

ACCA4023

BSc / HND / HNC Computing Portfolio

Introduction to Web and Database Concepts

Database Analysis and Design



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Northern Lights pvt Ltd

Initial Findings

Upon recent expansion Northern Lights pvt Ltd have made the decision to move to a computerised system, moving away from a manual administration process. Located in Swansea with branches in Neath and Carmarthen, Northern Lights is an event organising company. Each branch will manage requirements from the client regarding the event, tasks will be assigned to various department heads from the relevant branch manager.

Immediately apparent are different type of users accessing the Database Management Systems including.

- Clients – register, view own event booking & own details.
- Managers – Assign tasks to department heads, edit event details, edit staff & client details, run invoices.
- Department Head – view, record and generate invoices, view event details.
- Staff – view only access, events, suppliers, event tasks

For the purposes of this assignment the department details within each branch were to my discretion. I decided to have three departments at Swansea as the starter location, with two branches at Neath and Carmarthen. Swansea's department heads would manage teams responsible for ticket sales and administration, also cleaning and maintenance, and finally audio, and visual equipment. Whilst Carmarthen and Neath would each have a Cleaning, Maintenance and Ticket Sales department and an Admin, Audio, and Visual equipment department.

Clients and Staff can query and view the information associated with an event through the welcome page, Clients can also register here. There will be separate options on the welcome page for staff and clients allowing them to perform the above listed actions.

The database design process began with consideration to the companies' specifications. Connolly and Begg write [1] [1, pp 35] "The database is now the underlying framework of the information system and has fundamentally changed the way many organisations operate." In recent years systems are becoming more powerful and intuitive to use. The company has recognised the benefits of moving to a computerised system whilst expanding. Considering the requirements of the customer and various departments, I'm reminded by Connolly and Begg [1] [1, pp 63] "The database is no longer owned by one department but is a shared corporate resource".

Entity Relationship Diagram

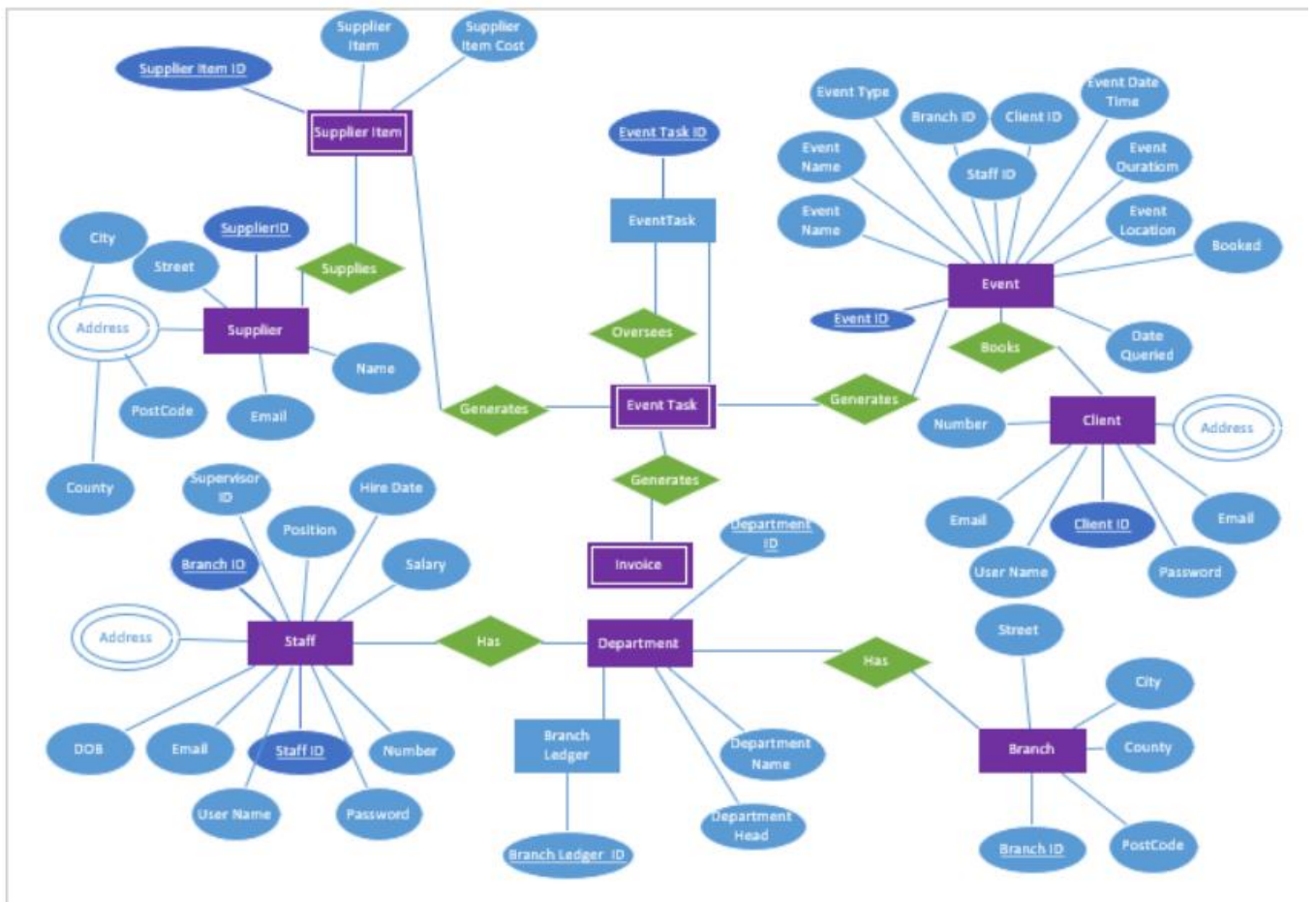


Figure 1 Entity Relationship Diagram created in Visio – larger image included in Appendices

To capture the database, design Visio has been used to create an Entity Relationship Diagram. Connolly and Begg continue [1] [1, pp 63] to describe the following: In entity represents a distinct object such as a place, thing, event, a person, place, or concept, in the organisation that is to be captured by the database. An attribute represents a property describing some aspect of the object being recorded, whilst a relationship demonstrates an association between entities.

Early Design demonstrated how complex database design could be. The database needs to satisfy an organisation's information needs, crucially, it needs to be acceptable to end-users. Connolly and Begg [1] [1, pp 60] explains this can be referred to as a paradigm shift. File based systems, driven by individual department application needs, differ from the database approach which must consider the data before the application. To avoid serious repercussions, great care should be taken when designing the database to avoid errors as a result of poor design. Having a good understanding of the tables before creating forms, queries or reports will improve the outcome. See the Entity Relationship Diagram below displaying relationships and degree of relationships between entities and associated attributes.

Connolly and Begg [1][1, pp95] describe a relational data model, based on the concept of mathematical relations. Data and relationships are represented as tables, each of which has several uniquely named columns. They discuss an example with a manager, a branchNo attribute. "However, there is no explicit link between these two tables; it is only by knowing that the attribute branchNo in the staff relation is the same as the branchNo of the branch relational that we can establish that a relationship exists."

Connolly and Begg continue [1][1, pp 405] database design is a top-down approach if we were to describe ER modelling. By first identifying the important entities at Northern Lights, database entities include:

- Event
- EventTask
- Invoice
- Client
- Staff
- Department
- Branch
- BranchLedger
- Supplier
- Supplier Item

Then establishing relationships between the data which needs to be represented in the model. For example, a branch can have many staff, but staff should only report to one branch. A Client may book many events, but a single event will be allocated to a branch, relevant departments and generate event tasks and invoices.

Third Normalisation

Hoberman [2][2, pp 69] explains how relationships visually capture rules on our data model. By connecting two entities with a line a relationship is displayed. If for example each department could contain many employees, this would be a one-to-many relationship. Capturing the rules between the two entities. The rules captured could also include "each employee must work for one department".

An additional consideration when designing the database was the requirement to meet the rules of third normal form. Connolly and Begg [2][2, pp 164] write in Database Solutions describe Third normal form, a summary of all three normalisation levels: Every data element must provide a fact about the key (1NF) First Normal Form, the whole key – (2NF) Second Normal Form, and nothing but the key – (3NF) Third Normal Form.

"3NF requires the removal of hidden dependencies. Each data element must directly depend on the primary key, and not directly dependent on any other data elements within the same entity. Alternate and foreign keys are excluded from this test. "

For further clarification we can look to Hoberman [3][3, pp 183]. To convert the StaffBranch table to 3NF he explains the need to remove the non-primary key columns which can be deduced by referring to another primary-key column. Hoberman [3][3, pp 184] further explains using an example, to make the 'StaffBranch' Table meets the rules of 3NF the removal of 'TelNo' and the 'BranchAddress' columns are required, a new table called 'Branch' is also required. This example was taken into consideration by separating staff, departments and branches into different tables thus applying the rule of third normal using relationships and primary and foreign keys.

Keys

Clearly to adhere to the rules of third normal form an understanding of keys is required. Connolly and Begg explain in Database Solutions [3][3, pp 28] A table won't have any duplicate records, making it always possible to uniquely identify each record. Meaning a table will always have a primary key. Alternate keys are candidate keys which are not selected as the primary key. For the Branch table, BranchNo could be chosen as the primary key, postcode would be an alternate key.

Not all fields can be immediately populated, Connolly and Begg [3][3, pp 32] discuss how null can be used to Represent a value for a column that is not applicable for this record or currently unknown. A null can mean no value has yet been supplied, implied to mean 'unknown'. It can also mean that for this record, a value is not applicable. Connolly and Begg continue "Nulls are a way to deal with incomplete or exceptional data. However, a null is not the same as a zero numeric value or a text string filled with spaces; zeros and spaces are values, but a null represents the absence of a value. Therefore, nulls should be treated differently from other values." For Northern Lights for example, and Event will be booked before tasks are assigned to departments, supplier invoices generated, or totals calculated.

With an understanding of Primary keys, tables can be created. Connolly and Begg [1][1, pp 152] explain a Relational data structure "A relation is a table with columns and rows. An attribute is a named column of a relation. A domain is the set of allowable values for one or more attributes. A tuple is a row of a relation." They also explain [1][1, pp 149] that a model is a logical structure, if put simply. However, behind this simple structure, many first generation DBMs (data management systems) are specifically hierarchical and network DBMSs are lacking the sound theoretical foundation.

This report follows the same premise as Connolly and Begg [1][1, pp 52] by considering a database a collection of related data, whilst a (DMBS) database management system is considered the software which controls access to and manages the database. Northern Lights will aim to use DBMS access. A program which at some point in its execution interacts with the database is simply known as a database application. 'Database system' is a more inclusive term, describing a collection of application programs which interact with the database, DBMS, and the database itself.

A reoccurring image throughout the Access database will be the logo created in Microsoft word using stock images, shapes and font.



Figure 2 North Lights Event Organisation Logo

Brief User Guide

All tables used in the background of this database can be found in the **appendices**. This guide will focus on the use of the forms created to guide users through the booking process. Any tables that are affected using the forms will be shared where appropriate.

1. Welcome Page

When starting the database, the user is greeted by the Welcome pane (Forms | Welcome). This allows the database to differentiate between a client and a member of staff. This form uses buttons with macros assigned to them, allowing the forms to appear as the user steps through.

Reflection: additional user separation using log in functionality with varying levels of view / edit access.

The screenshot shows a software window titled "Welcome" with standard Windows window controls (minimize, maximize, close). The main content area has a white background and features the following elements:

- Header:** "Northern Lights Events Management" in a large, bold, teal font.
- Logo:** A square icon with a stylized aurora borealis over a dark landscape, with the text "Northern Lights" below it.
- Instruction:** "Please select one of the following options:" in a smaller, italicized teal font.
- Buttons:** Five light blue buttons with rounded corners and black text:
 - New Customers:** "Register your Account"
 - New Event:** "Register a New Event"
 - Find Event:** A button with a magnifying glass icon.
 - Staff Administration:** Two buttons, "Event Summary" and "Client Invoice".
- Footer:** A grey bar containing a record counter "Record: 1 of 1", a "No Filter" status, and a "Search" input field.

Figure 3 Northern Lights Access Welcome Form

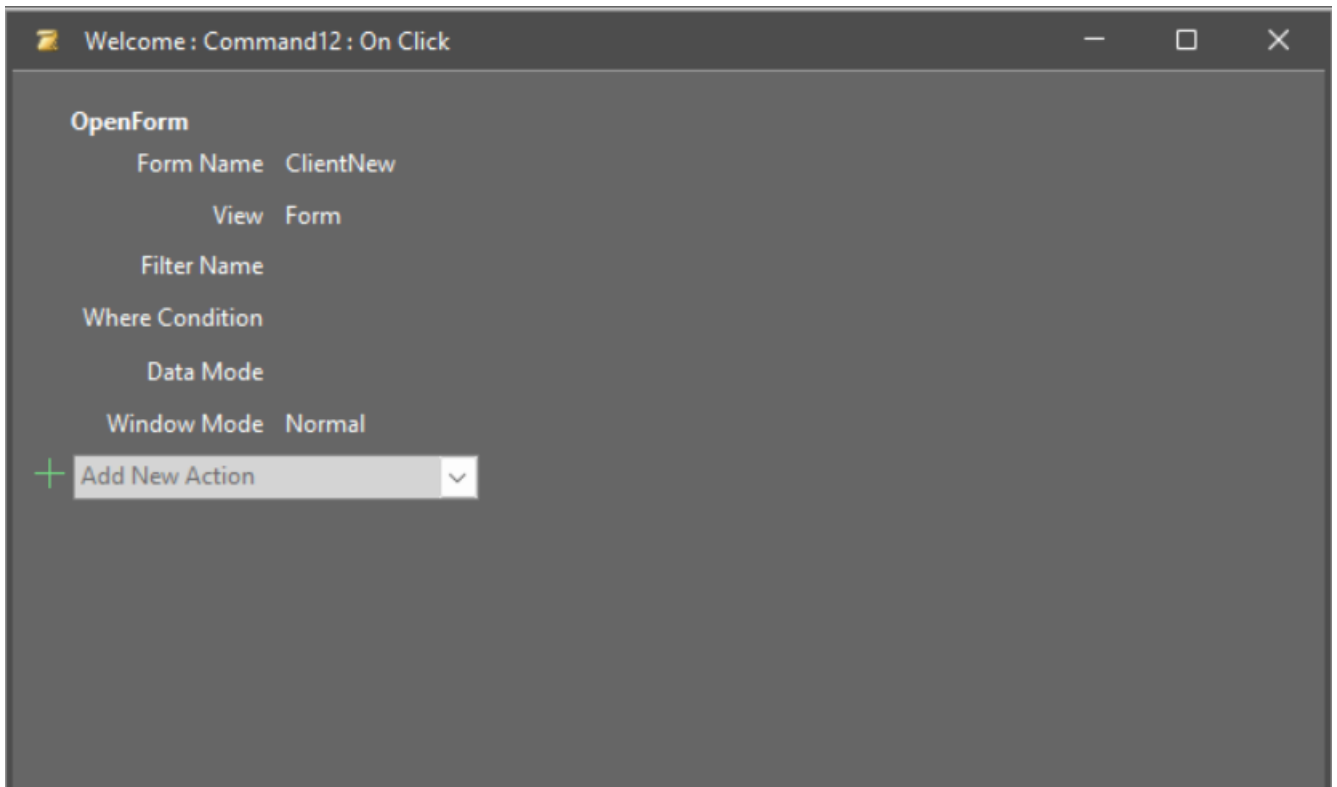


Figure 4 Macro used on navigation buttons

2. New Customer Forms

New Customers | Register Your Account

During design, it was identified that a client would need to register their details into the database. The decision was made to do so via a form, which would input the information into the Client table. As shown below, the user is prompted to fill in the necessary fields which are then saved to the database by pressing the Tab key between each entry until the form is complete. Once complete, the user is shown their ClientID for future reference. Suitable formatting applied, short text for most texts, number for phone numbers, data & time for dates and so on. Forms were created with suggestions taken from GCFLearn Free on YouTube [4] [5] [6].

The screenshot shows a Microsoft Access form titled "ClientNew" with the following elements:

- Title:** New Client Registration
- Subtitle:** Please enter your details below
- Fields:**
 - First Name
 - Last Name
 - Street Address
 - City / Town
 - County
 - Postcode
 - Email
 - Phone
 - Company
 - Username
 - Password
- Message:** Thank you, please make note of your Client ID shown below
- Button:** (New)
- Logo:** Northern Lights (featuring a stylized aurora over a globe)
- Footer:** Record: 1 of 8, No Filter, Search

Figure 5 Example of blank Client Registration form in Access

ClientNew

New Client Registration

Please enter your details below

First Name	Dai	Last Name:	Jones
Street Address	1 Dai Street		
City / Town	Swansea		
County	Swansea		
Postcode	SA12BA		
Email	dai.jones@thedais.com		
Phone	1792854545		
Company	The Dai's Limited		
Username	DaiJones		
Password	Dai123		

Thank you, please make note of your Client ID shown below

1

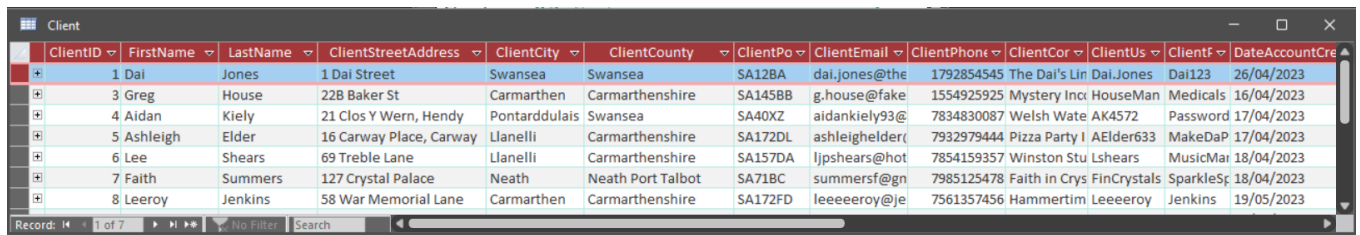


Record: 1 of 7 | No Filter | Search

Figure 6 example of completed Client Registration form.

Once the client has registered their details, it can be found in the Customer table. An example can be found in Figure 4 with examples of various data entries made during development.

Tables, relationships and database guidance taken from GCFLearnFree on Youtube [7] [8] [9] [10].

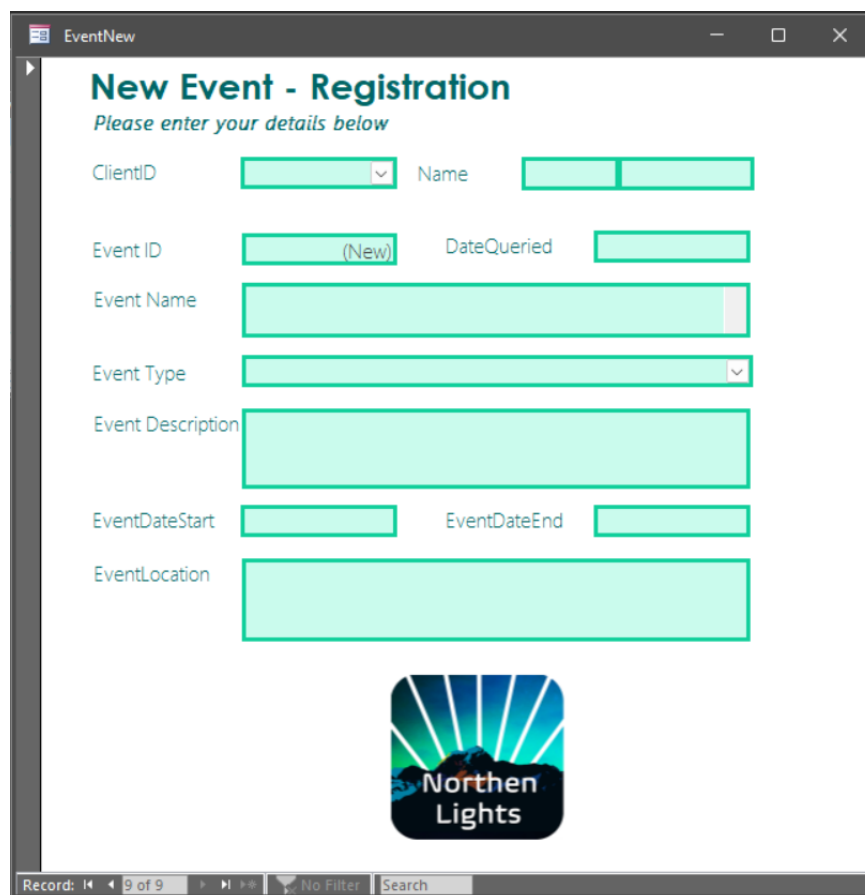


ClientID	FirstName	LastName	ClientStreetAddress	ClientCity	ClientCounty	ClientPo	ClientEmail	ClientPhone	ClientCor	ClientUs	Clientf	DateAccountCre
1	Dai	Jones	1 Dai Street	Swansea	Swansea	SA12BA	dai.jones@the	1792854545	The Dai's Lin	Dai.Jones	Dai123	26/04/2023
3	Greg	House	22B Baker St	Carmarthen	Carmarthenshire	SA145BB	g.house@fake	1554925925	Mystery Incc	HouseMan	Medicals	16/04/2023
4	Aidan	Kiely	21 Clos Y Wern, Hendy	Pontarddulais	Swansea	SA40XZ	aidankiely93@	7834830087	Welsh Wate	AK4572	Password	17/04/2023
5	Ashleigh	Elder	16 Carway Place, Carway	Llanelli	Carmarthenshire	SA172DL	ashleighelder	7932979444	Pizza Party I	AElder633	MakeDaP	17/04/2023
6	Lee	Shears	69 Treble Lane	Llanelli	Carmarthenshire	SA157DA	ljpshears@hot	7854159357	Winston Stu	Lshears	MusicMai	18/04/2023
7	Faith	Summers	127 Crystal Palace	Neath	Neath Port Talbot	SA71BC	summersf@gn	7985125478	Faith in Crys	FinCrystals	SparkleSc	18/04/2023
8	Leeroy	Jenkins	58 War Memorial Lane	Carmarthen	Carmarthenshire	SA172FD	leeeeroy@je	7561357456	Hammertim	Leeeroy	Jenkins	19/05/2023

Figure 7 Client table with user data entries

New Customers | Event Registration

Once the Client exists in the database, they're then able to register their event to be addressed by a manager. This involves providing further details on the event and allowing the database to assign an EventID for later use. Figures 5 and 6 display an example of both a blank and completed form. As an example, each example of an event and it's resulting forms will include two examples, Stereophonics and a Radiology Lecture.



New Event - Registration
Please enter your details below

ClientID Name

Event ID DateQueried

Event Name

Event Type

Event Description

EventDateStart EventDateEnd

EventLocation



Figure 8 Event registration form

Figure 9 Two examples of event data entry on New Event form

As seen in Figure 6, the relationship between the ClientID and the Events tables/forms is seen by including it on the top of the form. This ensures that any staff/management are aware of which client is associated to the event, allowing future elements of the database to work as required. Figure 7 displays the content seen in the forms in the underlying Event table.

EventID	EventName	EventDate	EventDateEi	EventLocation	EventType	EventDescri	Clieen	BranchID	Staffi	DateQuerie	DateBookec	Click to Add
1	Radiology Lecture	01/05/2023	01/05/2023	Swansea University	Seminar	Lecturer's will	1	1	1	26/04/2023	01/05/2023	
2	Snail Convention	20/05/2023	21/05/2023	Neath	Conference		5	2	2	01/03/2023	01/03/2023	
3	Comicon	01/08/2023	03/08/2023	Swansea Arena	Conference		1	2	2		24/11/2022	
4	Llandeilo Jazz Festival	16/07/2023	16/07/2023	Cawdor Arms	Music Festival		3	3	3		17/09/2022	
5	Stereophonics	03/07/2023	03/07/2023	Singleton Park	Concerts	Surprise sessic	4	1	1		01/01/2022	
6	Safety Conference	21/09/2023	22/10/2023	Liberty Stadium	Conference		6	3	3		27/04/2023	
7	Russel Howard	14/06/2023	16/06/2023	Swansea Arena	Concerts		7	1	1		17/03/2022	
8	Swan Lake Live Performance	19/09/2023	19/09/2023	Neath Theatre	Concerts		8	1	1			
(New)												

Figure 10 Event table with user data entries

3. Supplier and Supplier Items

Tables were required for both Supplier and the Items that they provide. Doing so will support further functionality in later forms. The Supplier table contains information relating to the supplier details, and the SupplierItems table contains the actual chargeable items listed in a Client's Event and they are linked via the SupplierItemID column. Figure 8 displays the list of suppliers created and the items that they provide.

The image shows two database tables. The top table is 'SupplierItem' and the bottom table is 'Supplier'.

SupplierItem Table:

SupplierItemID	SupplierItem	SupplierItemQuantity	SupplierItemCost	SupplierID	EventID	Click to Add
1	Projector	4	£50.00	1	5	
2	Sound System	1	£350.00	1	5	
3	Pyrotechnics	1	£150.00	1	5	
4	Bodyguards	2	£200.00	3	5	
5	Burger vans	3	£150.00	5	5	
6	Fish and Chips vans	1	£100.00	5	5	
7	Toilets	20	£50.00	4	5	
8	Smoke machines	4	£25.00	1	5	
9	Catering	24	£10.00	2	1	
10	Scienc Stand	1	£100.00	6	1	
11	Members Stand	1	£10.00	7	1	
12	Sound System	1	£350.00	1	1	
13	Projector	1	£50.00	1	1	
14	Tea and Coffee	24	£1.50	2	1	
(New)		0	£0.00			

Supplier Table:

SupplierID	SupplierName	SupplierAddress	SupplierPostCode	SupplierEmail	SupplierPhone	SupplierType	Click to Add
1	AudioTechnic	123 Audio Street	SA155GF	info@audiotechnic.com	1554775558	Audio & Visual	
2	Cegin Fach Y Wlad	86 Carmarthen Road	SA156DS	Sali@cfyw.co.uk	1554854446	Catering	
3	Tough Guys Security	9 Ironway Street	SA411DF	security@toughguys.com	1269878654	Security	
4	Porta-Loo	1b Flush Avenue	SA121DD	flush@portaloo.com	1792854452	Hygiene	
5	Burger Shop	97 Patty Lane	SA126RS	debra@yahoo.com	1554654879	Catering	
6	Science for Kids	24 Bunsen Close	SA218FL	scienceforkids@gmail.co	1554254691	Entertainment	
7	Institute of Medicine	236 Hospital Way	SA421BL	education@iom.com	1792854654	Entertainment	
(New)					0		

Figure 11 SupplierItem and Supplier tables with data entries

Reflection: This area of the database was designed to be done in the background by a member of management. Ideally, both tables would have been populated via a form selection. To allow for proof of concept, manual data entry was performed on the Items table to ensure the database was able to perform calculations in later sections.

3a. Query | SupplierItemsExtPrice

During design, it was identified that a total will need to be calculated to ensure that an invoice is itemised and accurate. For example, if a client requests 4 projectors costing £50 each, the column will need to show the total of £200. To achieve this, a query was made. Figures 9 and 10 display the query design and the resulting information it provided.

ExtPrice: [SupplierItemQuantity] * [SupplierItemCost]

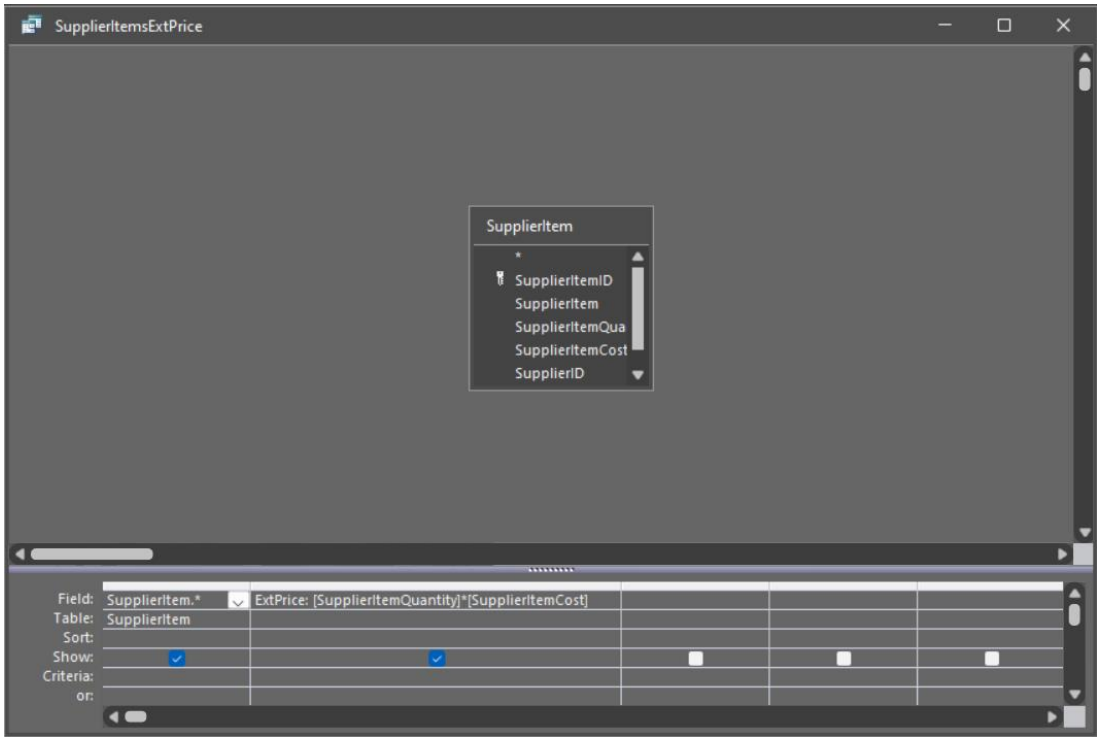


Figure 12 Query in Design View

SupplierItemID	SupplierItem	SupplierItemQuantity	SupplierItemCost	SupplierID	EventID	ExtPrice
1	Projector	4	£50.00	1	5	£200.00
2	Sound System	1	£350.00	1	5	£350.00
3	Pyrotechnics	1	£150.00	1	5	£150.00
4	Bodyguards	2	£200.00	3	5	£400.00
5	Burger vans	3	£150.00	5	5	£450.00
6	Fish and Chips vans	1	£100.00	5	5	£100.00
7	Toilets	20	£50.00	4	5	£1,000.00
8	Smoke machines	4	£25.00	1	5	£100.00
9	Catering	24	£10.00	2	1	£240.00
10	Scienc Stand	1	£100.00	6	1	£100.00
11	Members Stand	1	£10.00	7	1	£10.00
12	Sound System	1	£350.00	1	1	£350.00
13	Projector	1	£50.00	1	1	£50.00
14	Tea and Coffee	24	£1.50	2	1	£36.00
*	(New)	0	£0.00			

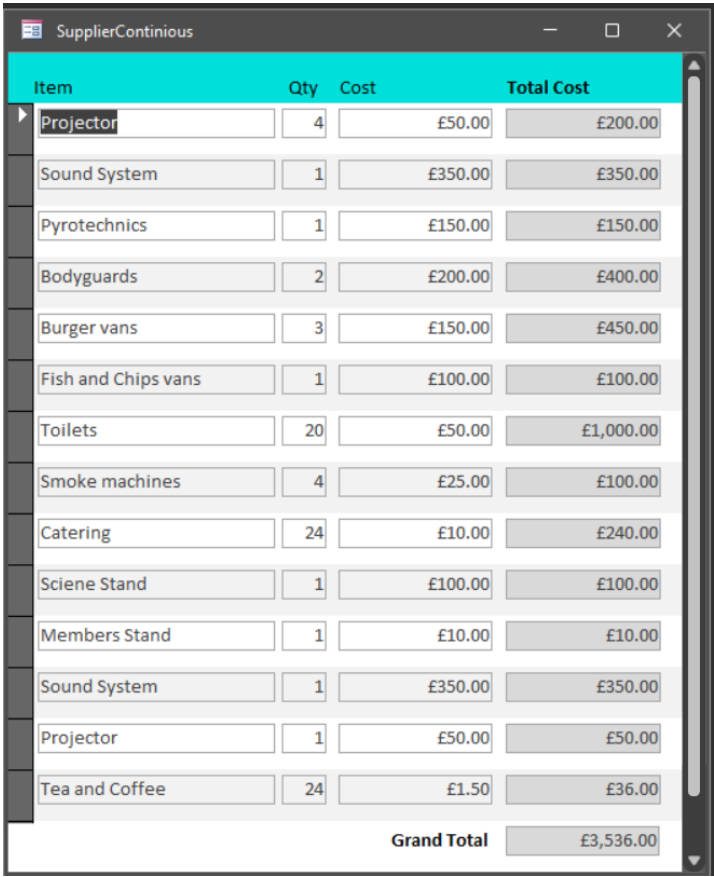
Record: 1 of 14 No Filter Search

Figure 13 Results of Query

As seen in Figure 10, the query has returned the 'ExtPrice' column which uses a calculation to successfully sum the total of the items together. This query will form the basis of sub-form implemented in later chapters. Query design inspiration taken from GCFLearnFree on YouTube [11] [12] [13] [14] and Computer Learning Zone also on Youtube [15].

4. Event Summary

To allow a member of staff or management to view the items assigned against an Event and Client, it was identified that a summary of items would be required. This is possible by accessing the Welcome screen and clicking the “Event Summary” button. The combination of a form and sub-form was used by using both EventSummary (Master form) and SupplierContinious (Sub form) forms. The below figures will display all various versions of both forms using two different event examples to highlight the differences in EventID and ClientID dictating the resulting items.



Item	Qty	Cost	Total Cost
Projector	4	£50.00	£200.00
Sound System	1	£350.00	£350.00
Pyrotechnics	1	£150.00	£150.00
Bodyguards	2	£200.00	£400.00
Burger vans	3	£150.00	£450.00
Fish and Chips vans	1	£100.00	£100.00
Toilets	20	£50.00	£1,000.00
Smoke machines	4	£25.00	£100.00
Catering	24	£10.00	£240.00
Sciene Stand	1	£100.00	£100.00
Members Stand	1	£10.00	£10.00
Sound System	1	£350.00	£350.00
Projector	1	£50.00	£50.00
Tea and Coffee	24	£1.50	£36.00
Grand Total			£3,536.00

Figure 14 SupplierContinious form

The form was created by using the query SupplierItemsExtPrice to ensure that the total summation calculation is pulled through in the summary and not the cost per individual item. This form is the sub-form, which means it'll be visible in the EventSummary view, minimising the level of detail depending on the EventID selected, which is why in this view, all entries are visible. Report inspiration and creation guidance taken from GCFLearnFree on Youtube [16] [17].

[illegible]

Figure 15 Event Summary form

Providing a client and event have been registered, this free text area would allow a member of management to type and list the items, quantities, and cost per item into the pane. Figure 14 displays examples of a completed form using two different examples.

Event Summary:

EventID: 1 Location: Swansea University

Start Date: 01/05/2023 End Date: 01/05/2023

Event: Radiology Lecture Description: Lecturer's will be on site to teach students about Radiology techniques

Items Requested:

Item	Qty	Cost	Total Cost
Catering	24	£10.00	£240.00
Scienc Stand	1	£100.00	£100.00
Members Stand	1	£10.00	£10.00
Sound System	1	£350.00	£350.00
Projector	1	£50.00	£50.00
Tea and Coffee	24	£1.50	£36.00
Grand Total			£786.00

Event Summary:

EventID: 5 Location: Singleton Park

Start Date: 03/07/2023 End Date: 03/07/2023

Event: Stereophonics Description: Surprise session with Stereophonics, limited capacity. Bodyguards essential!

Items Requested:

Item	Qty	Cost	Total Cost
Projector	4	£50.00	£200.00
Sound System	1	£350.00	£350.00
Pyrotechnics	1	£150.00	£150.00
Bodyguards	2	£200.00	£400.00
Burger vans	3	£150.00	£450.00
Fish and Chips vans	1	£100.00	£100.00
Toilets	20	£50.00	£1,000.00
Smoke machines	4	£25.00	£100.00
Grand Total			£2,750.00

Figure 16 EventSummary with data entries

As seen in Figure 14, the EventID has dictated the results shown in the SupplierContinuous sub-form as well as providing a different grand total to each EventID. The next stage would involve taking the information listed and populating a report.

5. Event Invoice Report

To ensure a client receives a summarised invoice of their event, a summary report was created to provide an invoice for payment. This was done by combining Client, SupplierItems tables with the SupplierItemExtPrice query to summarise all the relevant information.

Figure 17 Design view of Report

Item	Qty	Cost	Total
Catering	24	£1000	£240.00
Scene Stand	1	£100.00	£100.00
Members Stand	1	£1000	£10.00
Sound System	1	£350.00	£350.00
Projector	1	£50.00	£50.00
Tea and Coffee	24	£1.50	£36.00

Figure 18 Invoice created via a Report.

As shown in Figure 16, the report successfully summarises the Event details using the EventID, the Client details using the ClientID, and the related items ordered against the event. This is opened in a Print Preview format when using the button located on the Welcome form.

Relationship Diagram

One of the key elements of having a successful and operational database, are relationships. These allow tables to relate to each other, with all the relevant relationship connections being defined and illustrated via Microsoft Access's Relationship Diagrams.

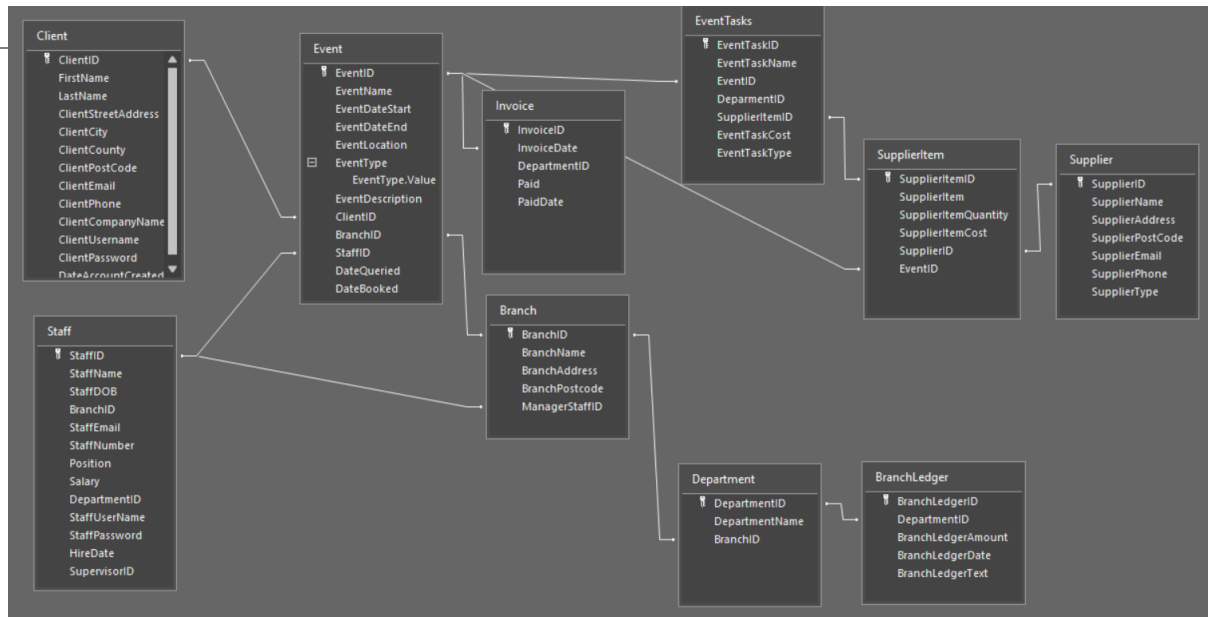


Figure 20 Microsoft Access Relationship diagram

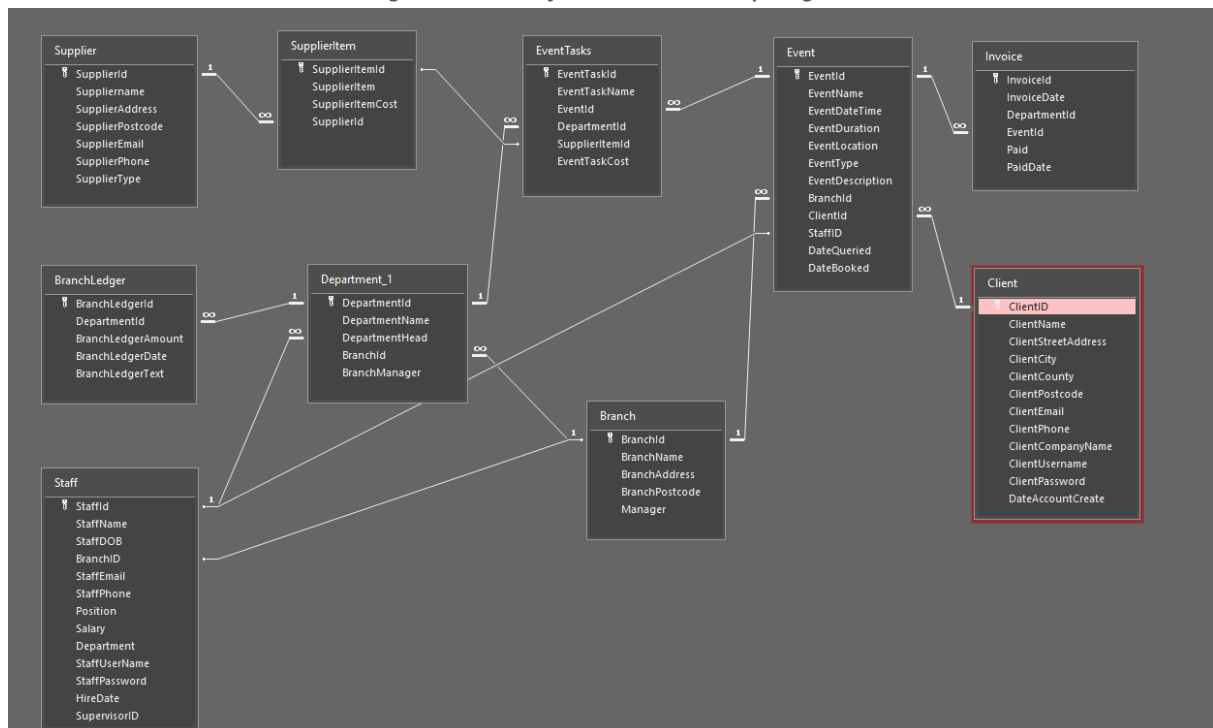


Figure 19 an earlier version of Microsoft Access Relationship diagram displaying one-to-many

Appendices

Branch						Department		
BranchID	BranchName	BranchAddress	BranchPostCode	ManagerStaffID	Click to Add	DepartmentID	DepartmentName	BranchID
1	Swansea	7 Castle Hill, Swansea, Swansea	SA1 1DW	1		1	Swansea Audio and Visual	
2	Neath	28 Kingston Close, Neath, Neath Port Talbot	SA11 3EN	2		2	Swansea Ticket Sales and Admin	
3	Carmarthen	42 Llamas St, Carmarthen, Carmarthenshire	SA31 1AA	3		3	Swansea Cleaning and Maint	
	(New)					4	Neath Audio, Visual and Maintenance	
						5	Neath Administration, Ticket Sales and Cleaning	
						6	Carmarthen Audio, Visual and Maintenance	
						7	Carmarthen Administration, Ticket Sales and Cle	
							(New)	

BranchLedger					
BranchLedgerID	DepartmentID	BranchLedgerAmount	BranchLedgerDate	BranchLedgerText	Click to Add
1	1	£1,000.00	26/04/2023	Invoice and internal c	
2	4	£750.00	17/03/2023	and internal costs	
	(New)	£0.00			

Event										
EventID	EventName	EventDate	EventDateEnd	EventLocation	EventType	EventDescription	ClientID	BranchID	StaffID	DateQueried
1	Radiology Lecture	01/05/2023	01/05/2023	Swansea University	Seminar	Lecturer's will	1	1	1	26/04/2023
2	Snail Convention	20/05/2023	21/05/2023	Neath	Conference		5	2	2	01/03/2023
3	Comicon	01/08/2023	03/08/2023	Swansea Arena	Conference		1	2	2	24/11/2022
4	Llandeilo Jazz Festival	16/07/2023	16/07/2023	Cawdor Arms	Music Festival		3	3	3	17/09/2022
5	Stereophonics	03/07/2023	03/07/2023	Singleton Park	Concerts	Surprise sessio	4	1	1	01/01/2022
6	Safety Conference	21/09/2023	22/10/2023	Liberty Stadium	Conference		6	3	3	27/04/2023
7	Russel Howard	14/06/2023	16/06/2023	Swansea Arena	Concerts		7	1	1	17/03/2022
8	Swan Lake Live Performance	19/09/2023	19/09/2023	Neath Theatre	Concerts		8	1	1	
	(New)									

Figure 21 Branch, BenchLedger, Event, Department tables

EventTasks						
EventTaskID	EventTaskName	EventID	DepartmentID	SupplierItemID	EventTaskCost	EventTaskType
1	Sell Tickets	1	2			Branch Booking
2	Book Venue	1	2			
3	Confirm Speaker	1	2			
4	Projector	1	1			
5	Speaker	1	1			
6	Cleaning	1	3			
7		1				
	(New)					

Invoice					
InvoiceID	InvoiceDate	Department	Paid	PaidDate	Click to Add
1	17/03/2022	1	☒	13/04/2023	
2	27/04/2023	4	☐		
3	17/09/2022	2	☒	18/09/2022	
	(New)		☐		

Supplier							
SupplierID	SupplierName	SupplierAddress	SupplierPostCode	SupplierEmail	SupplierPhone	SupplierType	Click to Add
1	AudioTechnic	123 Audio Street	SA155GF	info@audiotechnic.com	1554775558	Audio & Visual	
2	Cegin Fach Y Wlad	86 Carmarthen Road	SA156DS	Sali@cfyw.co.uk	1554854446	Catering	
3	Tough Guys Security	9 Ironway Street	SA411DF	security@toughguys.com	1269878654	Security	
4	Porta-Loo	1b Flush Avenue	SA121DD	flush@portaloo.com	1792854452	Hygiene	
5	Burger Shop	97 Patty Lane	SA126RS	debra@yahoo.com	1554654879	Catering	
6	Science for Kids	24 Bunsen Close	SA218FL	scienceforkids@gmail.co	1554254691	Entertainment	
7	Institute of Medicine	236 Hospital Way	SA421BL	education@iom.com	1792854654	Entertainment	
	(New)				0		

Figure 22 EventTasks, Invoice and Supplier tables

StaffID	StaffName	StaffDOB	BranchID	StaffEmail	Position	Salary	Department	StaffUser	StaffPas	HireDate	SupervisorID	Click to Add
1	Bob Jones	30/04/1970	1		0 Branch Manager	£30,000.00						
2	Esther Morgan	17/06/1965	2		0 Branch Manager	£30,000.00						
3	Jenny Brown	22/01/1987	3		0 Branch Manger	£30,000.00						
4	Darcy Butler	16/05/1992	1		0 Department Head	£27,500.00	1					
5	Gregory Davies	01/12/1982	1		0 Department Head	£27,500.00	2					
6	Mick Evans	19/10/1972	1		0 Department Head	£27,500.00	3					
7	Harry Lewis	12/08/1999	2	hl@staff.com	0 Department Head	£27,500.00	4					
8	Claire Casewell	16/08/1975	2	cc@staff.com	0 Department Head	£27,500.00	5					
9	David Davies	05/04/1985	3	dd@staff.com	0 Department Head	£27,500.00	6					
10	Julia Dickson	06/07/1987	3	jd@staff.com	0 Department Head	£27,500.00	7					
11	Ben Greene	07/08/1966	1	bg@staff.com	0 Administration	£27,500.00	2					
12	Jeff Beck	09/10/1994	2	jb@staff.com	0 Administration	£22,000.00	5					
13	Steve Stevenson	10/01/2000	3	ss@staff.com	0 Administration	£22,000.00	7					
14	Olivia Heart	12/02/1999	1	oh@staff.com	0 Ticket Sales	£22,000.00	2					
15	June Bug	16/04/2001	2	jb2@staff.com	0 Ticket Sales	£22,000.00	5					
16	Dexter Manning	17/04/2000	3	dm@staff.com	0 Ticket Sales	£22,000.00	7					
17	Miquel Horista	21/01/1989	1	mh@staff.com	0 Cleaner	£20,000.00	3					
18	Derek Jones	16/04/1985	1	dj@staff.com	0 Cleaner	£20,000.00	3					
19	Liam Bennett	31/05/1995	1	lb@staff.com	0 Cleaner	£20,000.00	5					
20	Sandra Lewis	30/06/1991	2	sl@staff.com	0 Cleaner	£20,000.00	5					
21	Sandra Evans	02/02/1999	3	se@staff.com	0 Cleaner	£20,000.00	7					

Figure 23 Staff table

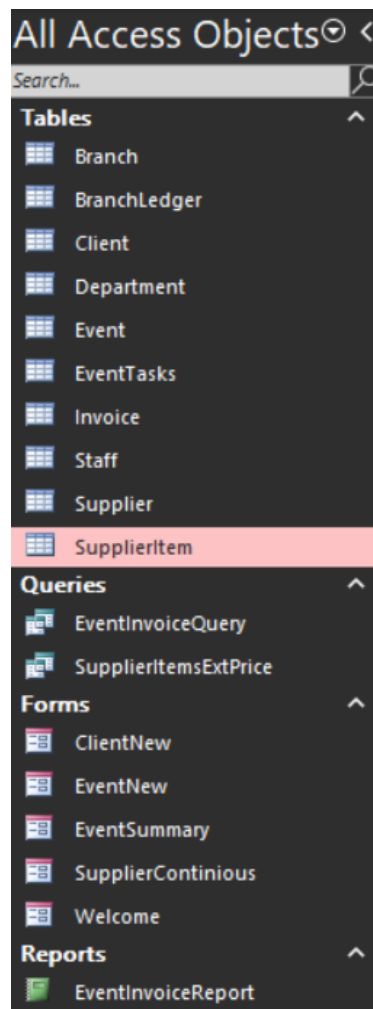


Figure 24 Microsoft Access Objects in Database

Entity Relationship Diagram

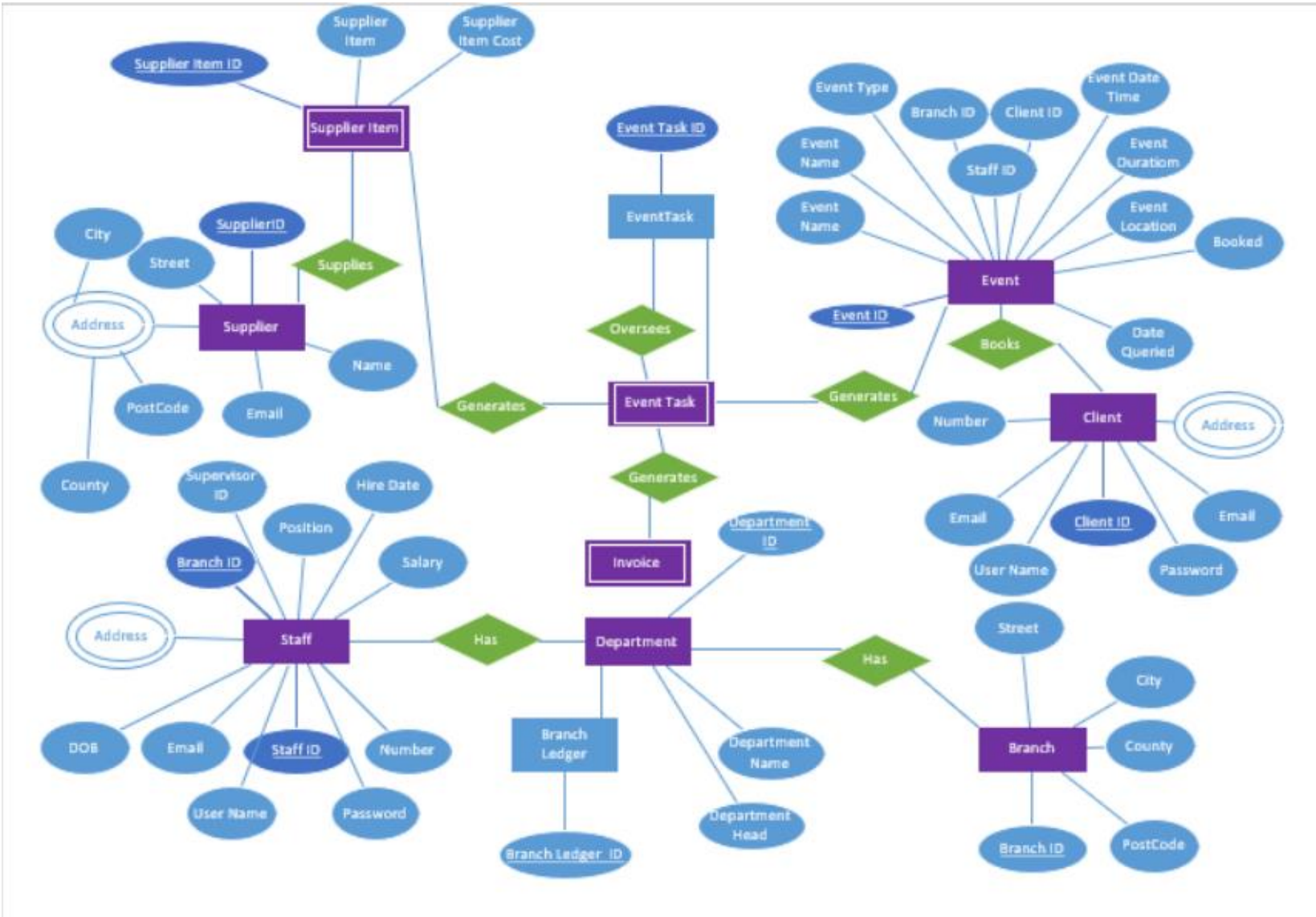


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