

P1.1 Analyse the key issues such as Integrity, Security, Recovery, Concurrency & Atomicity etc., and application of databases within organizational environments such as Banking, Retail, HR, Education, etc.

Integrity

Data integrity relates to the process of ensuring that data, such as data that is held and maintained in a banking environment is held accurately and consistently throughout its lifecycle. The functions of data integrity are most critical during the stages of transforming the data, string history, storing of definitions – referred to as Metadata and storing the lineage of data as it moves from one point to another. In essence therefore, data integrity in relation to a database is the warrant or reassurance that data is consistent and accurately held.

Security

Data security is the practice of ensuring that data especially information that is being held in a database is secure and protected from deliberate or malicious attack, corruption and unauthorised access. Further, data security is affirmed through parliamentary legislation in the form of the Data Protection Act 1998 and EU directives the most notable of which is the EU Data Protection Directive (Directive 95/46/EC). The remit of the legislation is far reaching primarily as it is designed to protect the “privacy of all personal data that is collected for or about citizens of the EU, especially as it relates to processing, using, or exchanging such data.” The applicable relevance of this legislation and importance of data security becomes immensely important when considered against the backdrop of a banking institution where trillions of low to high value transactions are completed and recorded each day. There are numerous companies at the forefront of providing secure database processes designed to protect the integrity of data the leading company is Oracle.

Recovery

According to Rouse (2012), “data recovery is the process of restoring data that has been lost, accidentally deleted, corrupted or made inaccessible for any reason.” The restorative processes vary in their complexities and are to a great extent dependant on many variables. These can include, the reasons underlying and surrounding the loss of data, the type of database management system (DBMS) where the data loss occurred, the nature and extent of data to be recovered, type of recovery software in place and many other similar factors are considered with regard to the complicated processes involved in data recovery.

Concurrency

Data concurrency exists when for example multiple users make simultaneous data entries or modifications in a database. In these circumstances, there is a requirement for a system of control to ensure that data remains consistent, accurate and that there is an absence of data conflict post modifications. It is generally held that there are two methodologies for concurrency control:

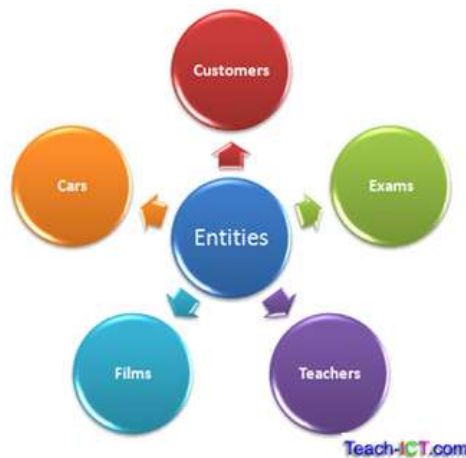
1. **Pessimistic** – a process of locking mechanisms the cumulative effect of which prevents users from changing data in a manner that detrimentally affects other users. Once an action is performed that creates data to be ‘locked’, another user cannot then alter the data in a manner that would conflict with the lock. The locked data can only be modified when released by the original user that caused the lock to be applied. This method of concurrency is invariably found in database environments where costs factors to lock data are less than those of data recovery.
2. **Optimistic** – optimistic concurrency control exists where data is not locked by users. Instead, where a user has updated data the system auto checks to discover if an attempt has been made to alter the data post the original modification. When such an attempt is discovered, the system delivers an onscreen error message to the second user who then rolls back the entry and commences the modification process again in a manner that does not elicit an error message. This concurrency methodology is generally applied in environments where it is more cost effective to roll back a data entry than to apply a lock to the data.

Atomicity

Refers to a feature of database systems that require for a transaction to be completed fully; there cannot be a partial completion of a transaction. For example where in travel agency a client purchases a flight ticket, then business logic would dictate that the action of purchasing the ticket would additionally reserve a seat for the customer? Whilst the buying of a ticket and the seat reservation are two distinct actions, one cannot be performed without the other as to do so would give rise to seats being reserved for different customers. Atomicity features as an integral element of atomicity, consistency, isolation and durability (ACID) principles which are applied to ensure the reliability of database transactions similar to the one example given above.

P1.2 critically evaluate the features such as entity, attributes, primary key, foreign key, etc. and advantages of database management systems using relevant example and diagram.

Entity



A database contains one or more tabulated forms of data. In the adjacent diagram, these tables are accordingly named: Cars, Exams, Customers, Films, and Teachers. These tables hold entities which are essentially things, people, places or any other tangible concept of which it is possible to collect information. Interestingly, the question of entity integrity has become a central theme for banking cartels determined to address internal and individual failings, the cumulative effect of which has resulted in the levy of multi-billion dollar fines for failing to spot transactions with suspicious entities within their database systems. The banks, including JP Morgan, Barclays and Goldman Sachs amongst others, plan to create a globally integrated client information repository known as Clariant Global where each participating bank will store and access data. This appears to be a logical step towards sharing global

information and data in order to better identify and isolate suspicious entity related transactions. However, according to Titcomb (2014), “storing information under one roof, as well as [the] number of banks involved presents a huge security risk.”

Attributes

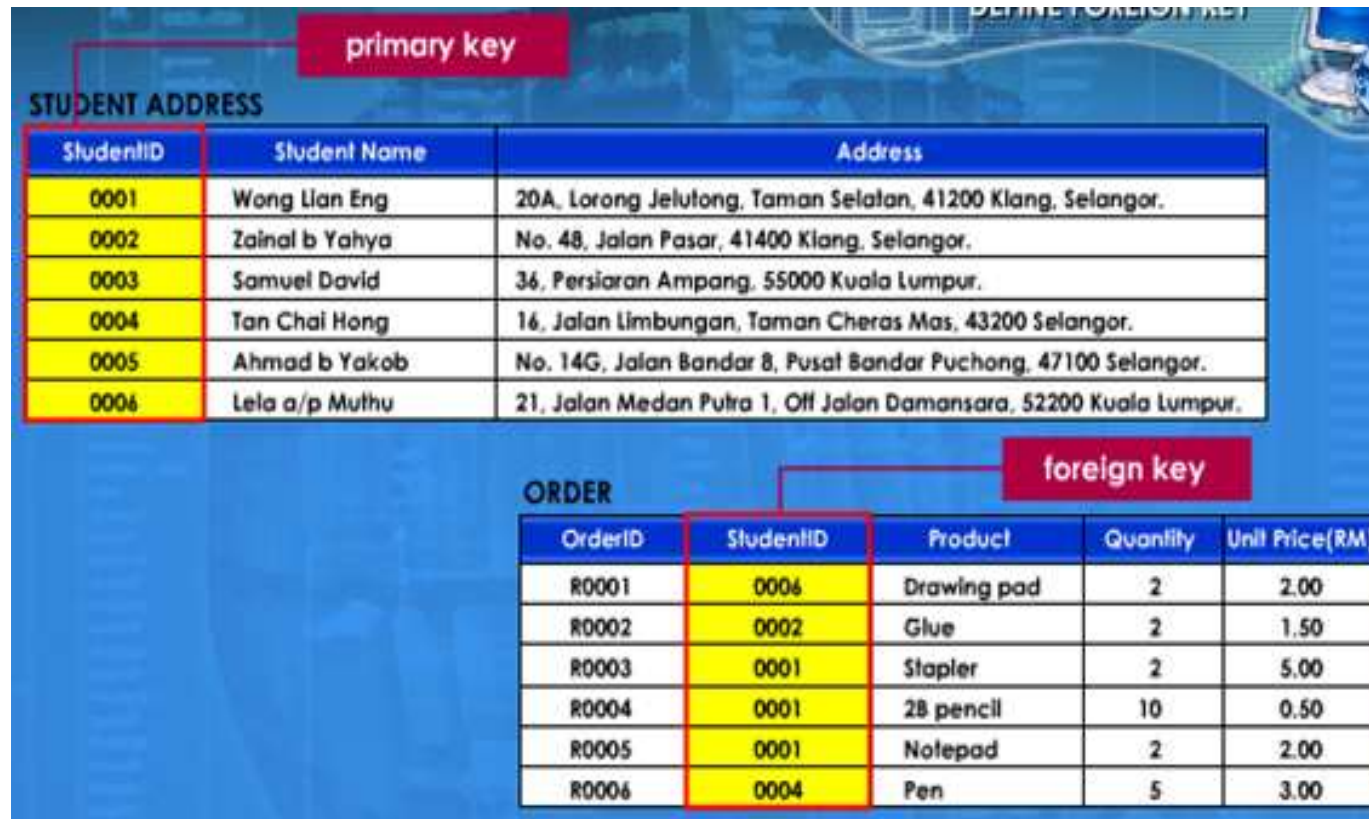
Entity = Customer

Customer ID
First Name
Surname
Date of birth
Address
Phone no.

**These are the
'attributes' for
the entity
'customer'**

The adjacent diagram lists the attributes or characteristics of the entity table “Customer.” form an individual table. More precisely, these attributes are the components that are integral to forming the table.

Primary and Foreign Keys

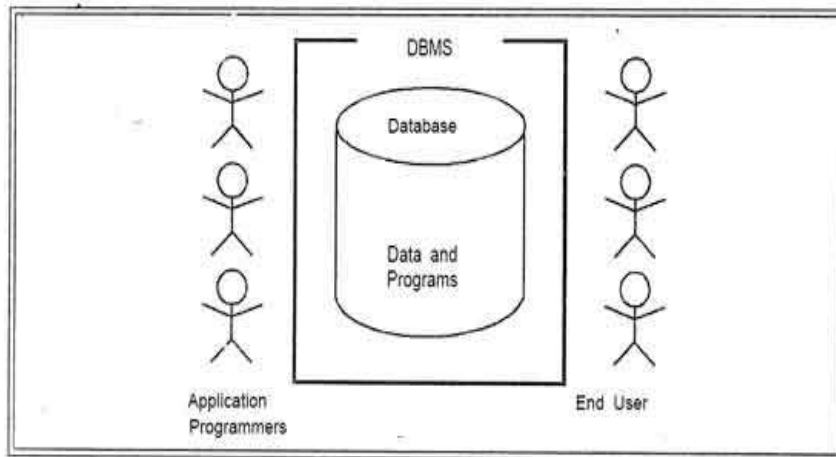


diagram, “Student ID” has become a foreign key within the “Order” table yet remains a primary key in Student ID table. Foreign keys are necessary in order to maintain integrity within the database by referencing the primary key.

Primary Key – can be regarded as a column or group of columns which provide a unique “row” marker. In order to function appropriately, each table should have a single primary key. In the diagram given, “Student ID” is the primary key in the table Student Address.

Foreign Key – as its name implies, a foreign key is a column or group of columns in one table where its values are replicated are matched in the primary key of another table. Again, referring to the adjacent

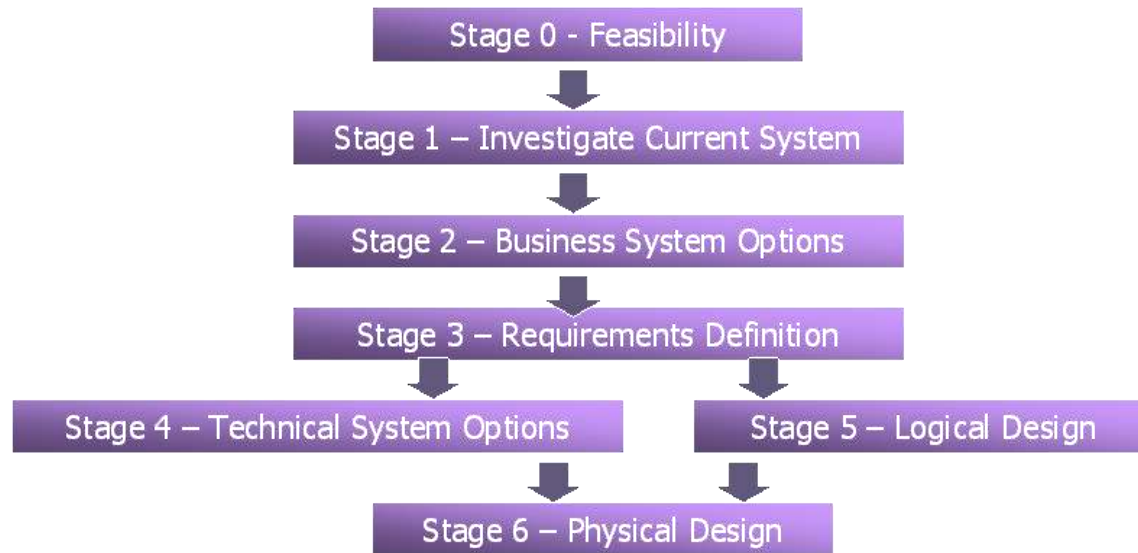
Database Management Systems



A database management system (DBMS) is essentially a collection of software programmes that allows for the manipulation, modification, creation and maintenance of data held within a database. DBMS is the interface between the stored data and the database. There are many DBMS systems which have the capacity to interface with small databases held on personal computers to gargantuan amounts of data stored on large mainframes. In the Banking example given previously, a discernible advantage exists where “the world’s biggest banks are collaborating on a massive repository of customer information,” the overarching advantage is to “prevent themselves from

doing business with sanctioned companies and organisations.” In addition to this, further advantages of a centralised database are: controlling redundancy, enforcement of integrity, consistency, data sharing across multiple users, ability to restrict unauthorised access, provision for backup and recovery, and concurrency amongst others.

P2.1 Analyze a database developmental methodology such as SSADM and its phases feasibility study, requirement analysis, requirement specification, physical design, etc.



Structured Systems Analysis & Design Method (SSADM) is a systems application methodology which divides the developmental stages of a project into quantifiable stages, steps or tasks. Moreover, this methodical approach provides a framework for the project to be managed from its inception at the stage of feasibility to conclusion with the physical design. The use of SSADM creates a number of positive factors some of which include for example, improves the overall management of the project, and establishes a structured framework for exchange between developmental staff. To appreciate the scale of the framework, it is necessary to consider the

individual phases: Feasibility, **Stage 0** – concerns the result of the processes of strategic planning and evaluative phases of Computer Choice which determined the technical, organisational, financial and legal feasibility options relative to the envisaged project. This initial stage is undoubtedly the most important as it considers the evaluative feasibility of the project proposal, analysis and determination of the most appropriate and relevant solution. Investigate Current Systems, **Stage 1** – in order to provide Craig of Computer Choice with a relevant database system which is appropriate for his business needs, it is necessary to consider the current systems and environment in order to identify problem areas and areas where improvement can be made to benefit Computer Choice. Business System Options, **Stage 2** – business system options considers new systems based on their functionality. Primarily, this is to provide Computer Choice with several options which are the most relevant and appropriate for their needs. Requirements Definition, **Stage 3** – having selected a business system option (BSO), a more thorough

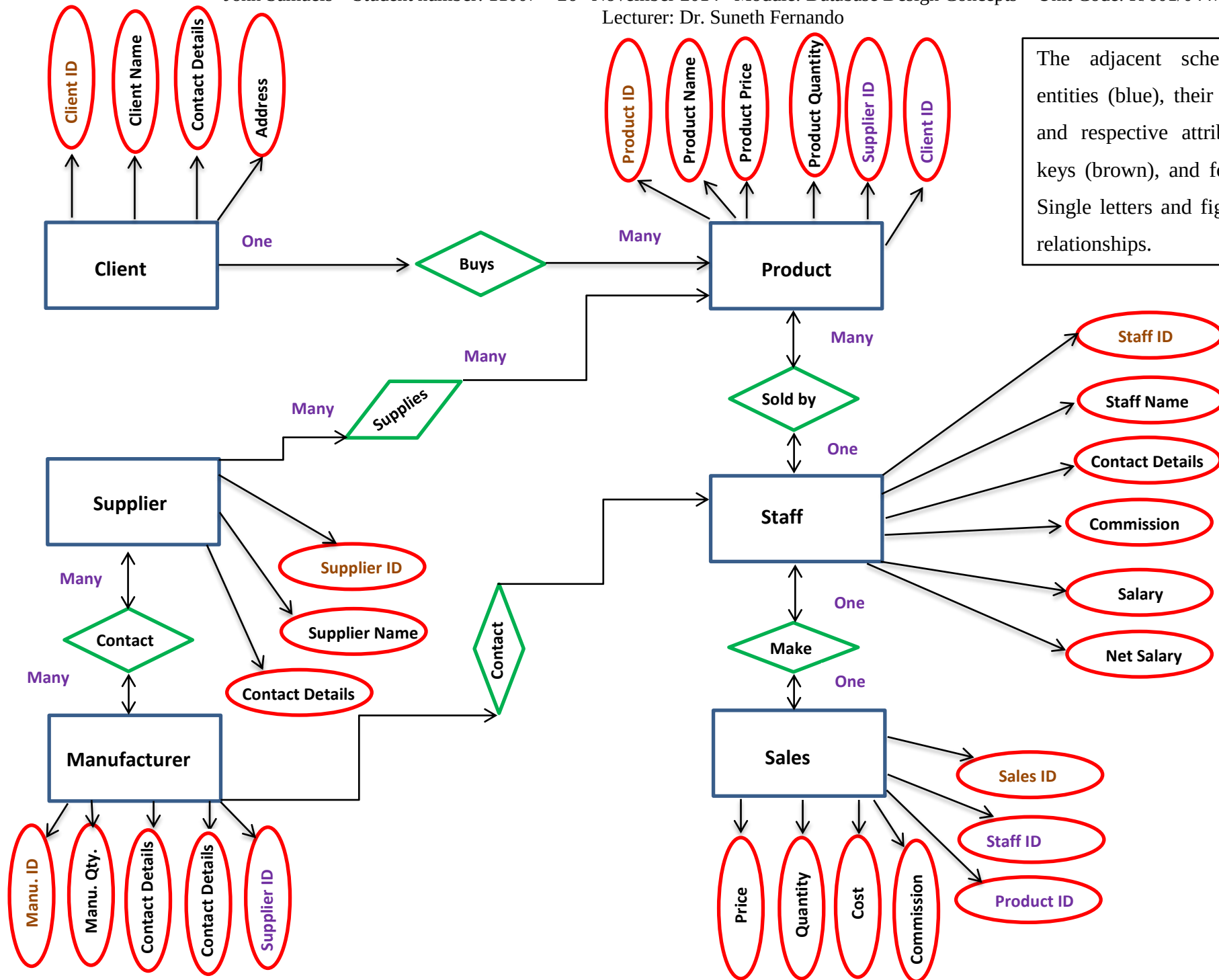
and detailed specification is prepared to meet the desired system data, functions and events. Technical System Options, **Stage 4** – the process of assessment in this phase of SSADM relates principally to the descriptive analysis of the costs, benefits, and constraints. Such constraints can comprise of time, cost, and hardware or software considerations raised in the feasibility phases for Computer Choice. Logical Design, **Stage 5** – only the logical framework of the system project is defined. At this stage, no physical attributes such as for example menu structures, designs of forms, etc. are given to the system project. Physical Design, **Stage 6** – consideration is given to the physical environment in which the system will operate. In this conclusive stage, the following elements are considered: storage of data, performance, and processing characteristics, and denormalising amongst other similar factors.

P2.2 - discuss entity-relationship modeling such as one-to-one, one-to-many and many-to-many relationship and normalization with 1st, 2nd and 3rd normalization to design database solution for Computer Choice.

When consideration is given to the design and implementation of a relational database such as in the case of Computer Choice, it is professional practice to create an entity diagram that clearly illustrates existing and potentially new relationships. The process therefore can be regarded as an evolutionary one, especially more so during the infancy stages of database conceptualisation. Refinements can be effected to the entity relationship diagram (ERD); cardinal values can be corrected, added or indeed eliminated according to the requirements of Computer Choice yet should remain economically efficient in so far as affording Computer Choice the opportunity to expand the database model as their business grows. Indeed, according to Castle (2013) during the end of the 20th and formative years of the 21st century, there has been an exponential rise in the accumulation and consequent processing of data by large corporate organisations principally using the relational database model. It is appropriate and indeed prudent that Computer Choice, regardless of its size, should seek to convert their manual data system to one that reflects the corporate climate. Indeed, Castle underlines this very point by alluding to the fact that:

“relational database systems—which organize information conceptually in a similar manner to the tabular layout of a spreadsheet, but with concurrent access, transactional reliability, and a flexible querying interface—ultimately became the dominant technology for storage and retrieval of structured data in commercial businesses and the de facto standard on the web. They are also firmly at the technical core of a vast, global transformation of enterprise data processing and management that has taken place in recent years.”

The methodology underpinning the execution of the ERD model will clearly provide a better overview of Computer Choice’s data needs and a better understanding of their organisation. An additional benefit of the ERD is that it can provide a mirror image of a conventional file based system that Computer Choice could hold during the interim period of the design and build stages of their database model.



The adjacent schematic displays the entities (blue), their relationships (green) and respective attributes (red), primary keys (brown), and foreign keys (purple). Single letters and figures denote cardinal relationships.

One-to-many

In relational databases, such as in the ERD given above, a relationship occurs when parent data or a record of data in one table references several records or child records in another table. However, it is not necessary for the parent record to have child records. In this instance, a one-to-many relationship allows for a zero, a single, or multiple child records within an identifiable table outside of the parent table. If we return again to the table above prepared for Computer Choice, we note that the CLIENT table contains the client ID which references the column of the same name in the PRODUCT table, this is so the purchase made by the client can be tracked and readily identified. A purchase related transaction can only apply to one client; however the same client can make many product purchases over a period of time.

Many-to-many

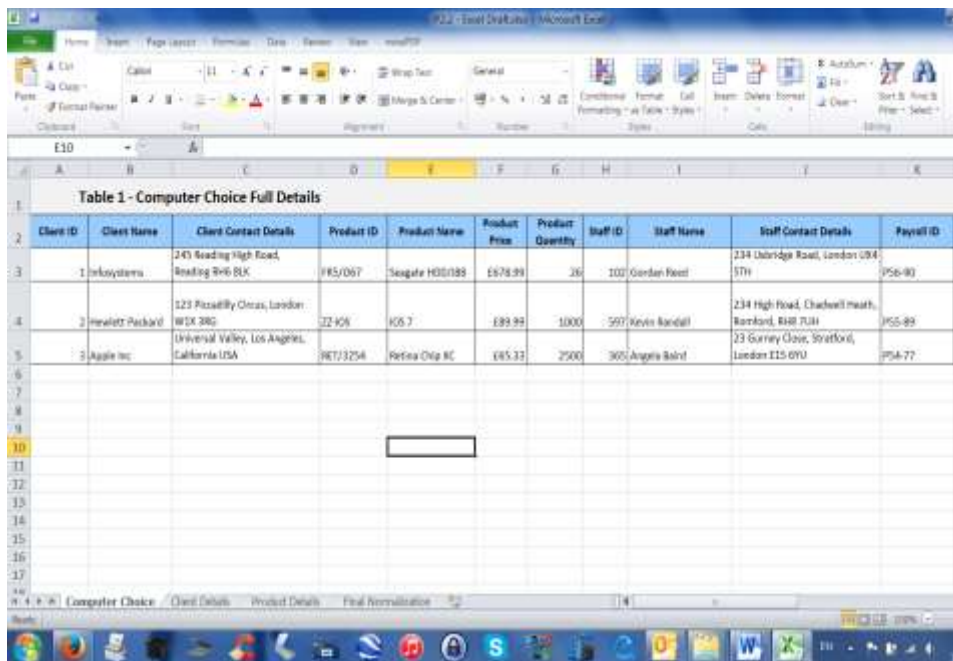
The inverse of a one-to-many relationship is referred to as a many-to-many relationship in which a child record can be connected or linked back to more than one parent record. Again, referring to the ERD above for Computer Choice, the SUPPLIER table supplies many products as referenced in the PRODUCT table in which child records can be linked back to the SUPPLIER table.

One-to-one

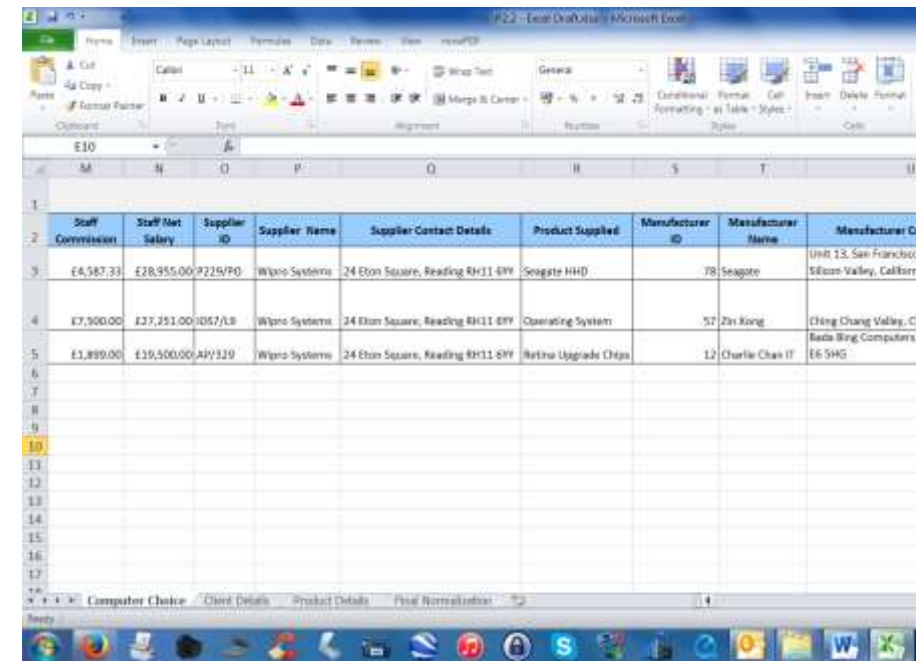
One-to-one relationships exist when the primary key of an identified table becomes the foreign key in another table. If we consider the SALES table and the STAFF table, we find that the column STAFF ID has been replicated in the SALES table as the foreign key. In so doing, a one-to-one relationship can be held to exist to identify staff individual sales.

Normalisation

Normalisation as its name implies, is the process of arranging the fields and tables of a relational database in order to minimise the existence of redundant data. This process is one where a table complete with data is then broken down into smaller and therefore less redundant tables where primary and foreign key relationships are defined. There are three stages involved in the process of normalisation; each distinct stage will create a table. I have applied these stages of normalisation to Computer Choice and have provided below a visual sequence of the process. The initial table shows the complete fields – including any repeating data - envisaged for the Computer Choice database.



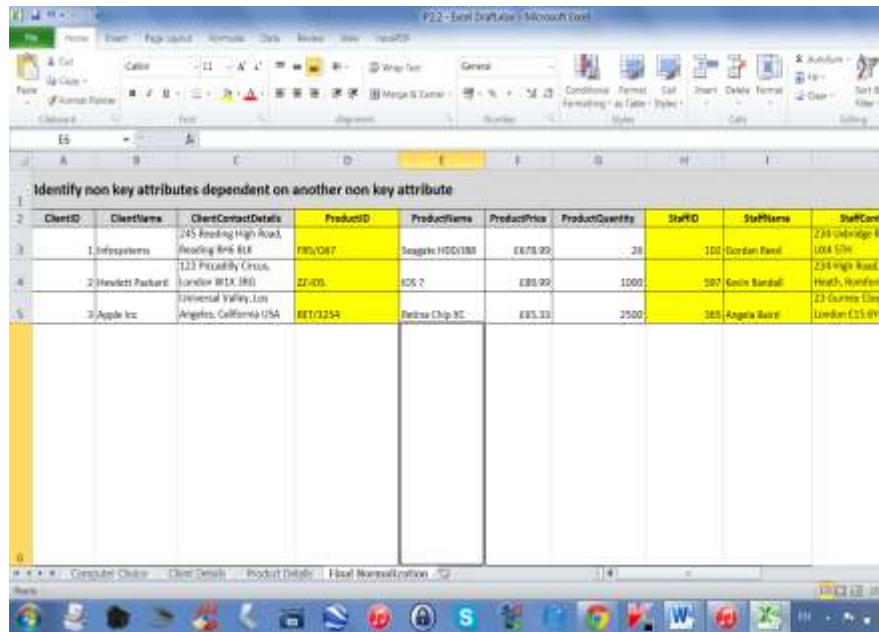
Client ID	Client Name	Client Contact Details	Product ID	Product Name	Product Price	Product Quantity	Staff ID	Staff Name	Staff Contact Details	Payroll ID
1	Infosystems	245 Reading High Road, Reading RG6 8LK	P95/D67	Seagate HDD/188	£678.99	20	100	Gordon Reed	234 Uxbridge Road, London UB4 5TH	P56-80
2	Hewlett Packard	123 Fitzwilliam Close, London W1X 3BG	J2-K06	iOS 7	£89.99	1000	597	Kevin Randall	234 High Road, Chadwell Heath, Romford, RM8 7UH	P55-69
3	Apple Inc	Universal Valley, Los Angeles, California USA	RET/3256	Retina Chip IC	£85.33	2500	300	Angela Baint	23 Gurney Close, Stratford, London E15 6YU	P54-77



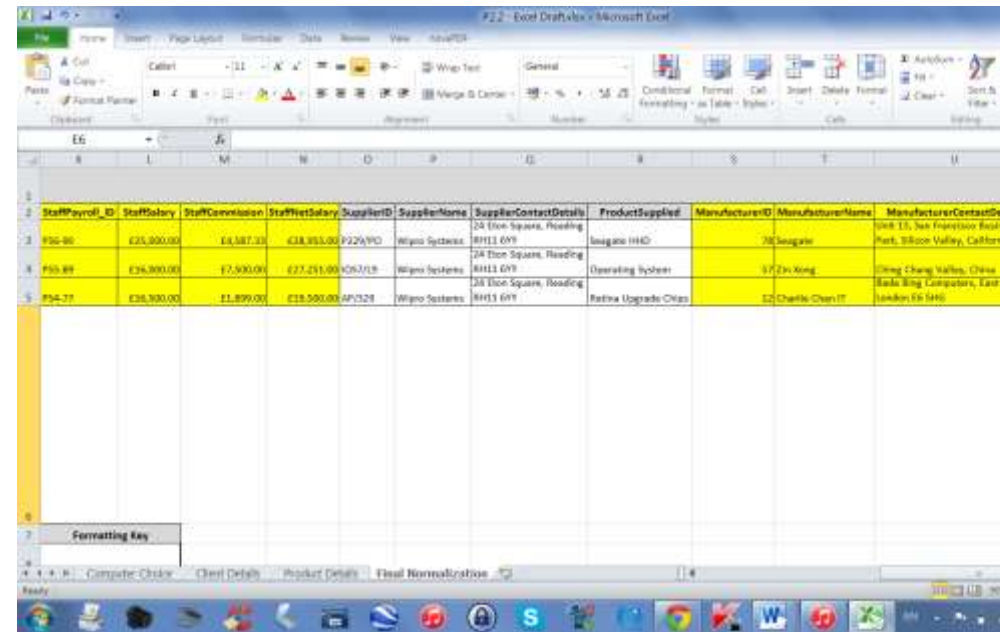
Staff Commission	Staff Net Salary	Supplier ID	Supplier Name	Supplier Contact Details	Product Supplied	Manufacturer ID	Manufacturer Name	Manufacturer C
£4,587.33	£28,955.00	P225/P0	Wipro Systems	24 Eton Square, Reading RG11 8YF	Seagate HDD	78	Seagate	19813, San Francisco Silicon Valley, Califor
£7,300.00	£27,251.00	D057/LB	Wipro Systems	24 Eton Square, Reading RG11 8YF	Operating System	57	Zin Kong	Ching Chung Valley, C
£1,899.00	£39,500.00	APY339	Wipro Systems	24 Eton Square, Reading RG11 8YF	Retina Upgrade Chips	12	Charlie Chan IT	Baca Bing Computers

Stage 1

Identify non key attributes dependant on another non key attribute



ClientID	ClientName	ClientContactDetails	ProductID	ProductName	ProductPrice	ProductQuantity	StaffID	StaffName	StaffContact
1	Infosystems	245 Reading High Road, Reading RG1 8LE	P001087	Seagate HDD/380	£678.99	20	100	Gordon Powell	234 Oakridge Rd, 004 5th
2	Hewlett Packard	123 Priority Circus, London W1X 8HG	27-005	IOS 7	£88.99	1000	587	Kevin Randall	234 High Road, C Heath, Romford
3	Apple Inc	Universal Valley, Los Angeles, California USA	RET/2254	Retina Chip XE	£85.33	2500	385	Angela Baird	23 Surmea Close, London E25 6YU



StaffPayrollID	StaffSalary	StaffCommission	StaffNetSalary	SupplierID	SupplierName	SupplierContactDetails	ProductSupplied	ManufacturerID	ManufacturerName	ManufacturerContactDetails
P56-80	£25,800.00	£4,587.33	£18,953.00	P229/90	Wipro Systems	24 Elm Square, Reading RG1 1 6Y9	Seagate HDD	20	Seagate	004 5th, San Francisco Road, Park, Silicon Valley, California
P55-89	£26,800.00	£7,900.00	£27,281.00	4057/18	Wipro Systems	24 Elm Square, Reading RG1 1 6Y9	Operating System	172	Zin Xing	234 Chang Valley, China
P54-77	£26,800.00	£1,899.00	£18,500.00	AP/328	Wipro Systems	24 Elm Square, Reading RG1 1 6Y9	Retina Upgrade Cities	£2	Charlie Chen IT	Back King Computers, East London E16 5HG

Stage 2

Identify partial dependencies.

Step 2 - Identify Partial Dependencies

ClientID	ClientName	ClientContactDetails	ProductID	ProductName	ProductPrice	ProductQuantity	StaffID	StaffName	StaffContactDetails	StaffPayroll_ID
1	Junkysystems	340 Reading High Road, Reading RG6 4LE	100/001	Seagate IDE0780	£678.99	25	302	London Road	234 Uxbridge Road, London U88 5TH	P56-90
2	Hewlett Packard	123 Poshilly Close, London N11 3BC	22406	IOS 7	£89.99	1000	567	Kevin Randall	234 High Road, Chelwell Heath, Runcorn, W48 7JH	P55-89
3	Apple Inc	Universal Village, Los Angeles, California USA	807/3254	Netica Chip XE	£85.33	2500	885	Angela Rand	25 Quarry Close, Stratford, London E15 8YU	P54-77

Table 2 - Product Details

ClientID	ProductID	ProductName	ProductPrice	ProductQuantity
1	100/001	Seagate IDE0780	£678.99	25
2	22406	IOS 7	£89.99	1000
3	807/3254	Netica Chip XE	£85.33	2500

Partial Dependency

F2.2 - Local Database

ProductQuantity	StaffID	StaffName	StaffContactDetails	StaffPayroll_ID	StaffSalary	StaffCommission	StaffNetSalary	SupplierID	SupplierName	SupplierContactDetails
25	302	London Road	234 Uxbridge Road, London U88 5TH	P56-90	£25,800.00	£4,587.33	£18,955.00	P225/00	Wipac Systems	24 Eton Square, Reading RG1 1 69Y
1000	567	Kevin Randall	234 High Road, Chelwell Heath, Runcorn, W48 7JH	P55-89	£18,800.00	£7,500.00	£17,251.00	X057/19	Wipac Systems	24 Eton Square, Reading RG1 1 69Y
2500	885	Angela Rand	25 Quarry Close, Stratford, London E15 8YU	P54-77	£18,500.00	£1,889.00	£16,580.00	AP/128	Wipac Systems	24 Eton Square, Reading RG1 1 69Y

Stage 3

Identify non key attributes dependent on another non key attribute.

P2.2 - Excel Draft.xlsx - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View novaPDF

Clipboard Font Alignment Number Styles Cells Editing

J12

Step 3 - Identify non key attributes dependent on another non key attribute

Table 3 - Staff Details				Table 4 - Salary Details			
StaffID	StaffName	StaffContactDetails	StaffPayroll_ID	StaffPayroll_ID	StaffSalary	StaffCommission	StaffNetSalary
102	Gordan Reed	234 Uxbridge Road, London UX4 5TH	£25,000.00	P56-90	£25,000.00	£4,587.33	£28,955.00
597	Kevin Randall	234 High Road, Chadwell Heath, Romford, RH8 7UH	£16,000.00	P55-89	£16,000.00	£7,500.00	£27,251.00
365	Angela Baird	23 Gurney Close, Stratford, London E15 6YU	£16,500.00	P54-77	£16,500.00	£1,899.00	£19,500.00

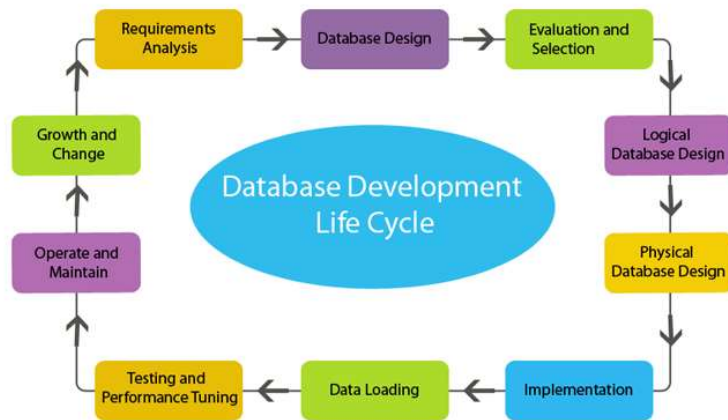
Table 5 - Supplier Details				Table 6 - Supplier Details			
SupplierID	SupplierName	SupplierContactDetails	ProductID	ManufacturerID	ManufacturerName	ManufacturerContact Details	SupplierID
P229/PO	Wipro Systems	24 Eton Square, Reading RH11 6YY	FR5/O67	78	Seagate	Unit 13, San Francisco Business Park, Silicon Valley, California	P229/PO

Computer Choice Client Details Product Details Final Normalization

Ready

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P 3.1 – apply the database developmental cycle, i.e., learners need to show the workings of different phases of database development methodology to develop database solution for the Computer Choice given data set.



System or software development life cycle is a process of necessary evaluative phases taken in order to transform Computer Choice's database preference into an effective software solution. These phases will include for example, planning stages, tracking development, building and integrating the software systems, managing developmental complications as and when they arise, and consideration of techniques and practices to be employed by staff at Computer Choice to manage the database system and ongoing site maintenance through a comprehensive and cost effective maintenance programme that allows for the database management system (DBMS) to be maintained and upgraded where and when necessary with

the absolute minimum downtime so as not to unnecessarily disrupt the day to day operations of Computer Choice. These multiple activities fall together and are commonly referred to as database development life cycle (DDLCL). As the adjacent diagram shows, there are numerous stages of DDLCL. However, for the purposes of the client Computer Choice, we will consider five of the principal stages.

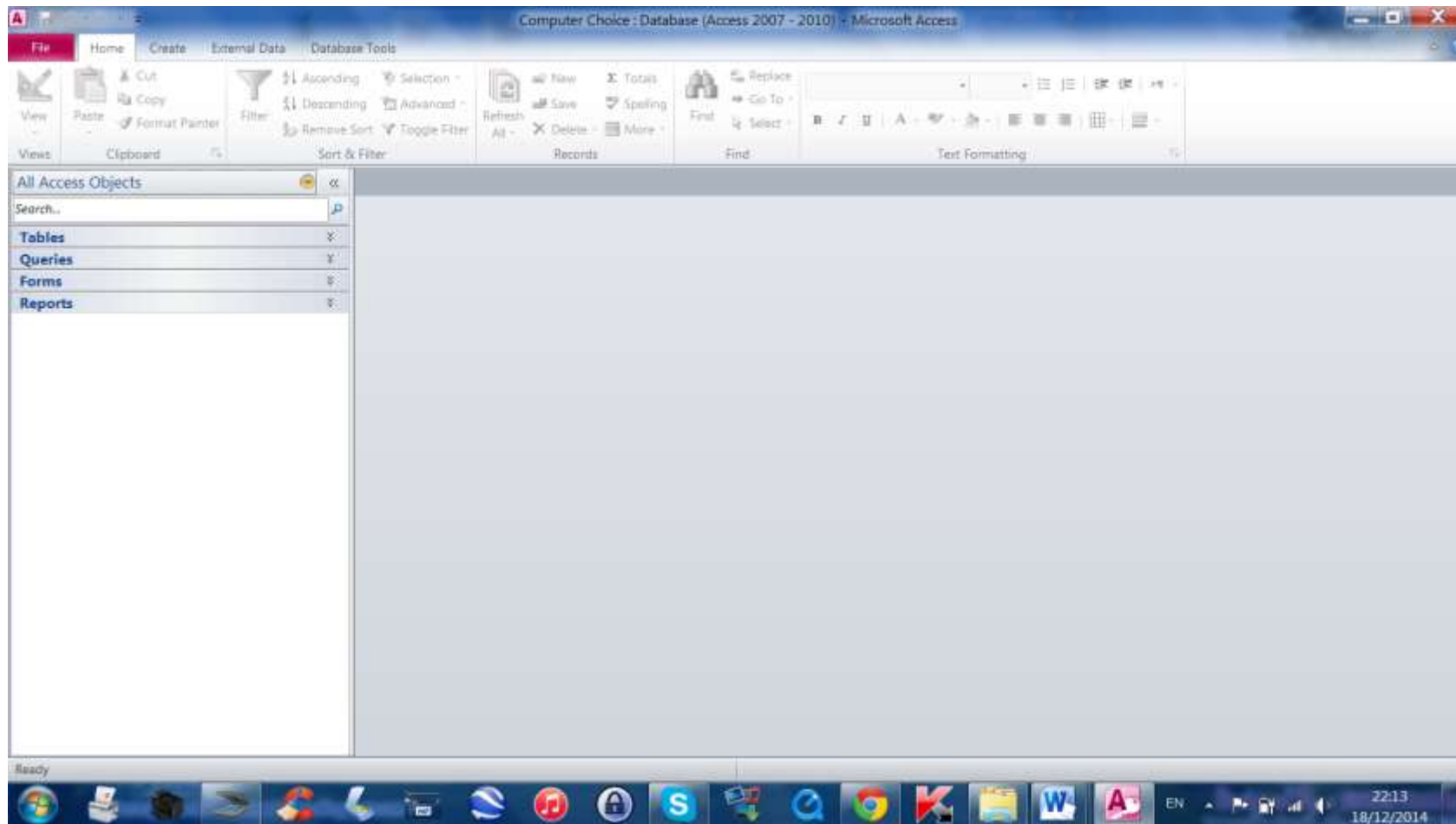
1. **Planning** – the planning stage is an important phase of DDLCL. Our client Computer Choice has provided sufficient information in order to plan a software solution that will not only fulfil their requirements but should equally be a software solution that is scalable to take account of future developments. Also, during the planning stages the project can be illustrated within a Gantt chart as this method will provide a chronological overview of every aspect of the intended project.
2. **Analysis** – in this stage, the project is subjected to critical evaluation using the client brief as a point of reference. Essentially what is looked for at this point is for the presence of any loopholes. For example, how effective is the proposed DBMS in identifying and distinguishing between the same Computer Choice product supplied and priced differently by separate suppliers and manufacturers.

3. **Design & Development** – it is in this stage that the logical design elements are finalised and the program development is executed within the allotted time frame.
4. **Implementation** – throughout this stage, the program which has been developed using the pre-defined set of data values are now brought together. Computer Choice database is now a fully functioning data information system.
5. **Maintenance** – the fifth stage is undoubtedly the most protracted and can be conducted over a long period. Primarily this is because Computer Choice database has to be tested not only to accord with client requirements, but to ensure that all DBMS features are functioning in line with manufacturer specifications.

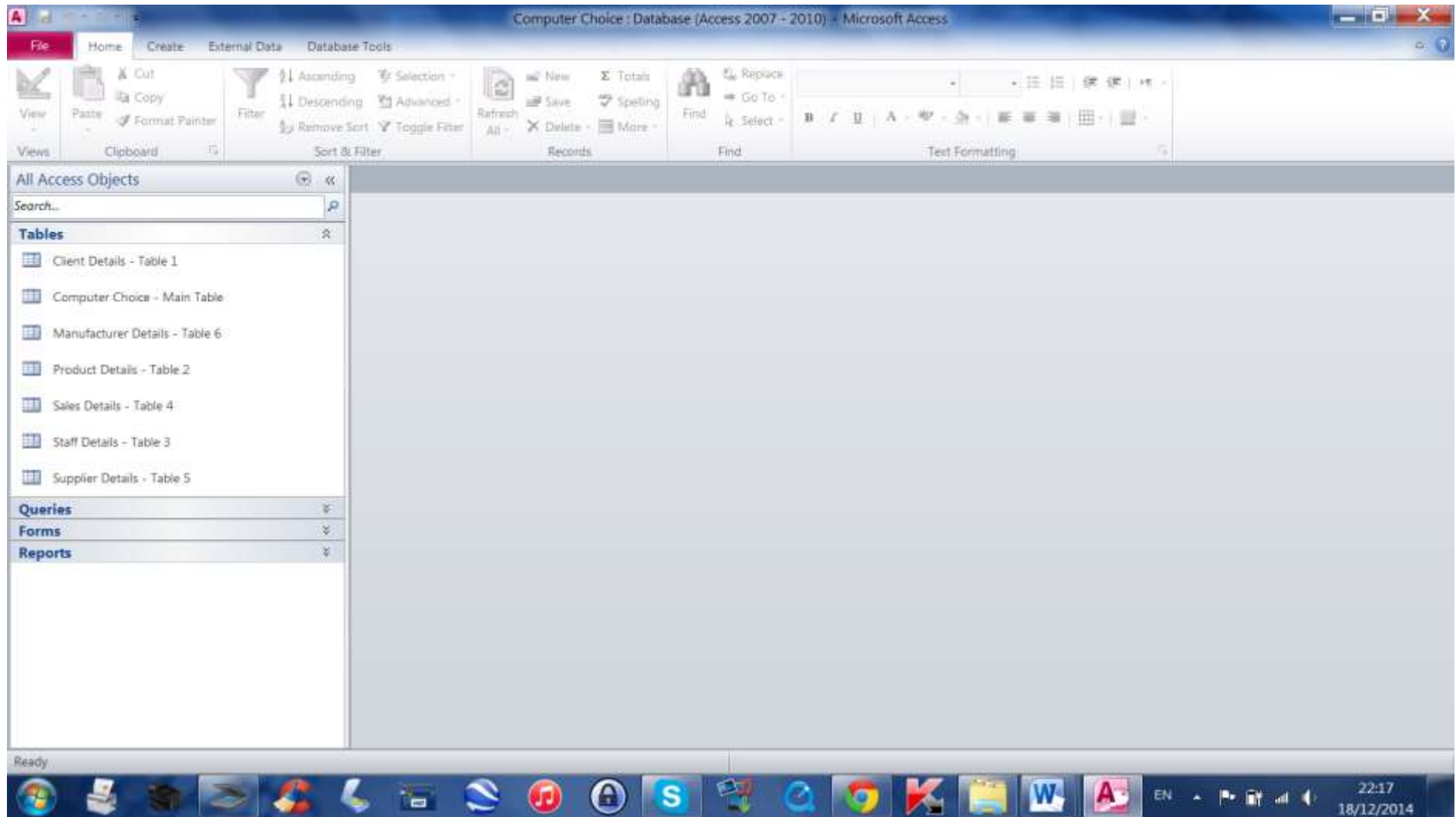
P3.2 Design a fully functional database (containing at least four inter-relational tables) including user interface i.e. need to create tables, forms, queries and reports using MS-Access 2007 or similar database applications for the Computer Choice database solution.

The following images have been provided in order to confirm the completeness of the task of building a database as per Computer Choice specifications. The database includes functioning tables, queries, forms and reports.

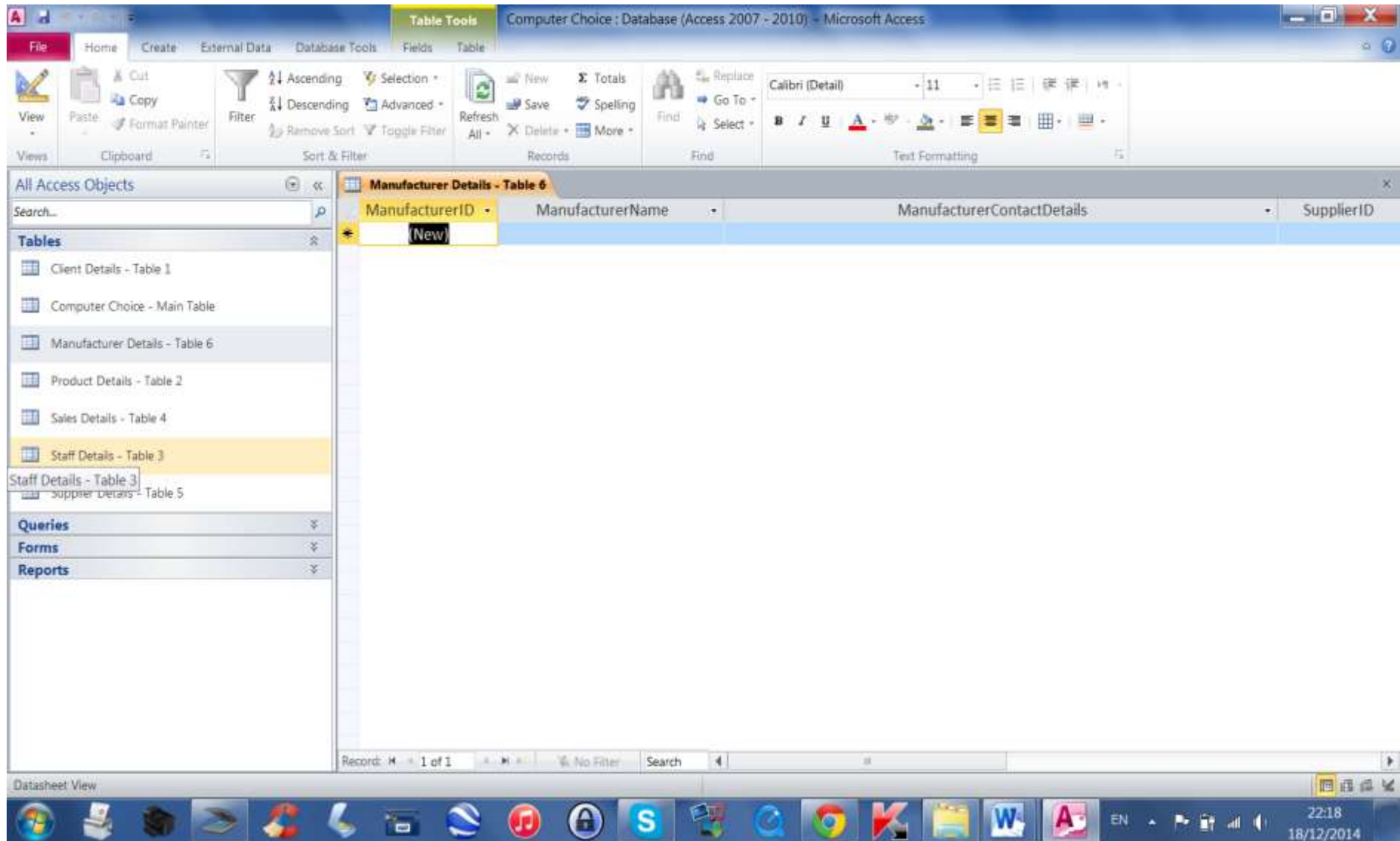
1. *Overview of completed database*



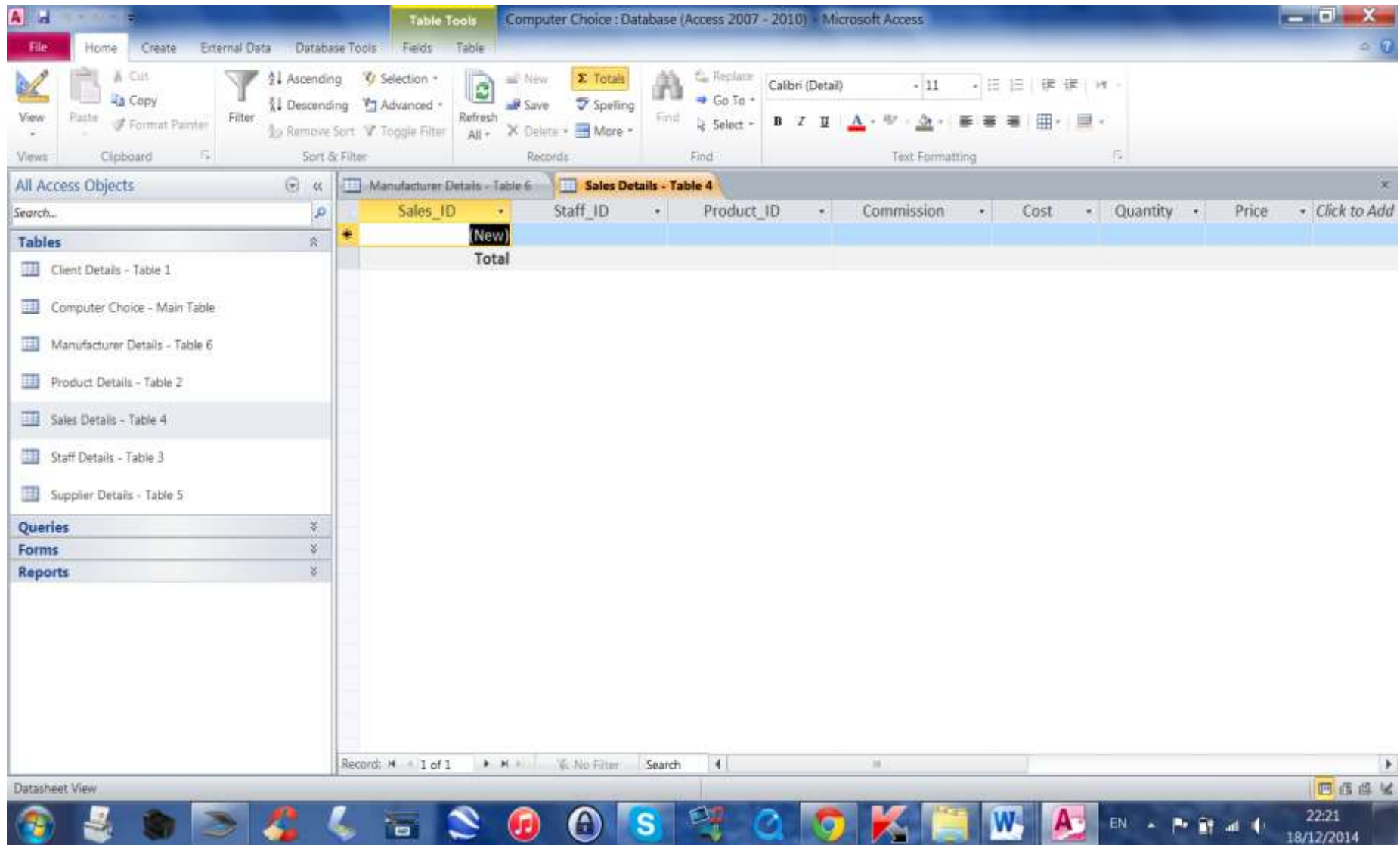
2. Tables



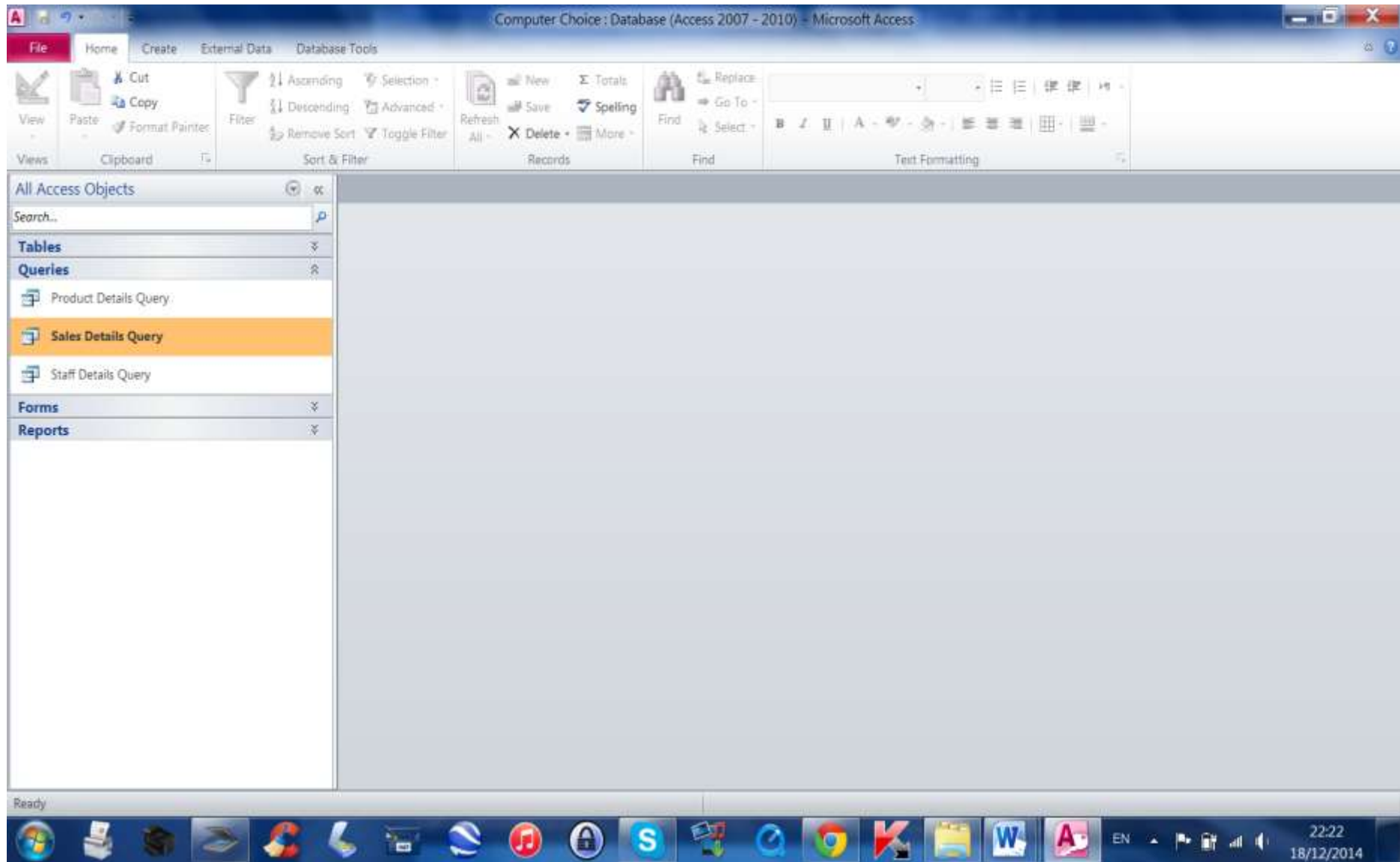
3. Tables (contd.)



4. Tables (contd.)

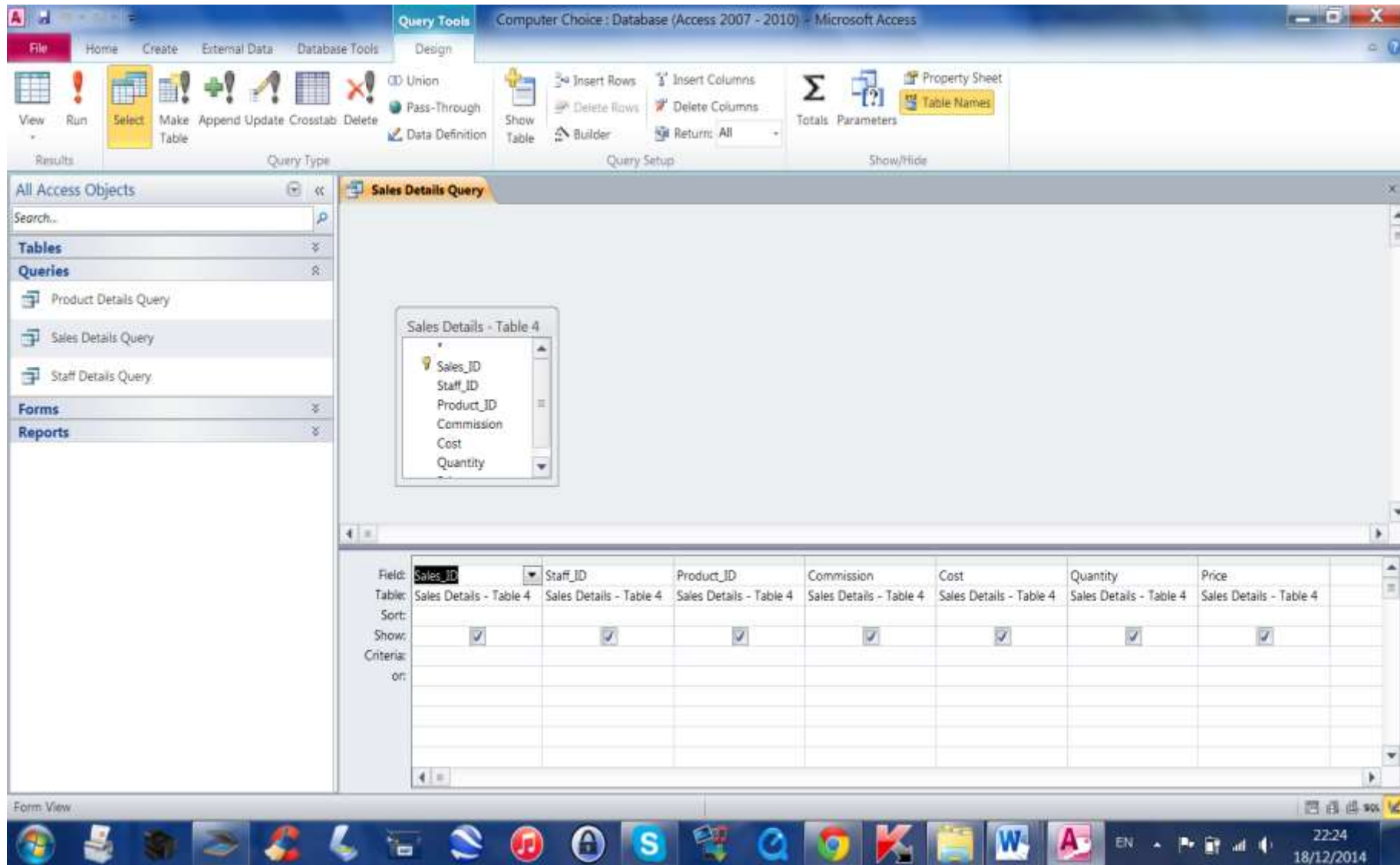


5. Queries

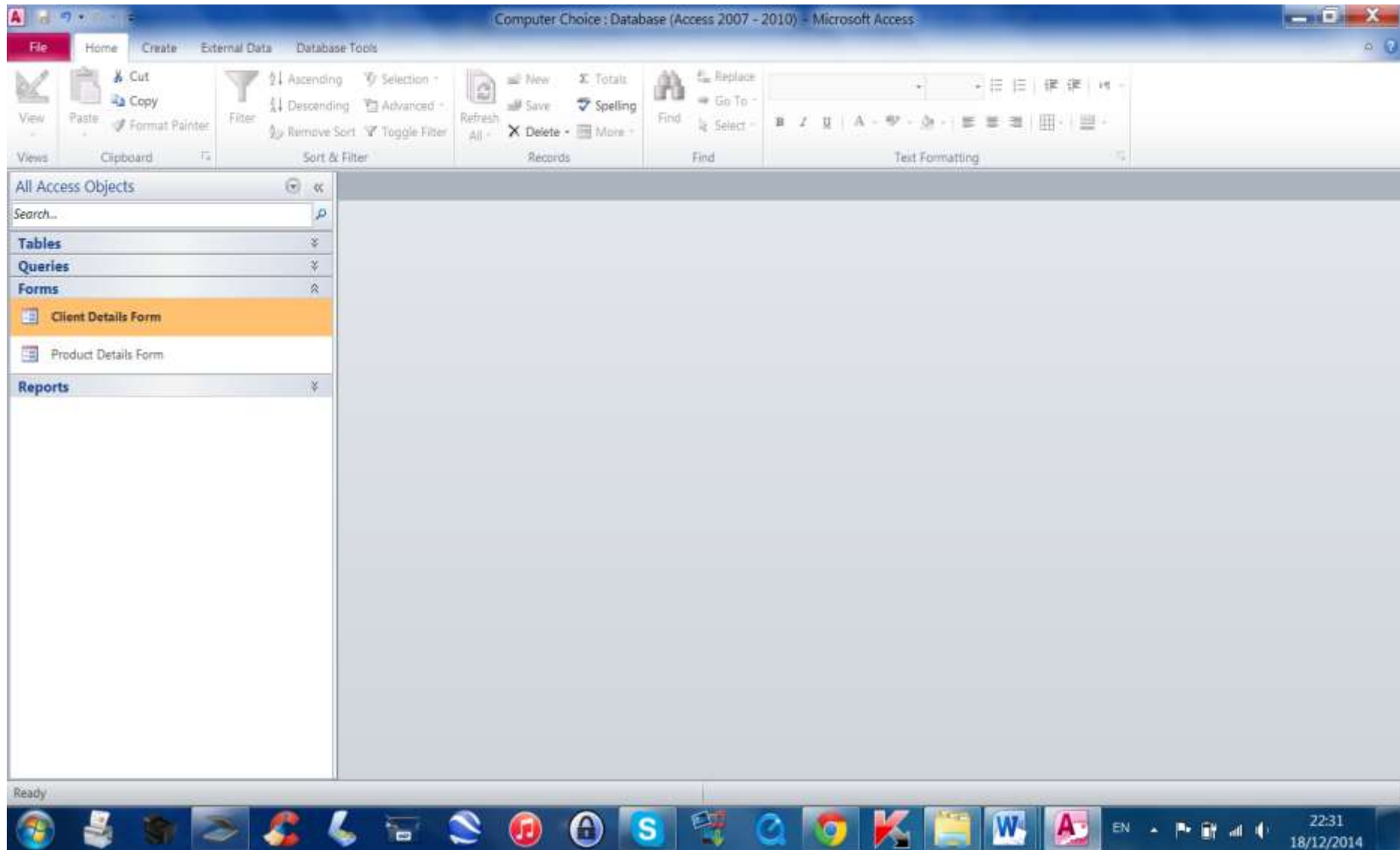


6. Queries (contd.)

Design view of Sales Details query



7. *Forms*



8. *Forms (contd.)*

View of functional form ready for data input and storage

Computer Choice : Database (Access 2007 - 2010) - Microsoft Access

File Home Create External Data Database Tools

View Paste Copy Format Painter Filter Sort & Filter Ascending Descending Remove Sort Toggle Filter Selection Advanced Refresh All Delete More Find Replace Go To Select Text Formatting

All Access Objects

Search...

Tables

Queries

Forms

Client Details Form

Product Details Form

Reports

Client Details - Table 1

Client ID

Client Name

Client Contact Details

Address

Larry

03040 4404004

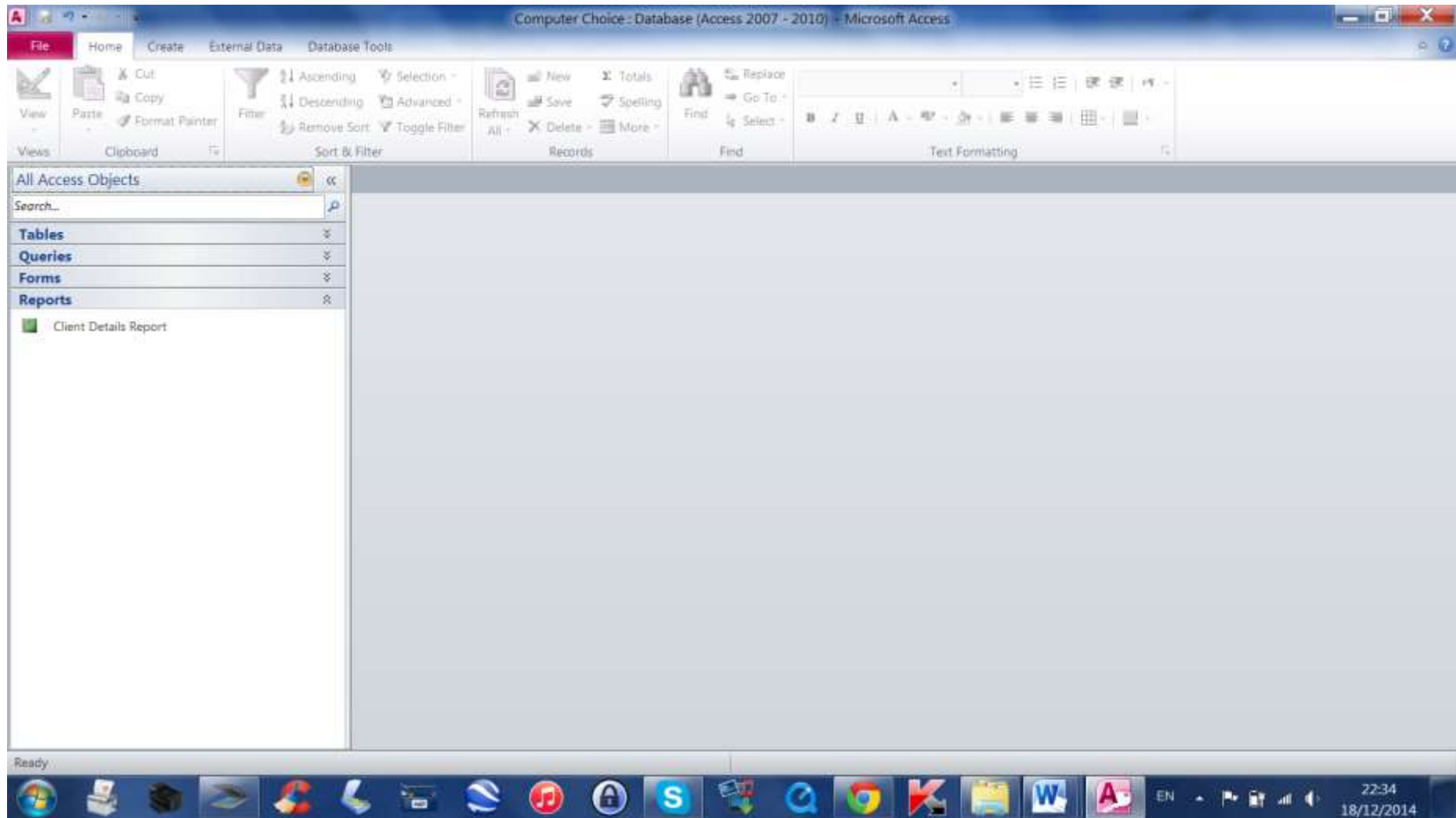
west london

Records: 1 of 6 No Filter Search

Form View

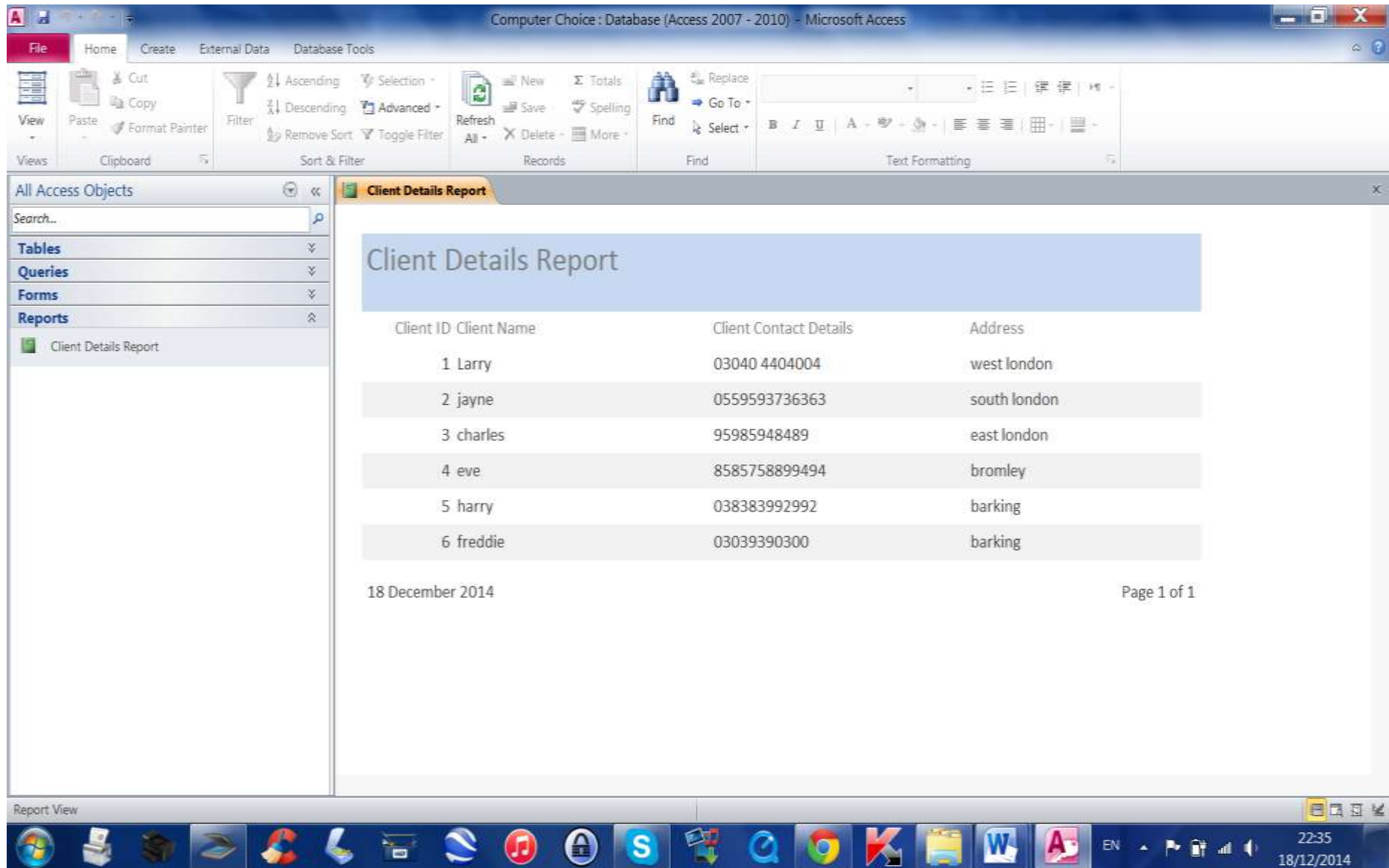
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9. Reports

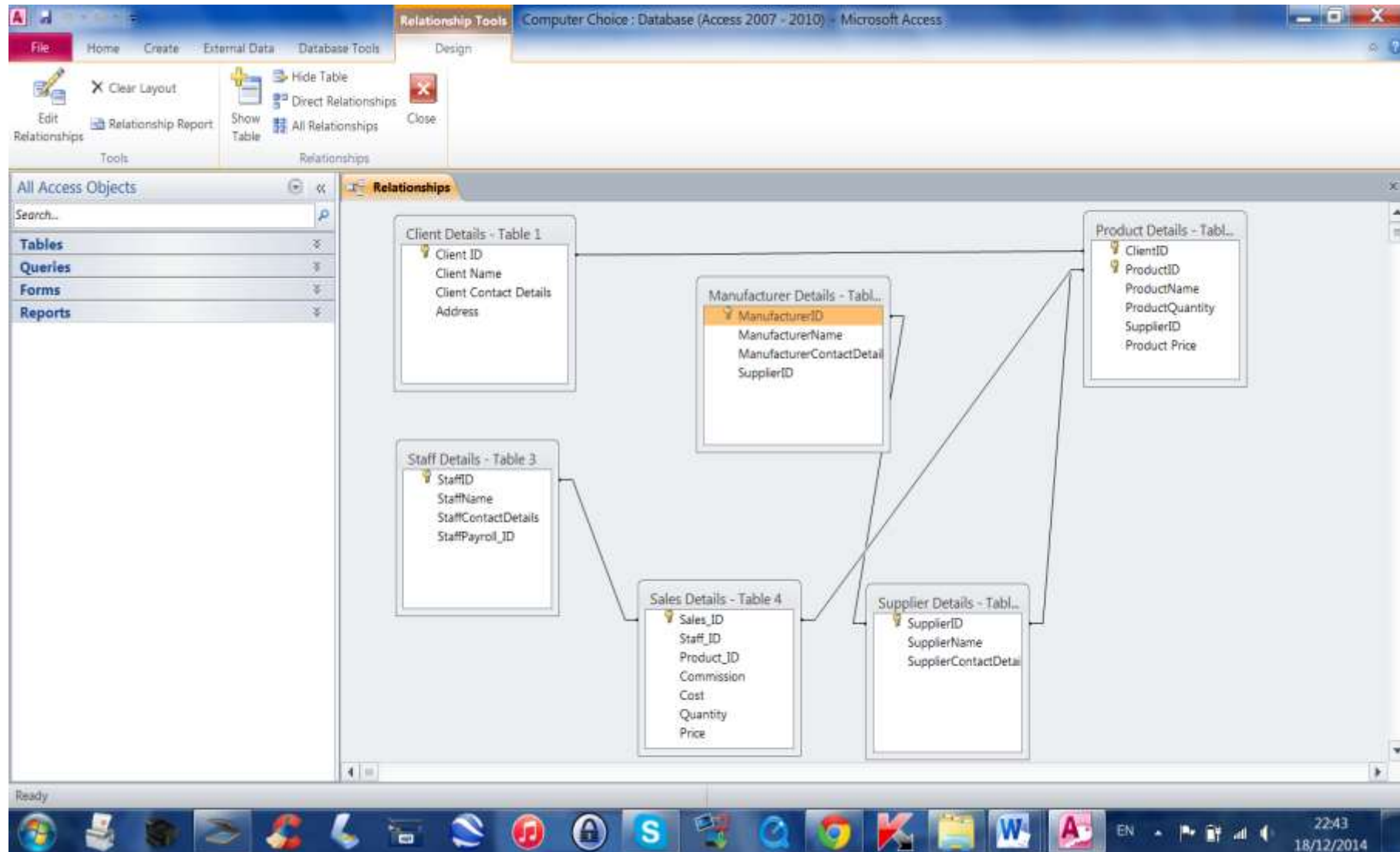


10. **Reports (contd.)**

Completed report created through use of MS Access wizard



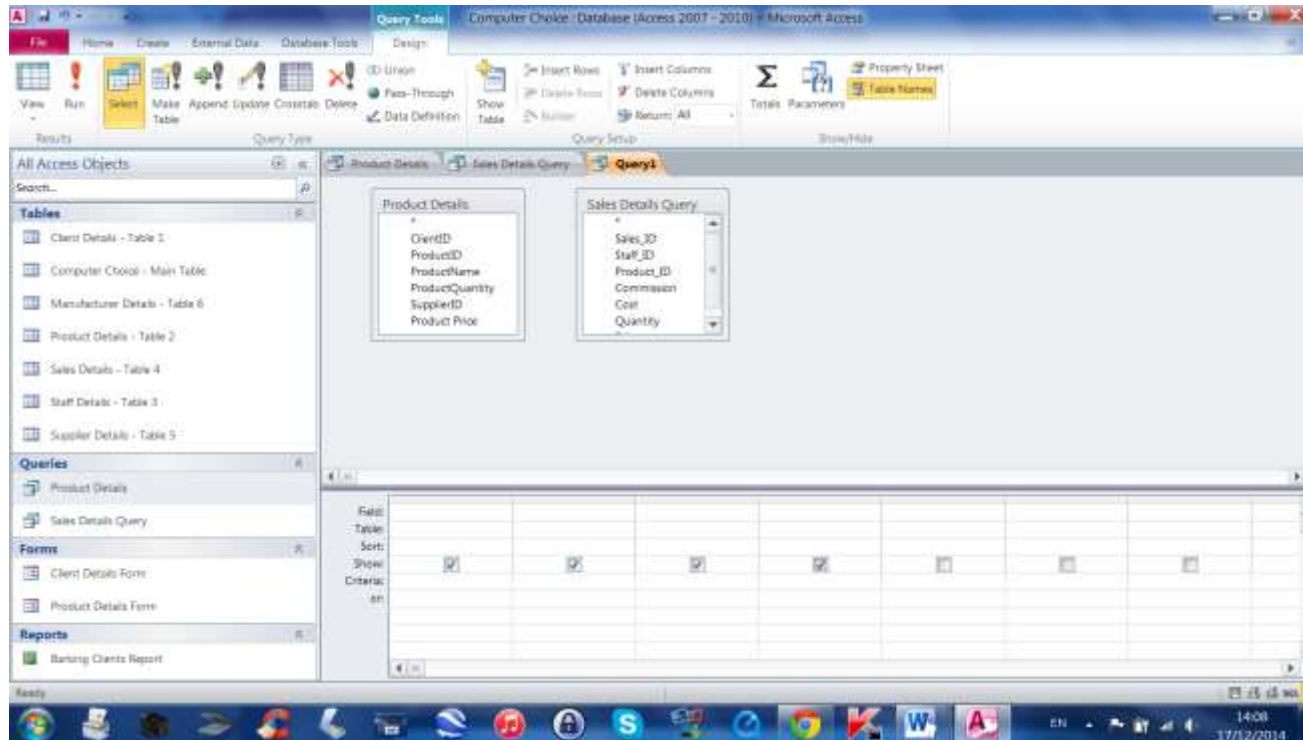
11. Relationships



P3.3 - evaluate the effectiveness of the database solution and suggest methods of improvement i.e. to create advanced queries and advanced reports, Macros etc., using MS-Access 2007 or similar database applications for the Computer Choice database solution to evaluate the effectiveness of the solution for the business with ways to improve the developed solution in future.

Having now completed the database solution for Computer Choice, I now need to suggest methods of improvement that will enable the company to benefit from the many inherent features such as advanced queries and reports, and the benefits and effectiveness of Macros of MS-Access 2007.

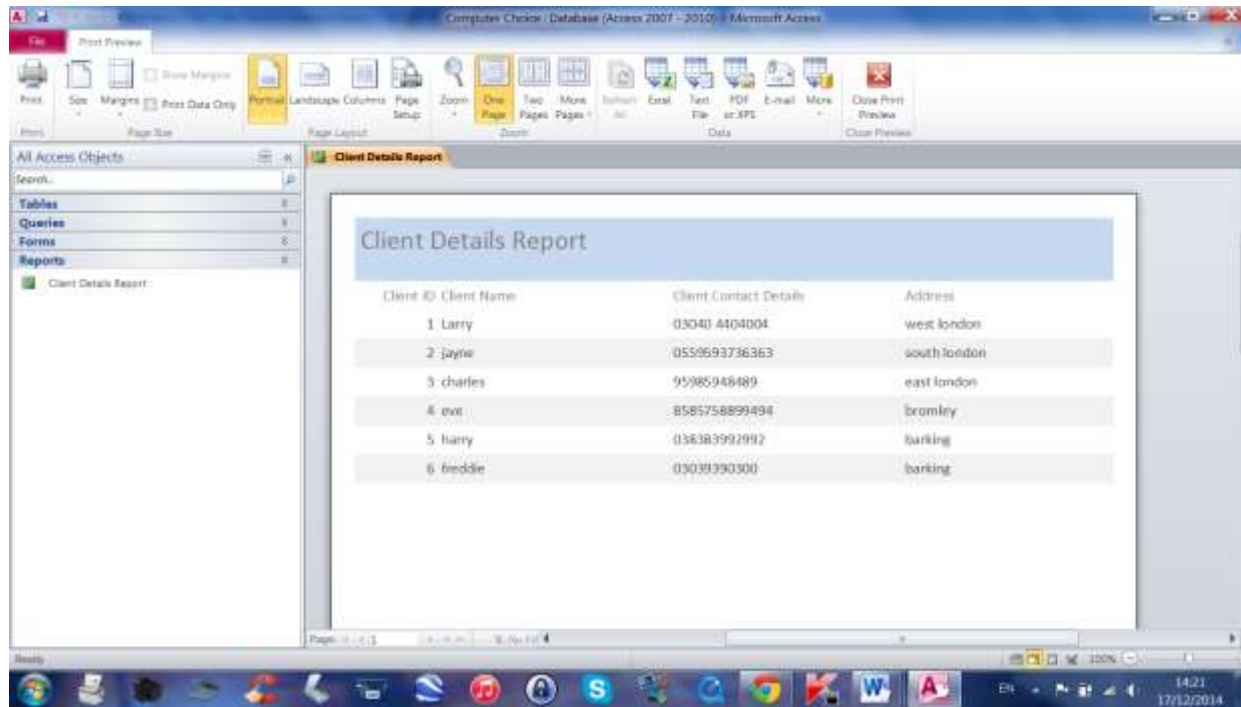
Advanced Queries



Database queries will benefit Computer Choice by allowing them to extract relevant information from the database. This will save the company much time as they will not need to scan an entire table in search of particular information. Instead, they can pre-define the category of information they require and apply search parameters that will, on execution, ignore the information and data that is considered irrelevant based on search parameters. For example, if we needed to ascertain the proportion of products being sold by staff, we would

follow the query wizard steps that will enable Computer Choice to acquire this information.

Advanced Reports

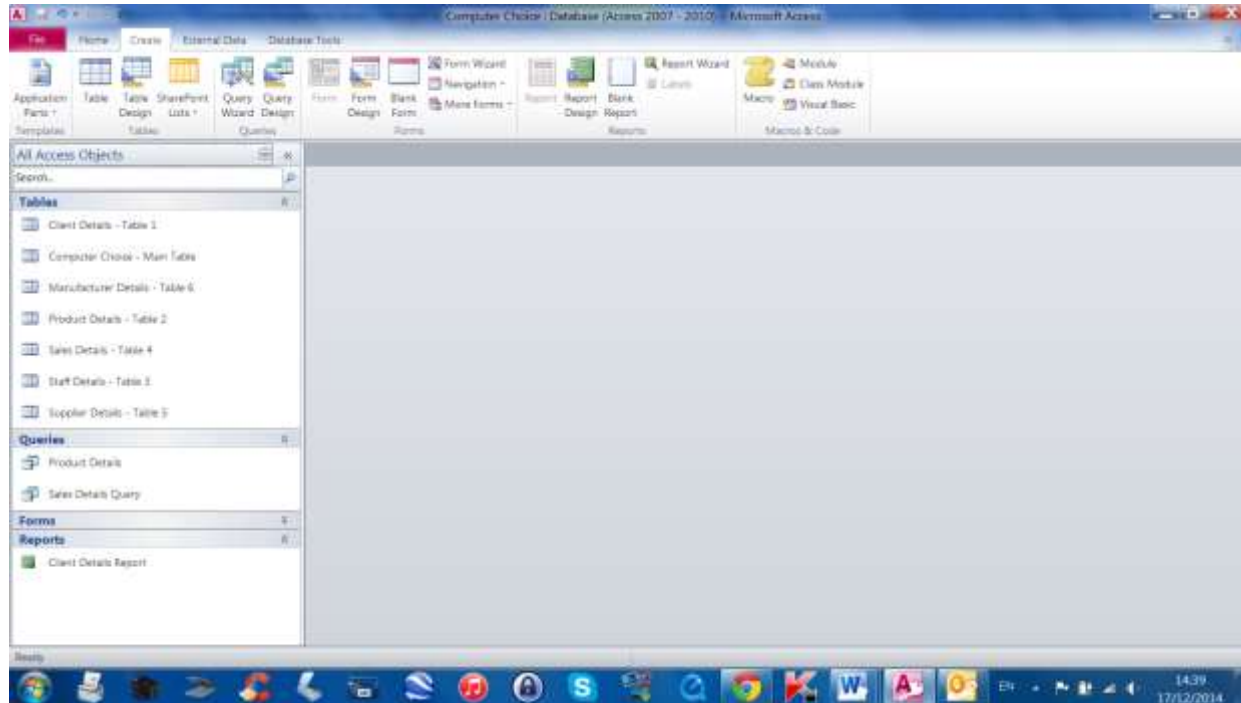


print multiple reports for the benefit of Computer Choice senior management.

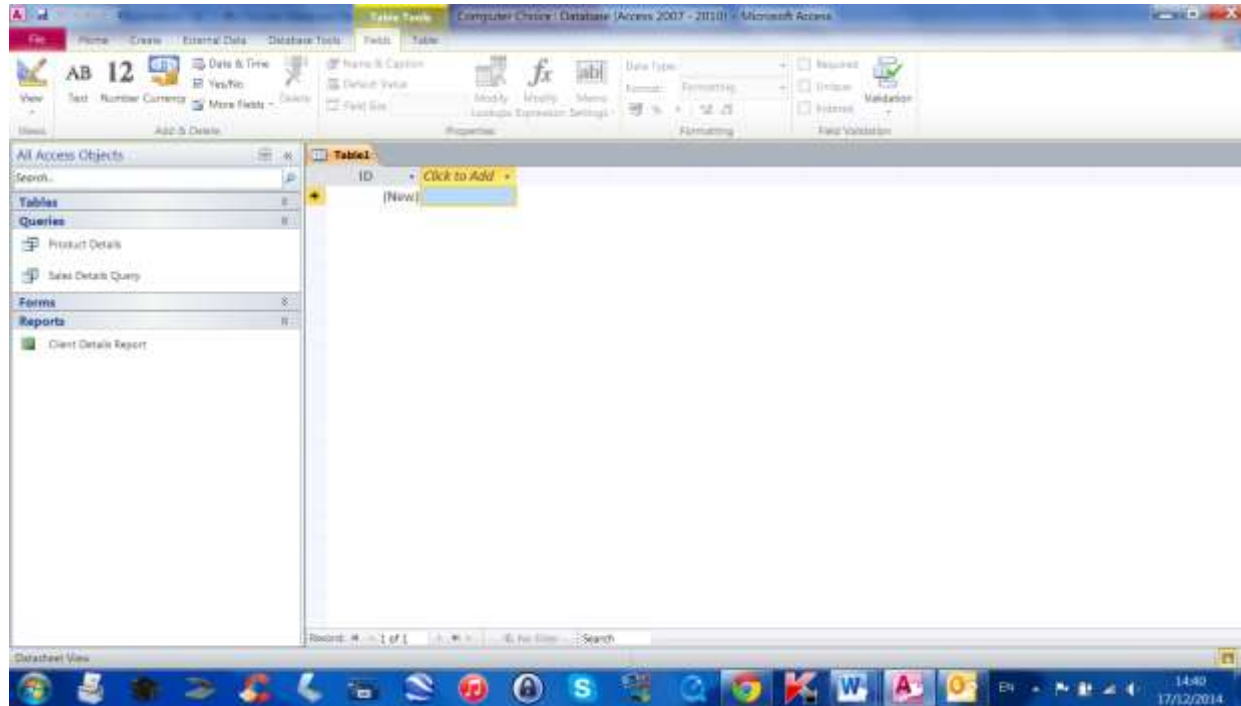
The benefits and effectiveness of report in database systems is the obvious convenience of being able to present key data in an easily understandable and readable format. For example, where in Computer Choice there is a directors meeting, it would be impractical for directors and senior managers to have to individually refer to a computer screen during the course of a meeting in order to view client or other tabular data. MS-Access 2007 removes the need for such an event by preparing in advance the relevant information and allowing the database user the ability to

P3.4 - provide supporting user such as user manual and technical documentation contain information such as ERD, Normalisation, table, forms, queries and reports etc., screen shots.

1. *How to create a table*



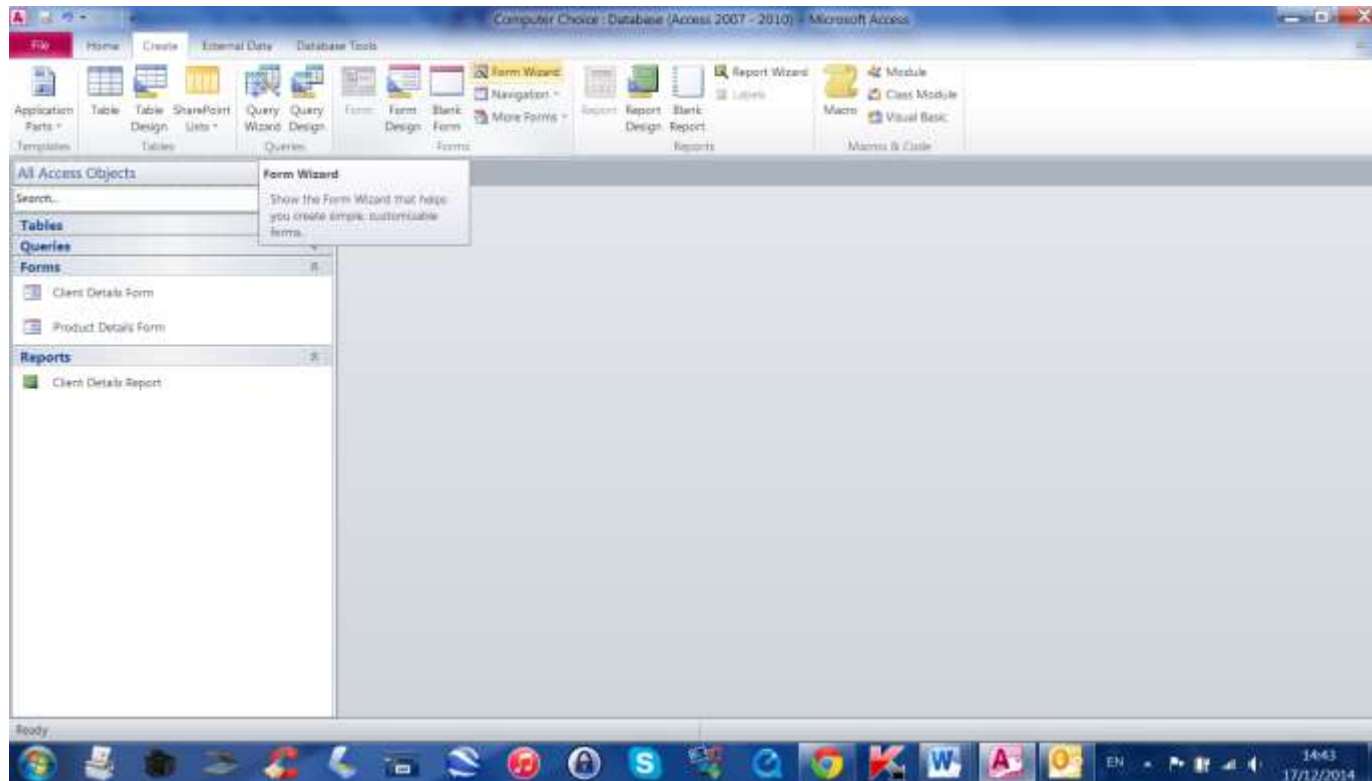
In MS-Access 2007/2010, navigate to the 'create' tab and click create.



A new table is automatically created and allows the user to input field data as required.

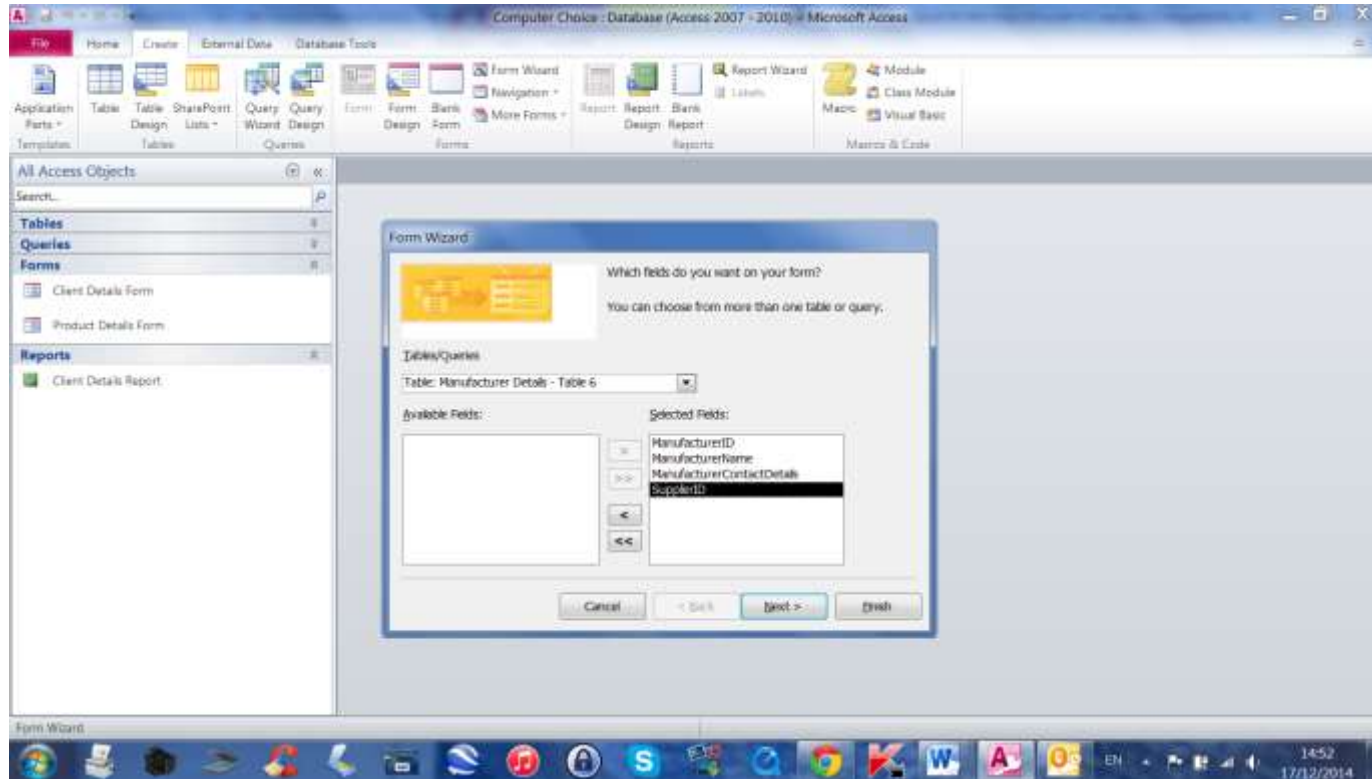
2. *How to create a form*

Step 1



To create forms, MS Access provides a step by step process known as the wizzard. This automated database process allows for simple step by step intructions to be followed in order for a form to be created as can be observed in the adjacent image.

Step 2



As can be seen from the accompanying image, the form wizard provides a pop up and intuitive window that accompanies the user through the various stages prior to the implementation of the form. In this aspect, the user is given the option of selecting particular table fields.

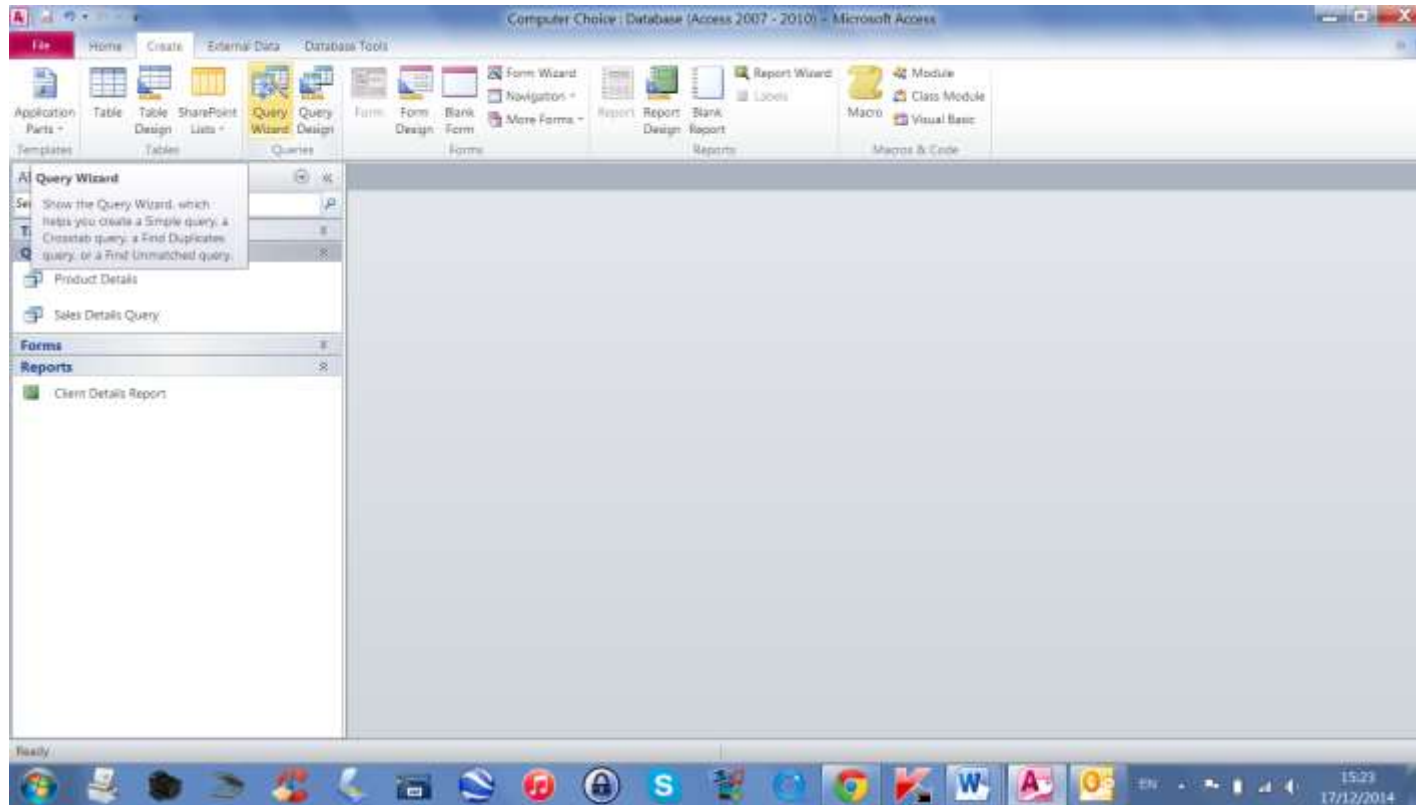
Step 3 – Final stage.

The screenshot shows the Microsoft Access application window titled 'Computer Choice | Database (Access 2007 - 2010) - Microsoft Access'. The ribbon at the top includes 'Form' and 'Database Tools' tabs. On the left, the 'All Access Objects' pane shows a tree view with 'Tables', 'Queries', 'Forms', and 'Reports'. Under 'Forms', 'Manufacturer Details - Table 6' is selected. The main workspace displays the 'Manufacturer Details - Table 6' form in 'Form View'. The form has a title bar and contains four text boxes: 'ManufacturerID' (with a 'New!' button), 'ManufacturerName', 'ManufacturerContactData', and 'SupplierID'. The status bar at the bottom indicates 'Record: 1 of 1' and 'No Filter'. The Windows taskbar at the bottom shows various application icons and the system clock displaying '15:09 17/12/2014'.

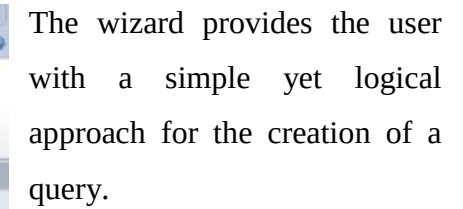
As can be seen from the accompanying screen shot, the final stage of the wizard form process presents the user with a functioning form which is capable of receiving and storing data input.

How to create a query

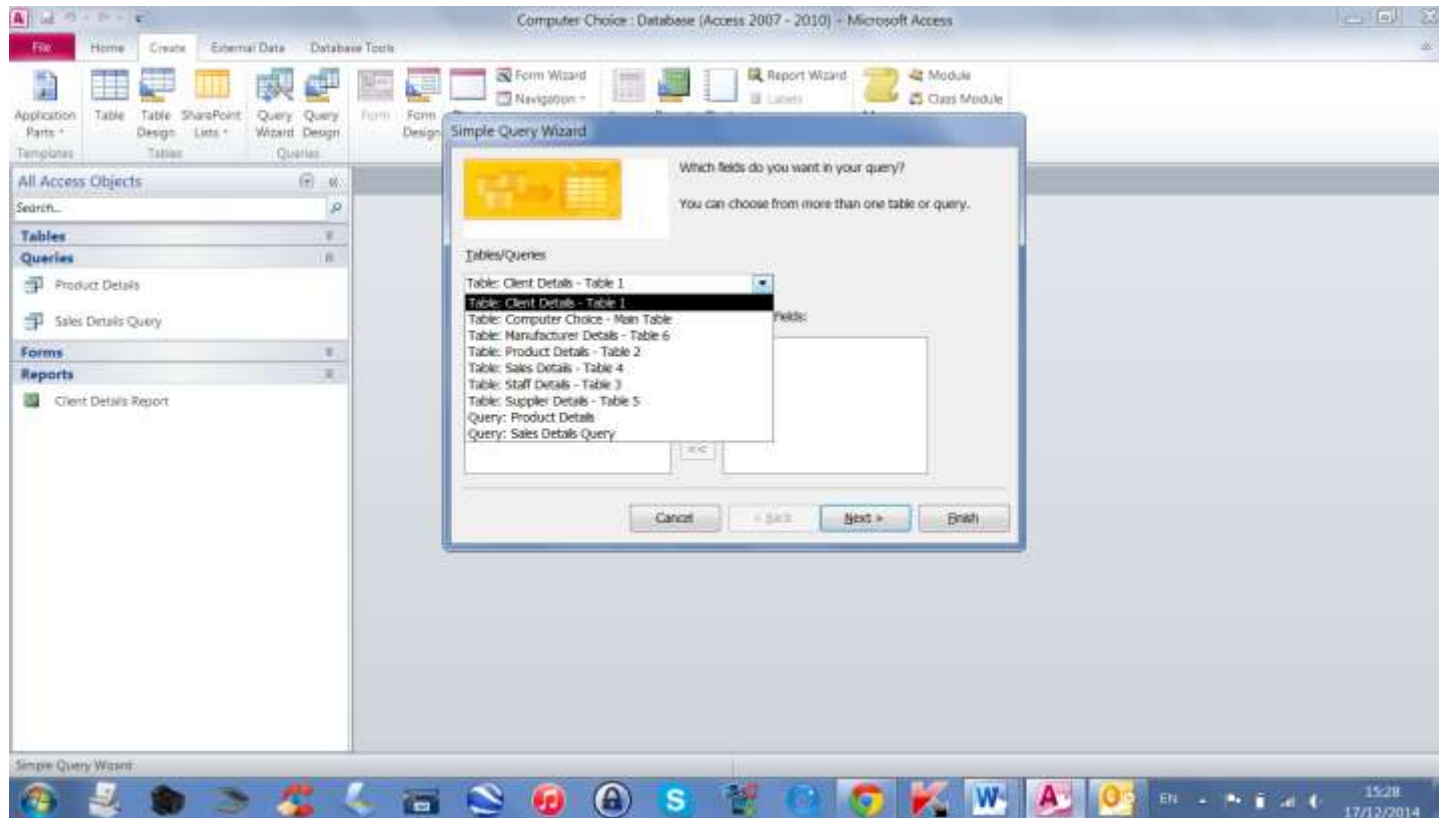
Step 1



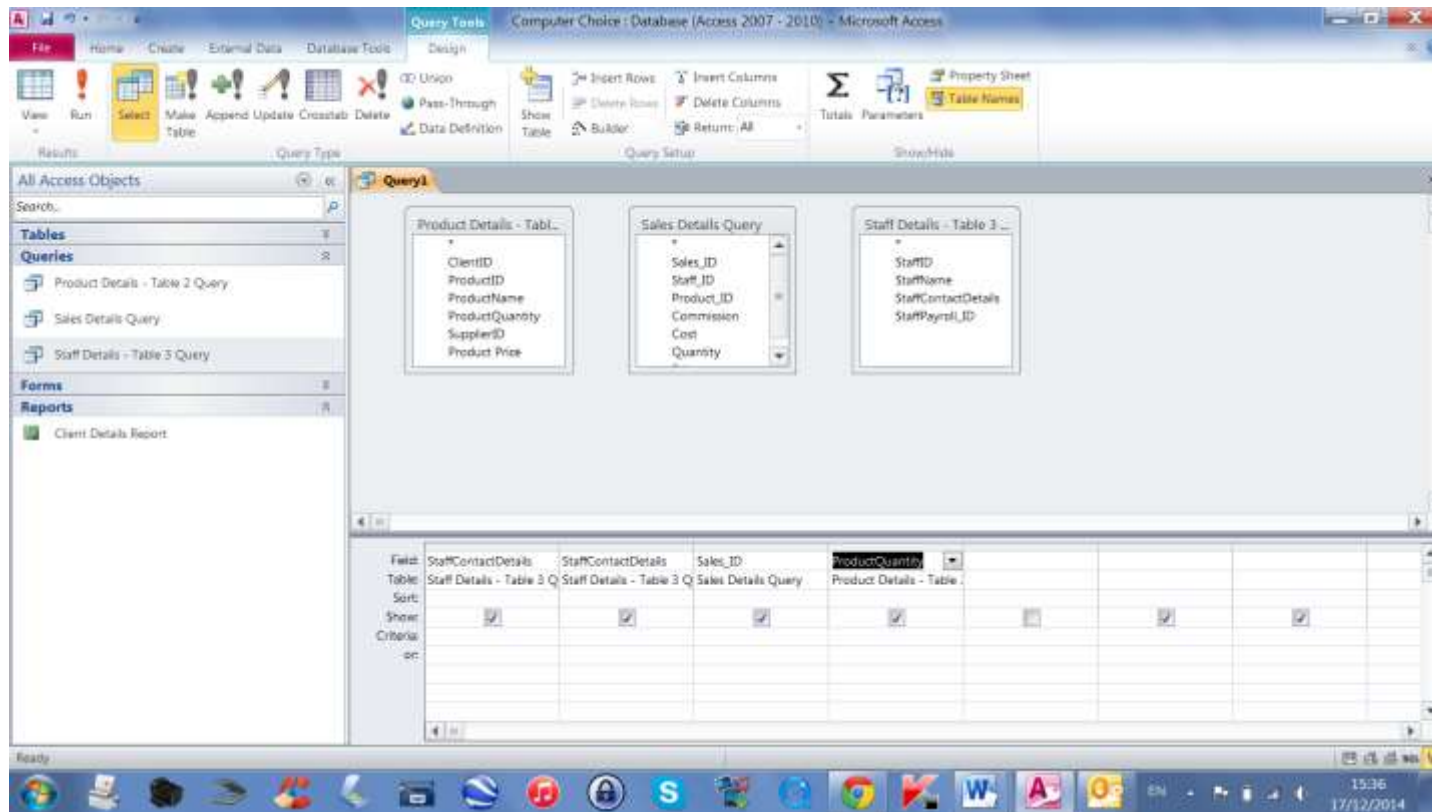
Queries in Access provide the user with the ability to extract relevant information as per criteria instructions. For the purposes of making a query, Access provides the user with a step by step approach (please see adjacent image). This facility is referred to as MS Access wizard.



Step 3

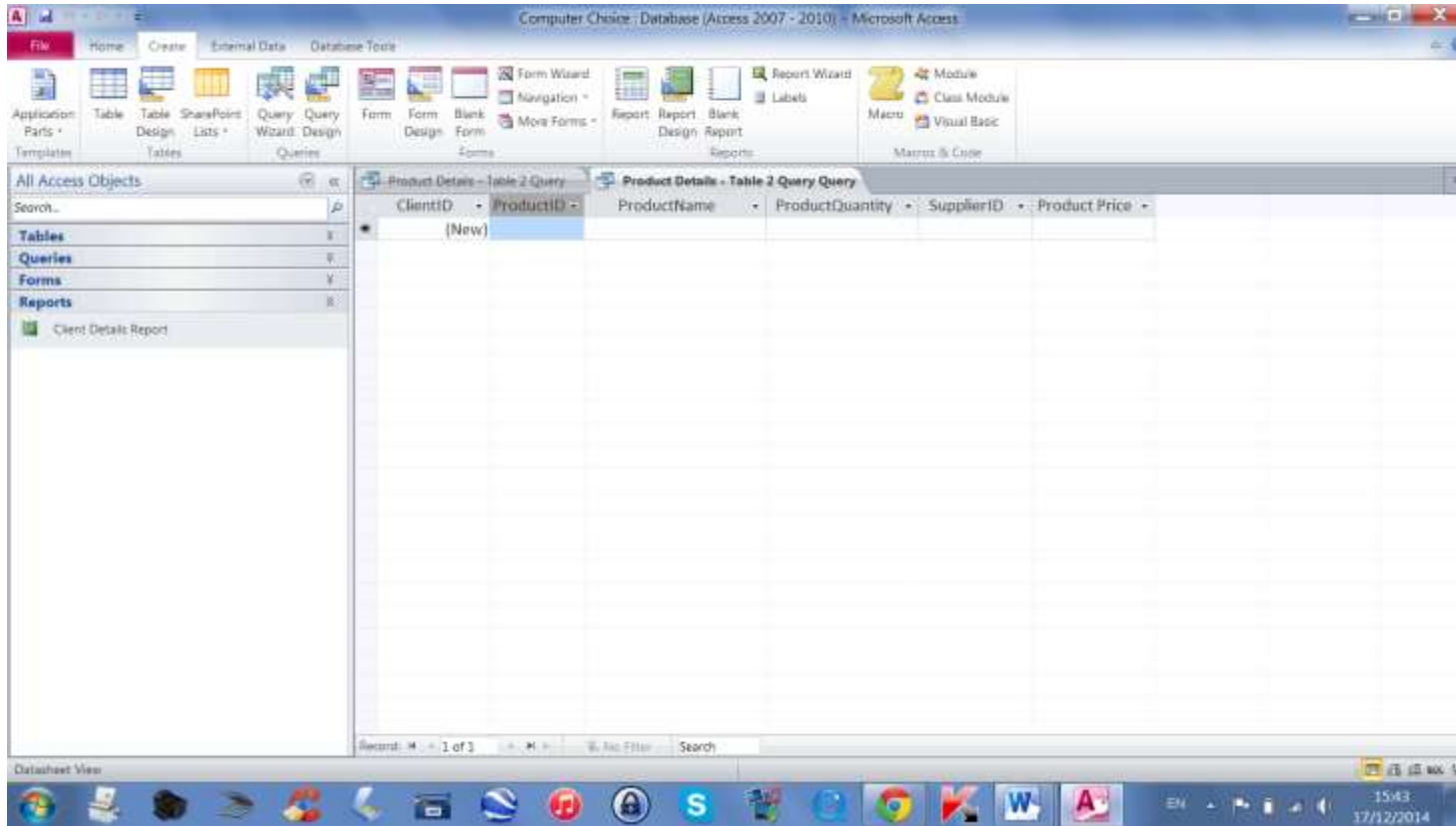


Step 4



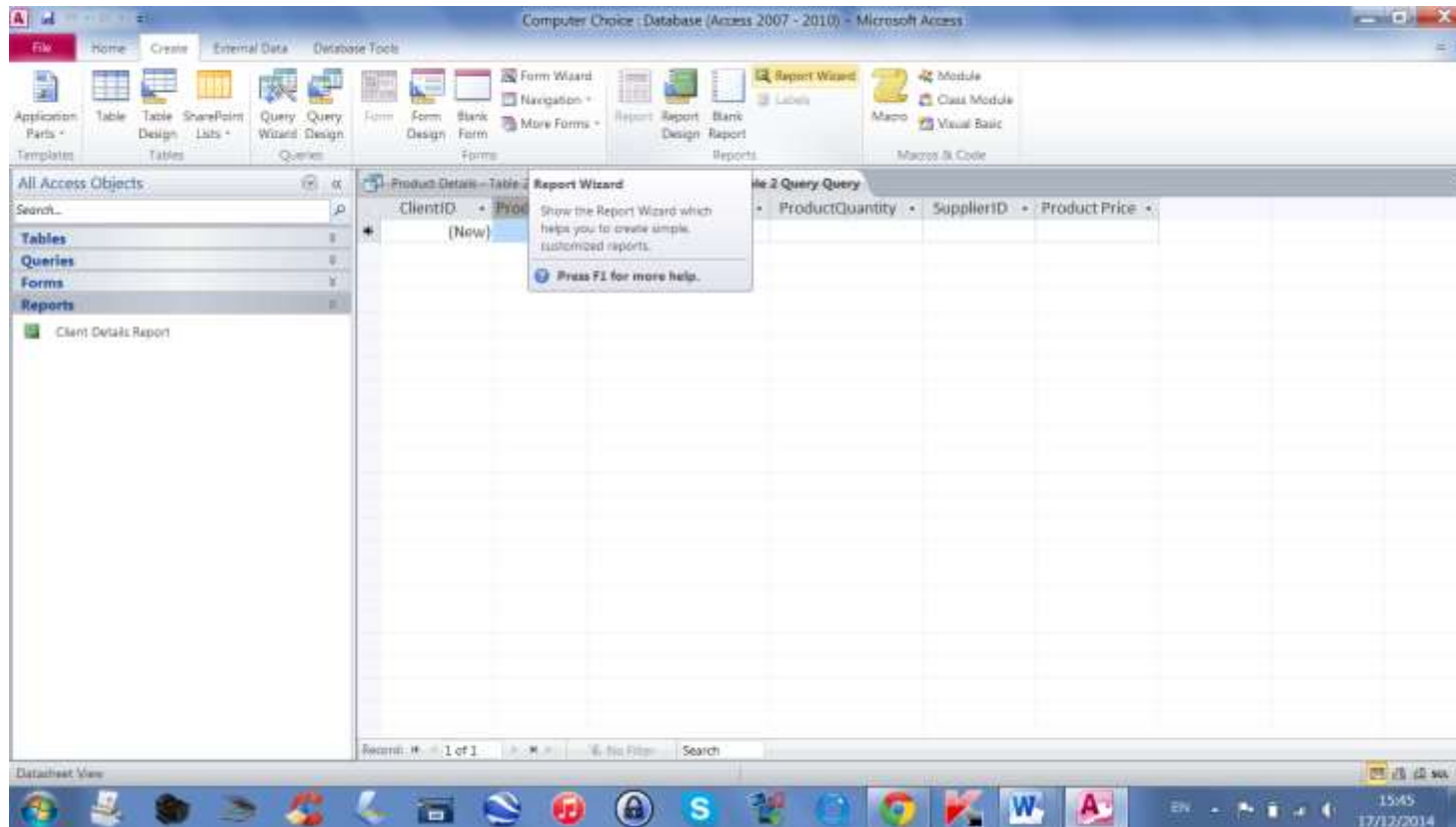
In design view, the user can select the search parameter variables (please see adjacent image) to accord which accord with Computer Choice search requirements.

Step 5 – Final Stage



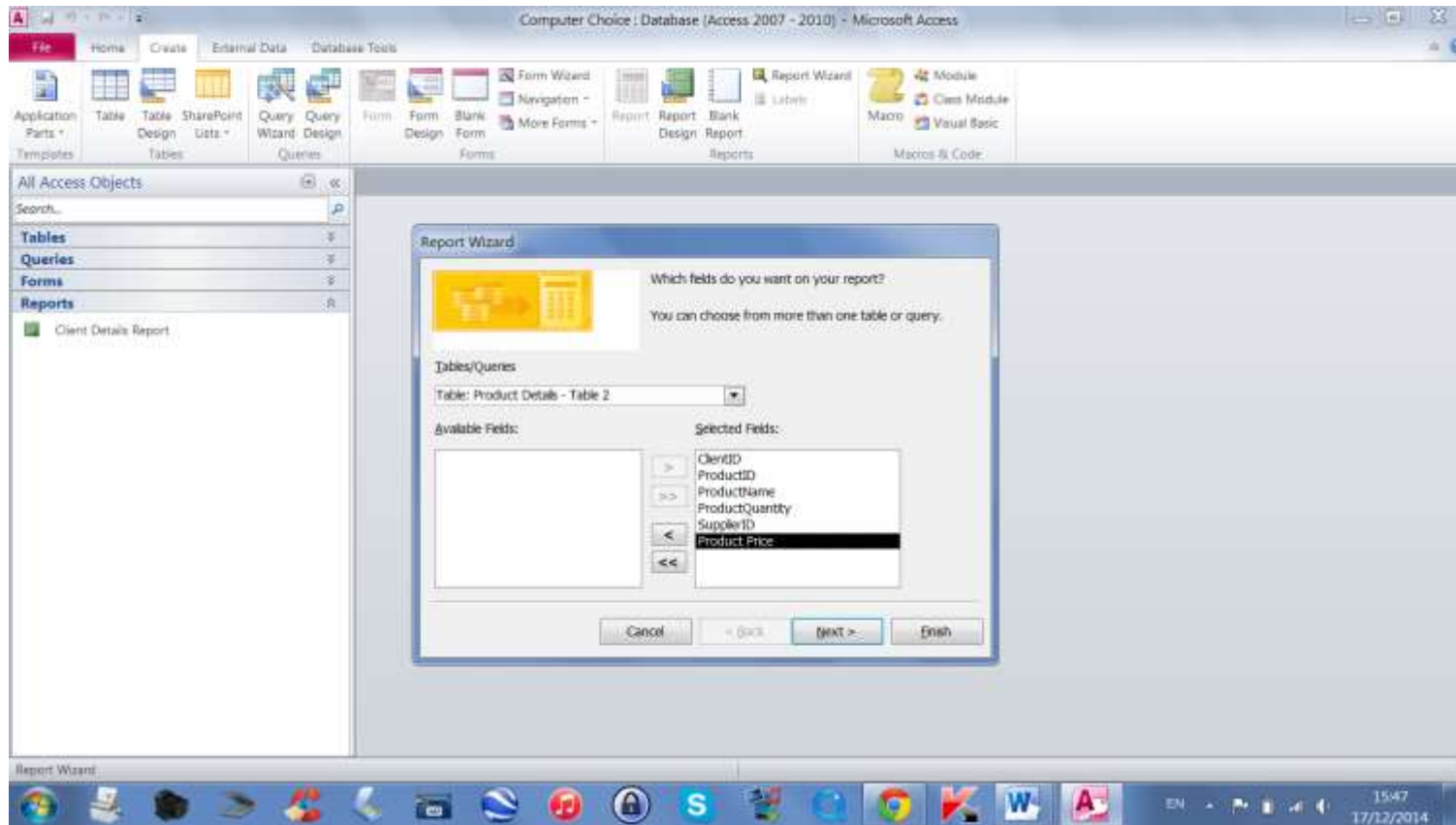
How to create a report

Step 1

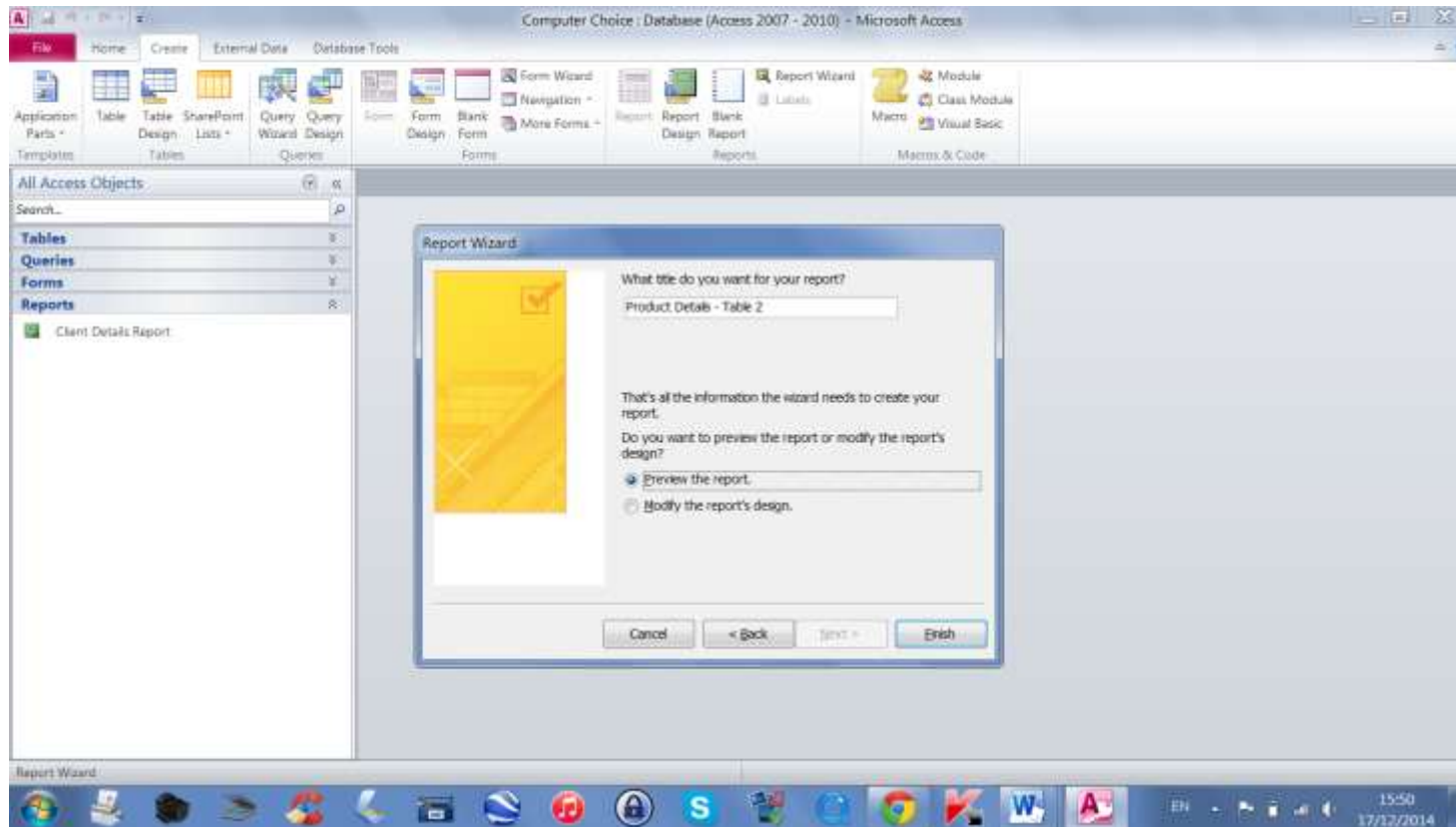


The report wizard of MS Access again supports the function required to create database reports.

Step 2



Step 3



At this stage, the Computer Choice user is presented with the option of modifying the reports design or continuing by using the wizards default template design.

Rouse, M. (2012). *Data Recovery*. Available: <http://searchdisasterrecovery.techtarget.com/definition/data-recovery>.
(Last accessed 3rd December 2014.)

The National Archives. (2012). *Data Protection Act 1998*. Available: <http://www.legislation.gov.uk/ukpga/1998/29/contents>.
(Last accessed 3rd December 2014.)

Rouse, M., (2008). *EU Data Protection Directive (Directive 95/46/EC)*. Available: <http://searchsecurity.techtarget.co.uk/definition/EU-Data-Protection-Directive>. (Last accessed 3rd December 2014.)

Rouse, M., (2008), *SSADM (Structured Systems Analysis & Design Method)*. Available:
<http://searchsoftwarequality.techtarget.com/definition/SSADM>. (Last accessed 3rd December 2014.)

Technet - Microsoft SQL Server, (2014). *Types of Concurrency Control*. Available: <http://technet.microsoft.com/en-us/library/ms189132%28v=sql.105%29.aspx>. (Last accessed 3rd December 2014.)