to open the 'View/Edit Order' form. This can accessed via the 'Order Menu' form. By selecting the save button you can cycle through the records.



User Documentation

From here you can edit the order record. A use of this edit feature is in the event that a customer wants to change their delivery date from 26/04/2016 to 28/04/2016. The record and the relevant fields can easily be updated without having to create a new record. Once you've edited the record you can click the 'Save' button to update the order record.

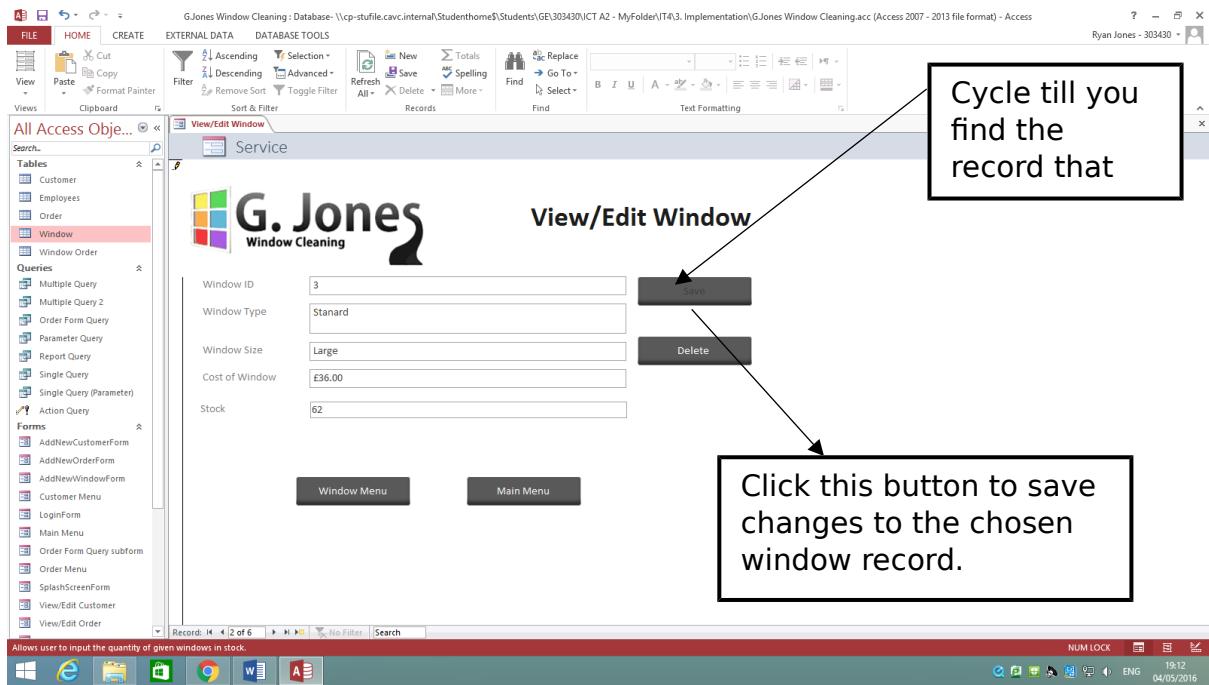
Order ID	Customer ID	Order Date	Order Time	Order Cost	Order Total Cost	VAT Cost	Delivery Date	Sales Person	Month	Click to Add
13	20	22/04/2016	13:00	£50.00	£60.00	£10.00	28/04/2016	Sarah Hills	April	
17	21	28/04/2016	14:30	£133.33	£160.00	£26.66	29/04/2016	John Jenkins	April	
18	18	27/04/2016	11:30	£50.00	£60.00	£10.00	28/04/2016	Sarah Hills	April	
20	19	22/04/2016	13:00	£37.50	£45.00	£7.50	28/04/2016	John Jenkins	April	
22	18	15/04/2016	11:00	£50.00	£60.00	£10.00	27/04/2016	Sarah Hills	April	
24	20	04/05/2016	13:45	£106.64	£128.00	£21.33	08/05/2016	Sarah Hills	May	
25	21	19/05/2016	14:50	£150.00	£180.00	£30.00	21/05/2016	John Jenkins	May	
28	18	13/05/2016	00:00	£66.67	£80.00	£13.33	20/05/2016	John Jenkins	May	
*	(New)	0		£0.00	£0.00	£0.00				

How to Edit:

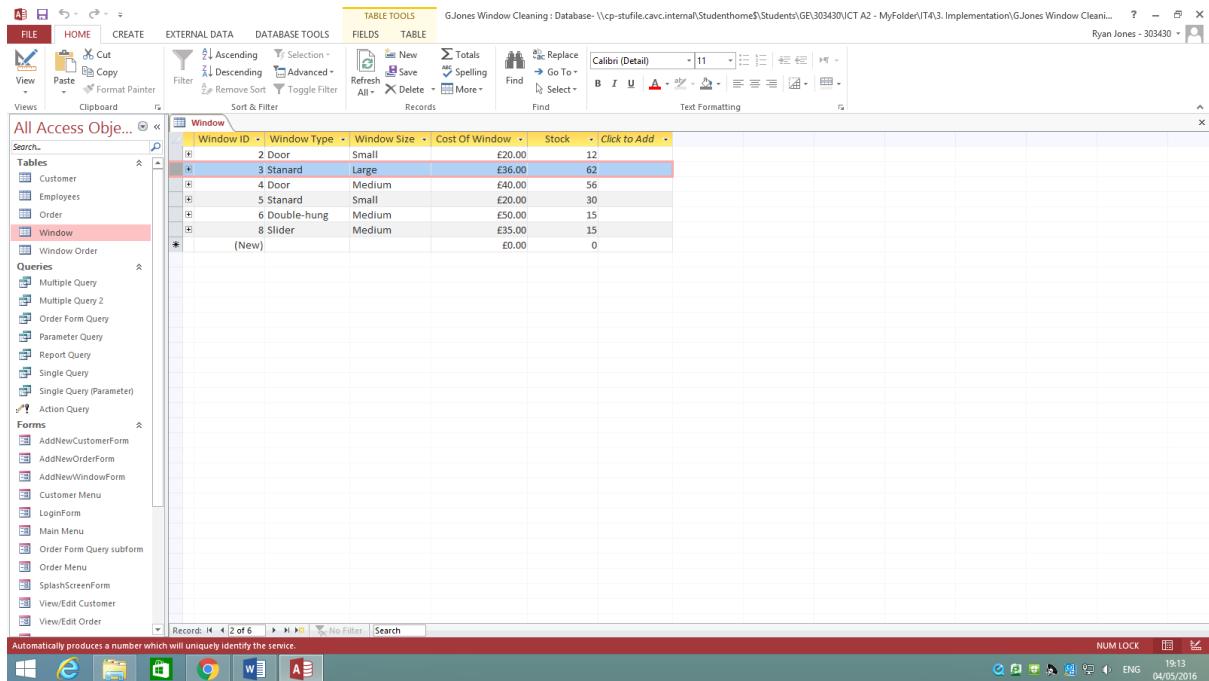
Window Record

To edit a window record which is already saved within the database then you firstly need to open the 'View/Edit Window' form. This can accessed via the 'Window Menu' form. By selecting the save button you can cycle through the records.

User Documentation



From here you can edit the window record. A use of this edit feature is in the event that the user wants to update the stock of a particular window record. The record and the relevant fields can easily be updated without having to create a new record. Once you've edited the record you can click the 'Save' button to update the order record.

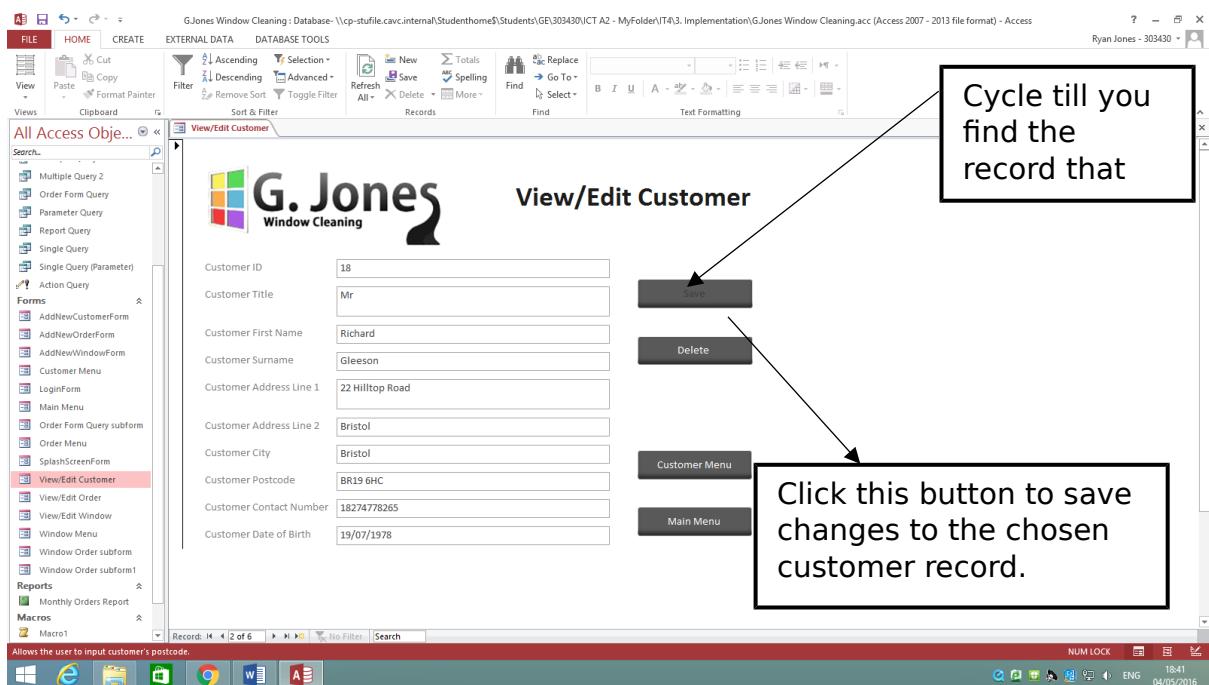


User Documentation

How to Save:

Customer Record

Users can only save changes to the customer record via the 'View/Edit Customer' form. By selecting the save button you can cycle through the records, once a change has been made to a record and you select 'Save' it will update that record in the database. This should be done whenever the customer's details change, as it will ensure that the database is kept up to date.



User Documentation

Once you've clicked the 'Save' button then the customer record will be updated with the new data. Being able to update previous records reduces the risk of data duplication by creating new records.

Customer ID	Customer Title	Customer First Name	Customer Surname	Customer Address Line 1	Customer Address Line 2	Customer City	Customer Postcode	Customer Contact Number
17	Mr	John	Little	32 Greenwich Street		Cardiff	CF12 9GK	(1726) 3847523
18	Mr	Richard	Gleeson	22 Hilltop Road		Bristol	BR19 6HC	(1827) 4778265
19	Miss	Laura	Wilson	88 Park Road		Cardiff	CF88 9DX	(1746) 2837532
20	Mr	Ryan	Michaels	10 Dumballs Road		Cardiff	CF19 2KD	(0736) 1827364
21	Mrs	Sarah	Watts	12 Park Avenue		Barry	CF99 2LD	(1783) 9377234
27	Mr	William	Jones	45 St. David's Street		Barry	CF88 6LD	(0758) 2637785
*	(New)							

How to Save:

Order Record

Users can only save changes to the order record via the 'View/Edit Order' form. By selecting the save button you can cycle through the records, once a change has been made to a record and you select 'Save' it will update that record in the database.

Cycle till you find the record that

View/Edit Order

Save

Delete

Report

Click this button to save changes to the chosen order record.

User Documentation

Once you've clicked the 'Save' button then the order record will be updated with the new data. Being able to update previous order records reduces the risk of data duplication by creating new records.

The screenshot shows the Microsoft Access application interface. On the left, the navigation pane displays 'All Access Objects' with categories like Tables, Queries, and Forms. The 'Tables' section has 'Order' selected. The main area shows a datasheet of order records. A new record is being added at the bottom, indicated by '(New)' in the Order ID column. The table structure includes columns for Order ID, Customer ID, Order Date, Order Time, Order Cost, Order Total Cost, VAT Cost, Delivery Date, Sales Person, and Month. The data shows various orders from April and May 2016.

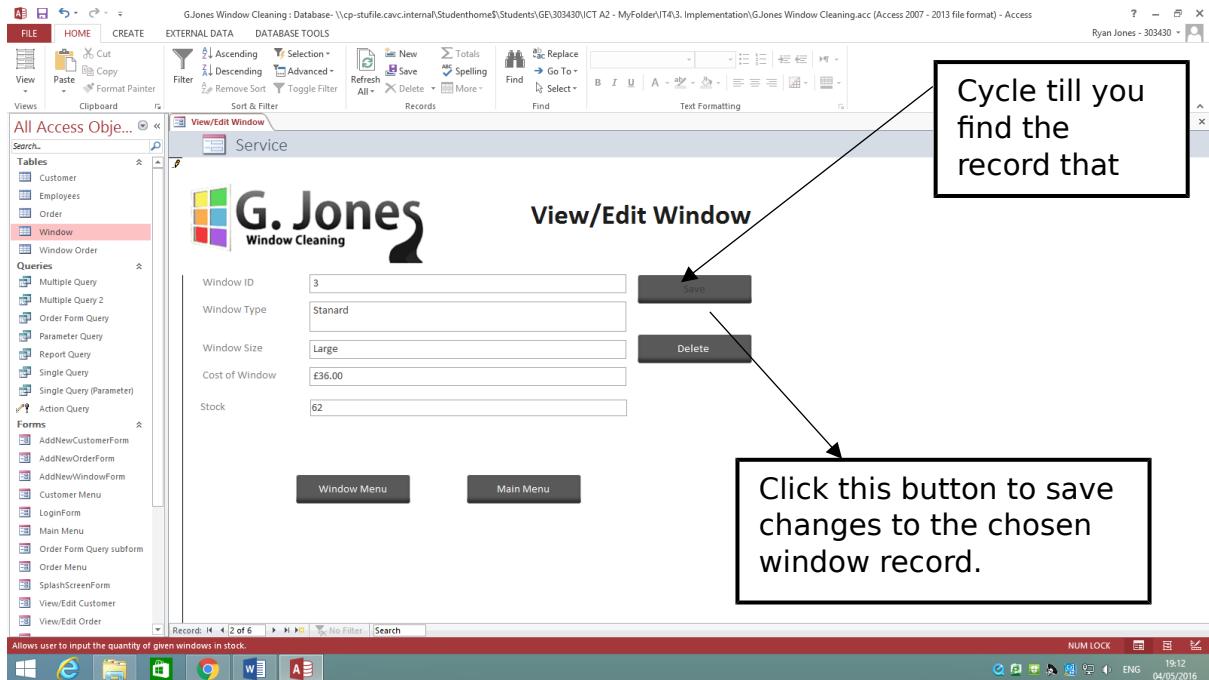
Order ID	Customer ID	Order Date	Order Time	Order Cost	Order Total Cost	VAT Cost	Delivery Date	Sales Person	Month
13	20	22/04/2016	13:00	£50.00	£60.00	£10.00	28/04/2016	Sarah Hills	April
17	21	28/04/2016	14:30	£133.33	£160.00	£26.66	29/04/2016	John Jenkins	April
18	18	27/04/2016	11:30	£50.00	£60.00	£10.00	28/04/2016	Sarah Hills	April
20	19	22/04/2016	13:00	£37.50	£45.00	£7.50	28/04/2016	John Jenkins	April
22	18	15/04/2016	11:00	£50.00	£60.00	£10.00	27/04/2016	Sarah Hills	April
24	20	04/05/2016	13:45	£106.64	£128.00	£21.33	08/05/2016	Sarah Hills	May
25	21	19/05/2016	14:50	£150.00	£180.00	£30.00	21/05/2016	John Jenkins	May
28	18	13/05/2016	00:00	£66.67	£80.00	£13.33	20/05/2016	John Jenkins	May
(New)	0			£0.00	£0.00	£0.00			

How to Save:

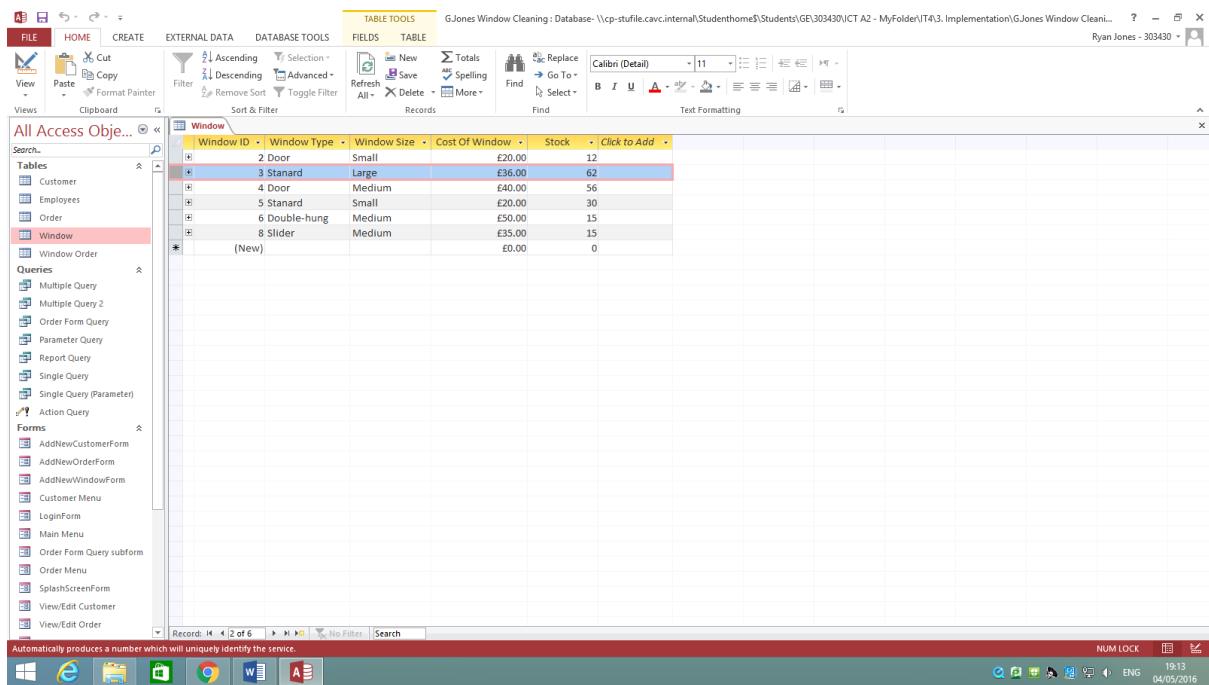
Window Record

Users can only save changes to window records via the 'View/Edit Customer' form. By selecting the save button you can cycle through the records, once a change has been made to a record and you select 'Save' it will update that record in the database. This should be done whenever there has been a purchase of a particular window, as it will ensure that the stock field and database as a whole is always kept up to date.

User Documentation



Once you've clicked the 'Save' button then the window record will be updated with the new data. Being able to update window records reduces the risk of data duplication by creating new records.



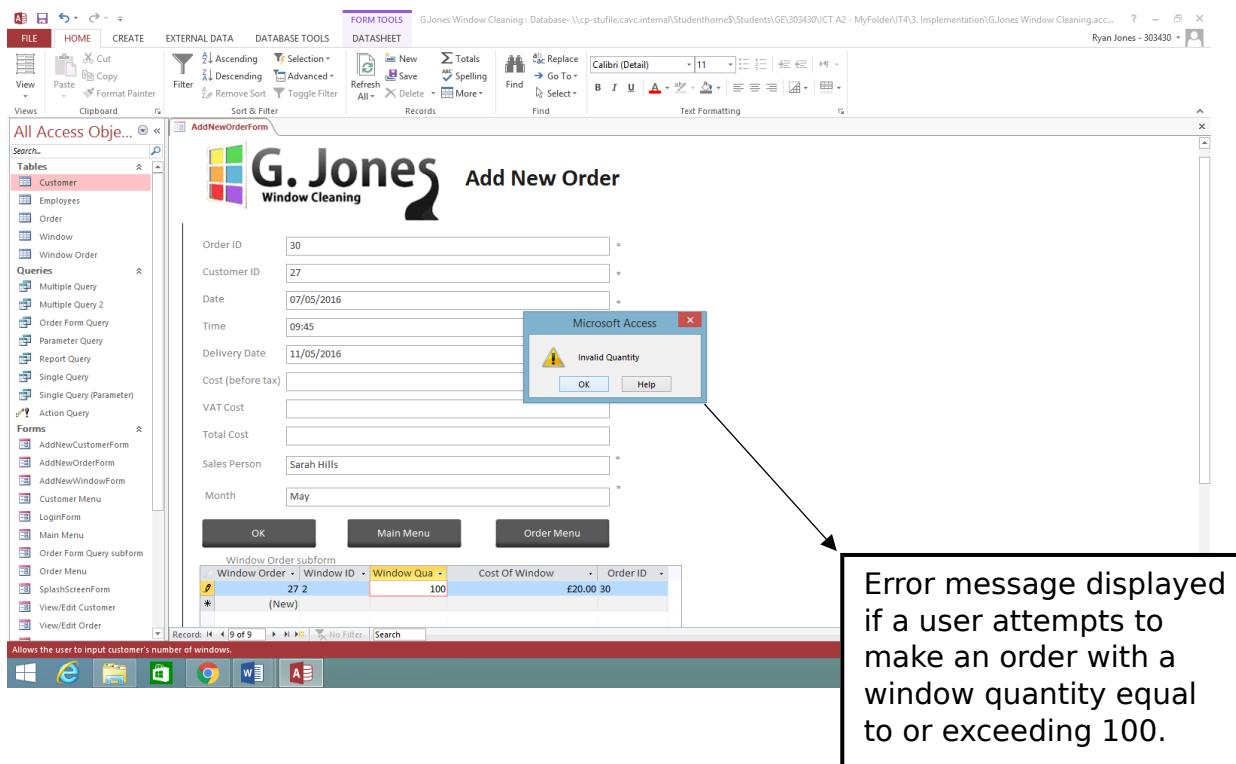
Examples of Validation Text:

Validation techniques have been implemented within the database. These techniques have been used to ensure that the data entered in fields is accurate, sensible, reasonable and not excessive.

Validation Technique 1:

User Documentation

My first validation technique was used in the 'Add New Order' form on the 'Window Quantity' field which is within the Game Order sub-form. I used this validation technique to ensure that all any order which had a window quantity of more than 100 would produce an error message and not accept the value. The error message reads "Invalid Quantity" when the user attempts to select a window quantity of 100 or more.

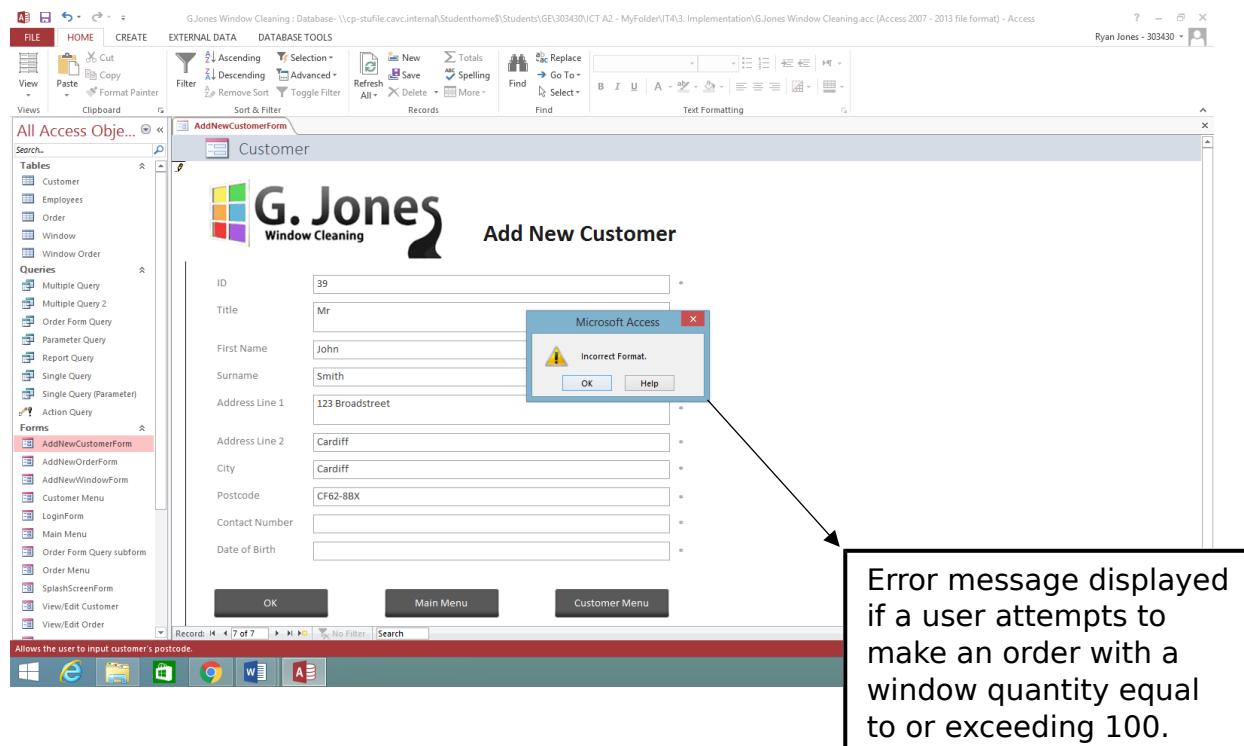


Validation Technique 2:

My second validation technique was used in the 'Add New Customer' form, on the 'Customer Postcode' field. This validation technique ensures that the user does not enter any characters in the postcode field that are not letters, digits and spaces. For example, if a user entered a hyphen in the postcode this would not be accepted and an error message would be displayed. This validation

User Documentation

technique is used because we want the postcode to be in a consistent format. When the user enters a postcode which includes a character other than a letter, digit or space, an error message will read “Incorrect Format”.



Instructions about types of Queries:

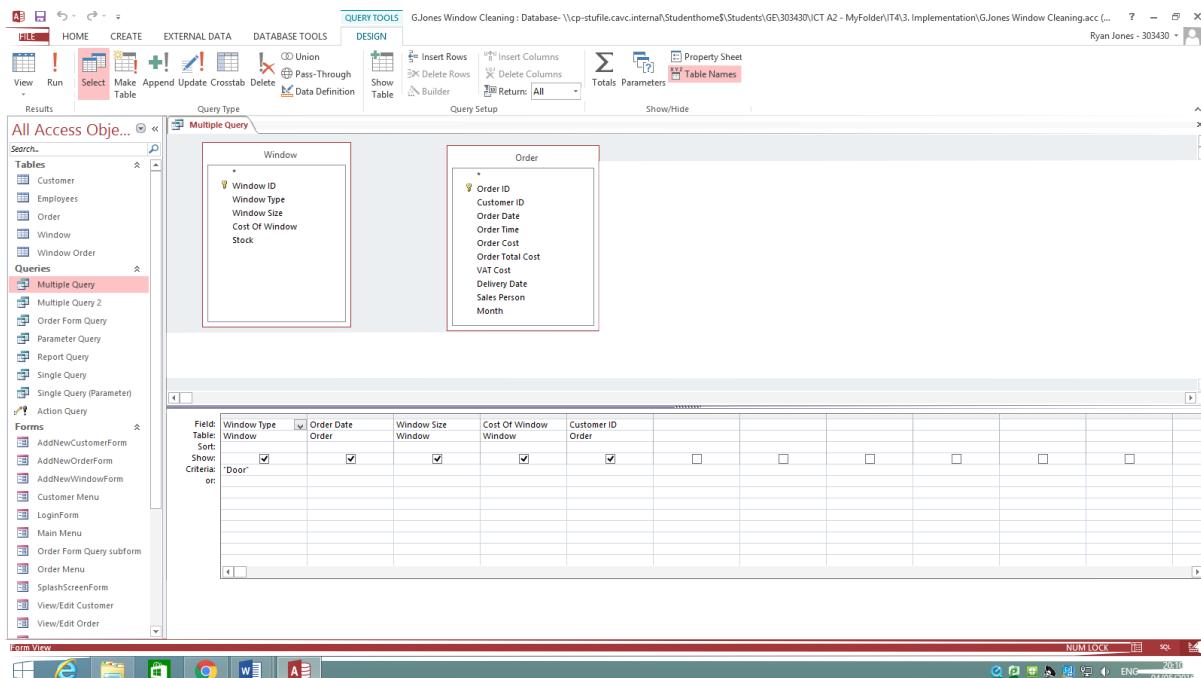
Multiple Queries

The first multiple query in the database allows the user to view all window records that have the 'Door' type, it will also display the date those windows were ordered and the ID of the customer that ordered it.

User Documentation

The following fields will be returned when the query has been run:

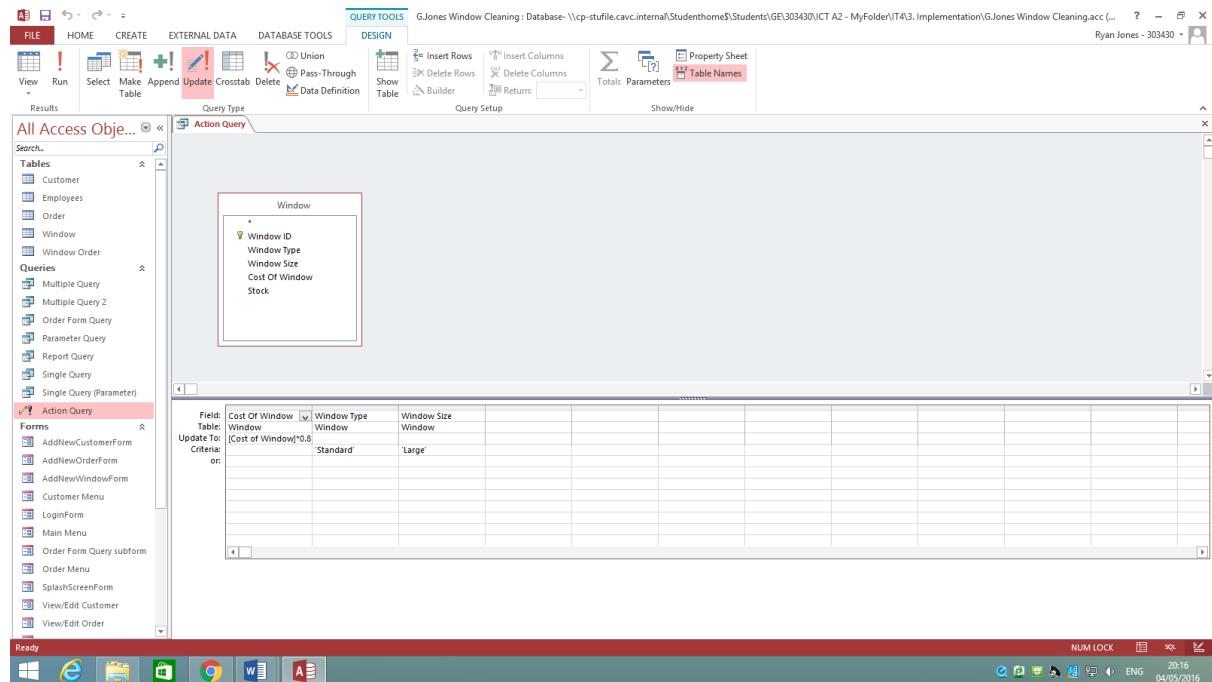
- Window Type
- Order Date
- Window Size
- Cost of Window
- Customer ID



Update Query

The update query allows the user to very quickly and easily update the cost of windows which are both the window type 'Standard' and window size 'Large'. The update is built to reduce the cost of those windows by 20%. This query ensures that fewer mistakes are made by human involve, for instance, the user make incorrectly calculate 20% of the set cost of the window, whereas the computer will consistently calculate this value correctly and it will not require any human to manually enter this value.

User Documentation



Instructions on how to print the Report:

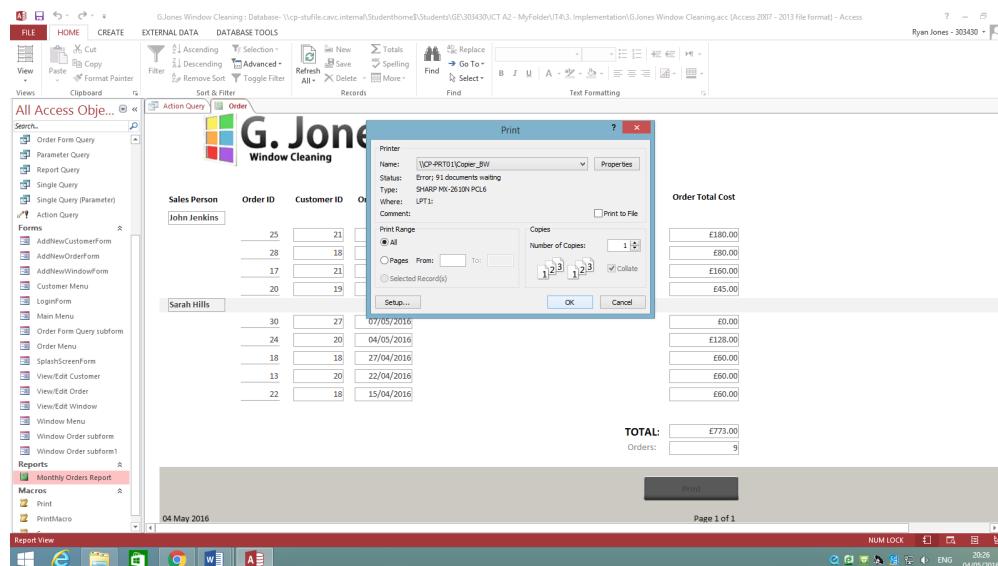
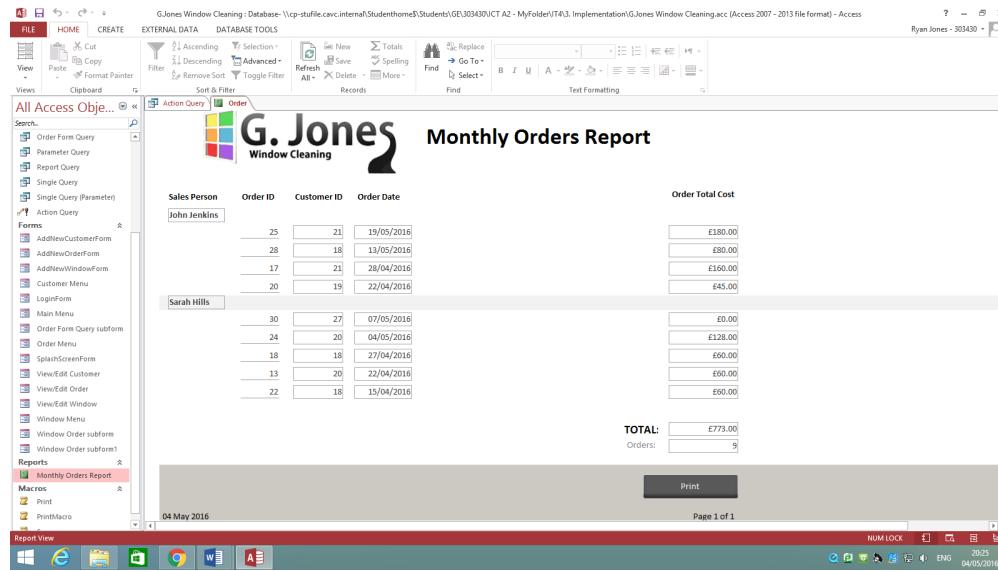
Within the 'Monthly Income Report' there is a print button which will allow the user to print off the monthly report, presumably for backup purposes.

Report

The report is 'Total Monthly Income' which allows the user to view the total number of orders, their details and most importantly the total income by

User Documentation

combining together all the order totals. In order to print this report out you will first need to open the report, which can be done via the 'View/Edit Order' form. Once the report is open you can then click the 'Print' button. A menu will then pop up so that you can specify how you want the report to be printed.



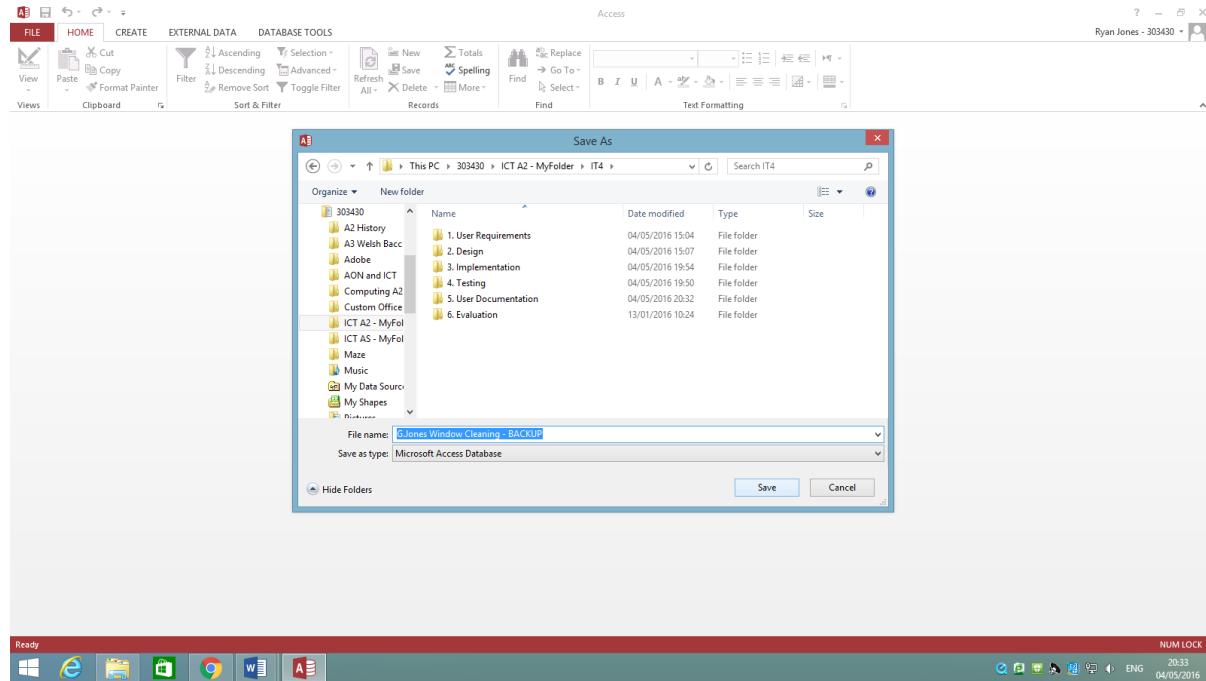
Once you select 'OK' from the print menu then the printer will print out the report.

Instructions about Disaster Recovery:

In order to combat disasters the database should be backed up via an external hard drive (such as a USB) or disc, as this will ensure that if the database ever goes down or becomes corrupted then there will be a backup which can then be

User Documentation

used to restore the system. To create a backup for the first time you will need to choose where it is going to be created and saved.



Now you have the chosen location for the backup you can save it to that location and it will serve as a method of disaster recovery for whenever it may be needed.

Ryan Jones

IT4

Evaluation



Evaluation

The initial task and aim was to design and implement a database which looked professional and would allow G. Jones Window Cleaning to work in a much more efficient way, enabling them to store and manipulate their customer, window and order details entirely electronically. The company decided that they wanted to replace their paper based system with an electronic database in an effort to increase productivity by increasing organization and compartmentalisation, as well as various other features that a database will enable the company to utilise. Their manual system caused errors and problems such as losing documentation and records. It also took up a lot of time, not just data entry but also time spent on calculations that the computer could do as quick as the click of a button. By not being able to keep track of records as easily it made business predictions more difficult, such as keeping track of what windows have been selling best and should more stock than those windows which sell less. The business found making backups very difficult as it required writing out second copies, which is incredibly inefficient and time consuming.

I found that both the design and implementation of the database system went very well. I have designed the entry and view/edit forms to be very easy to use, and they have massively decreased the amount of mistakes and the time spent by employees when making records for customers, windows and orders. This has led to an increase in customer satisfaction as the business has run smoother since it has been using the database. Glyn Jones has told me that since the system has been implemented employees have had a much easier time creating monthly reports, as they no longer have to search through the order records from the whole month in order to calculate totals, as the 'Monthly Orders Report' automatically compiles the records and produces the totals. Upon completion of the database system I have found that there is plenty of room for future expansion and improvements to create a better overall system.

I believe that the database came out looking very slick and professional. I achieved this by utilising the owner's requests of using the company's house style of slick black throughout the forms. The majority of the forms are mostly white but include the professional blacks on command buttons which correspond to the company's logo, which has thick black text. I chose to use a black background and white text version of the logo for the splash screen. This is because when the system boots up I want the user to visually see that this new and different from the manual system, but upon logging in the user can see that the main menu (and all forms) follow a consistent and familiar house style of white background and black text. I think having these contrasts makes for a very interesting and simple but professional looking database. By having the logo throughout every single form it prevents the user from ever getting confused. Additionally, I kept my placement of command buttons and entry fields consistent so that the user can quickly familiarise themselves with the forms, with the idea being if you know how to use one form then you know how to use the rest. After speaking with the owner, Glyn Jones, we decided that the ideal font for this system would be Calibri (detail) in sizes 11-24, as it is professional without looking too formal (like times new roman) and the size is just big enough that those with poor sight are still able to read the text. In the header of my report 'Monthly Orders Report' I have added the company's logo as well as the

Evaluation

title of the report and in the footer I have added the date, the page number and the print button. Having these elements in the header and footer allows for a more functional and professional look, whilst keeping in touch with the company's house style and ethos.

So that users are able to navigate from form to form easily, I have designed and implemented a simple menu driven navigational structure, which consists of a main menu and a number of other sub-menus. I believe that the navigational structure I implemented is very effective, however if I were to make an improvement it would be by having a close command button on the main menu, as all forms lead straight back to the main menu, so when a user wants to close it they can do it straight from the main menu, which they will inevitably end up at anyway. I designed all the menus so that they are easy to read and have clear and understandable titles as I wanted the user to know exactly what a button does as soon as they look at it. Though my navigational structure is very effective a possible improvement for this system would be to completely eliminate the 'Customer Menu', 'Window Menu' and 'Order Menu' then place all the rest of the command buttons straight onto the main menu. As this may increase the speed at which the user can use the database.

The way in which I designed the forms is so that it is very easy to use as I wanted someone with very little experience in IT to be able to use it with relative ease, due to the fact that the system was being designed for a company that previously used a paper system meaning they may not have very much IT skill, therefore a very complex interface may be quite intimidating and turn the employees/management off. To ensure that the whole system was working properly I implemented a test plan which allowed me to ensure that all bugs were fixed and the system ran smoothly before the company began implementing the database. In testing I thoroughly tested the data entry forms to ensure they worked. The data entry forms have proven to be a success for the company and it has reduced the amount of time consumed on data entry from before as it is a significant improvement from the manual paper based system. Though, during testing I only input a small amount of data, no more than ~10 records. When the company are entering data they will be making much more records than that, so my testing may have not been an accurate representation of reality and could've done with more testing. If I could do it again I would like to spend a week on testing alone in order to push the database to its limits and attempt to recreate something as close to the actual use of the database as possible. Furthermore, I've created view/edit forms which will allow the user to view, update or delete the records of customers, windows and orders. The changes that are made within the view/edit forms, when saved will update the actual tables corresponding to those forms. This is in order to reduce the chances of data duplication. It is not necessary to keep records of out-of-date information and creating new records then deleting the old ones is messier system than simply updating the already existing systems, which is a huge improvement from

Evaluation

the paper based system of the past as it's much less labour intensive and time consuming.

I ensured that the fields in all of the data entry forms were assigned a specific data type, e.g. customer name was set to short text but contact number was set to number. For text fields I also included a text length, effectively not allowing users to enter any more characters than is dictated. This was used to both save on memory and ensure that the data entered isn't too excessive, for instance it is would be quite unusual to have a first name that is over 50 letters, therefore if a user has input a 50 letter word then it probably isn't a sensible entry. By clicking the save button in the view/edit forms it will cycle through the records. However, I believe that this could've been done better in the future. I would've liked to create a parameter query which asks for a customer/window/order ID then it will automatically get the records up. This would be an improvement because the way it currently works is that the records are cycled one at a time via the save button, if there are 100 records then this could take a very long time. I think if I had spent more time on the testing process I would've quickly run into this problem and corrected it.

I included a sub-form on my 'Add New Order' form. This is so that the customer can choose exactly what item they want and the quantity of those items they want. Once selected both these fields a calculation will then automatically run which will produce the cost per window, cost excluding VAT, VAT cost and total cost of the order. For this sub-form I also added a validation technique to the 'Window Quantity' field so that no more than 100 windows could be ordered at any time.

Links were made between the tables within the database in an effort to reduce the likelihood of data redundancy and data duplication. A big problem using a paper based is the fact that a lot of data duplication can take place. So these relationship links have made a huge improvement as they have greatly reduced data duplication. I tested the tables throughout the testing stage and did not encounter any problems associated with data redundancy and duplication, I am hopeful than issues concerning duplication will not arise when the database is being utilised by the company.

G. Jones stressed that to respect their customers and keep their information safe, they wanted some form of a security system. This was also required of the database under the 1994 data protection act. So I implemented a username/password system to ensure that the database was secure. I did this by dictating via code the single correct username and password. Employees will have access to this username and password (which have hidden characters in the login fields) and this will ensure that no one who shouldn't be accessing the database will be. And if an employee forgets this login information they can get it from the system manager. However, I think there is room for improvement of this security system. If I were to do it again I would have a system whereby individual employees have their own username and password, which must include a capital letter and at least one number. I believe this would've greatly increased the security of the system.

Evaluation

Management and employees stated that they were eager to have a report system, as in their paper based system they found it laborious to reference all the order records over the month and calculate totals. They particularly wanted a report that concerned the monthly income, as keeping track of income is essential for them to gauge the progress of their company. They also wanted it to double up as a sales person record, which could help decide employees of the month/most valuable sales persons (that may be in line for a pay raise based on their performance). So because of this requirement I created a 'Monthly Orders Report'. The report is grouped by sales person, so below the sales person's name you can view all the orders they've taken with their sub totals, which are also grouped by the order date, showing newest orders first and oldest orders last, the report is then sorted by order total cost (from largest to smallest). This report allows them to view the order ID, the ID of the customer who placed the order and the date of which they placed them. At the bottom of the page there is a monthly total which adds up the order total costs. I believe this accurately met the user requirements as I managed to incorporate a multi-purpose report which also displayed the company's house style throughout. The company additionally mentioned they require that the report is printable, therefore I implemented a print button in the report footer so that with a click of a button the user can print the report off. I believe the implementation of this report went very well.

As the company wanted to improve their paper based system by reducing the likelihood of errors, I implemented two validation systems. The implementation of these validation systems overall went well, however I experienced some difficulty when thinking of where exactly I should use them and what type of validation techniques I should implement. I eventually decided that I wanted to insert a range check into the window quantity field, within the link form. This is because we do not want the user to input orders of anything with a quantity of above 100. This is unrealistic for the company to deal with and it will not be accepted. The second validation technique I implemented was a format check on the postcode. The company wanted the format of certain fields to be consistent throughout, because of this I decided to input the format check on the postcode so that any character that is not a letter, space and number will not be accepted and an error message will be produced. The format of the postcode MUST include numbers, letters and spaces. If a postcode with a hyphen is included, or a forward slash, this will not be acceptable. I rigorously tested the validation to ensure it worked correctly. As an easy third validation technique, I added a presence check to virtually all the fields, this dictated that data actually had to be entered into the relevant fields and could not be left empty. At no point did I experience any issues with the validation post-implementation of them. I tested them with normal data (to be accepted), incorrect data (to see how they are rejected and the error message pop up) as well as extreme data, both on the high end and the low end of the spectrum. I could see no problem in this testing phase, as everything I expected to happen did happen. Though, if I were to do it again I would've liked to add another validation rule in the title field, whereby users could not simply enter anything, but it would have to be one of the set titles, such as Mr, Miss, Mrs, Dr, etc.

One of the requirements outlined by the company was the ability for users to use queries to get information from the database in a quick and easy way. In total I implemented 6 queries for the user to take advantage of. The first query I

Evaluation

implemented was a single table query which allowed the user to search all records of windows that have the size 'small'. The second, was also a single table query but with a parameter; the user has to enter a delivery date. What this will do is display all orders that share the same delivery date. The third was a multiple table query in which the user can view all orders of the window type 'door'. The fourth I implemented was also a multiple table query, utilising three tables to allow the user to view all orders including customer details such as their surname, ID and contact number, it also included the window type and window size so the user can view exactly what the order was, along with the cost and the relevant information relating to the customer who placed the order. The fifth query I implemented is a parameter query. This allowed the user to search a particular customer's ID and it would then display that customer's record with all their fields. And lastly, the sixth query I implemented was an action query. This query is somewhat different, as it allows the user to perform an action with the click of a, rather than simply displaying data. The action the query performs will reduce the cost of all windows that have the 'Standard' type and are in the size 'Large' by 20%. This allows the company to very quickly and very easily reduce the cost of a window in the event of a sale or discount. I thoroughly tested these queries to ensure that they worked and I was not disappointed when doing so. All tests were success and the queries worked exactly how I had expected them to. I believe my implementation of queries went very well and I met the exact requirements that the company had laid out. The owner has told me that they find the queries very useful for quickly finding information, especially by having the ability to search for a customer by their ID number.

Another requirement that the company had asked of me was that I produce a user guide for the system, so that users could revert to that if they were ever confused as to how to take advantage of the features. This was the only requirement that I was not able to actually test. I believe the user documentation that I created went well. It included a detailed description of where to find the database and how to start it up, how the password/username security system worked, how to navigate the user interface and move from one form to another, how to use the view/edit forms I created by giving in depth instructions on how to add, delete, edit and save changes made on those forms, examples of how the validation rules work and what the user will see if they have entered unacceptable data (or data which is simply in the wrong format), instructions about the types of queries and how to utilise them, instructions about how to print the report out and lastly instructions on disaster recovery techniques. It was important to make this guide because throughout designing the system I had the goal of making it very user friendly and catering to those without much knowledge or experience of computers. In order to make the guide more palatable I included images throughout with text boxes and arrows to really make the guide as simple and understandable as possible. I did not want the users to require any training upon implementing the database in their work, therefore it was a significant goal that it was firstly designed in a way which feels simple and intuitive, but also to produce a user guide which easily explained and cleared up those areas where users may have difficulty. All in all, I was happy with the way in which my user documentation turned out. However, the system as a whole still has much more room to grow and will have to be modified in the future to accommodate for the growing demands of a prosperous company.

Evaluation