

# NCC Level-5DC Diploma in Computing



## Database Design and Development

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**Module Title : Database Design and Development**

**Assignment Title : Hanwell Pest Control**

**Examination Cycle: September 2015**

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**Expected candidate time allocation: 35 to 40 hours**

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**Module Name : Database Design and Development**

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**Number of Words : 1254**

I confirm that this is my own and that I have not plagiarized any part of it. I have also noted the assessment criteria and pass mark for assignments.

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**Introduction:**

The given scenario is based on Han well pest Control Company in London. The assignment has four tasks. such as,task-1:entity relationship normalized model to 3<sup>rd</sup> normal form and data dictionary ,task-2:implementation and data and queries,task-3:derived data as well as task-4:evaluation. For this assignment I have applied knowledge of various Database Design and Development skills to solve the problems described in the assignments scenario. I have tried my best to fulfill all the requirement of the assignment.

## Task-1

### (1)Parts of Design:

To analysis data, Relationship and constrains, the generally use graphical representation is ER model. It is one type of high level data mode.

Here Record of a few name of entity:

- assignjob
- customer
- Equipment
- Job
- Job rate
- Job Type
- jobstaff
- Staff

Diagram of Relationship Entity:

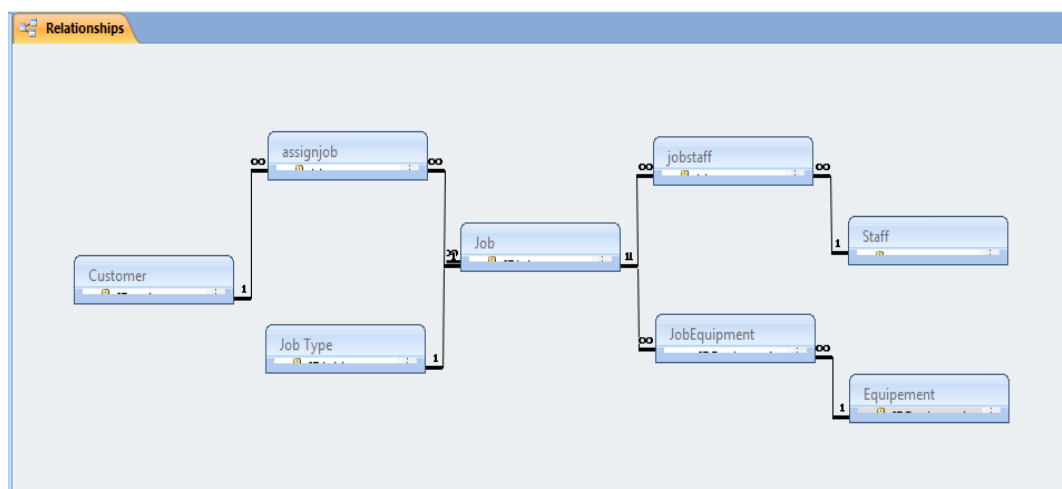


Figure No-1.1: Diagram of Relationship Entity.

## Entity Relationship Model:

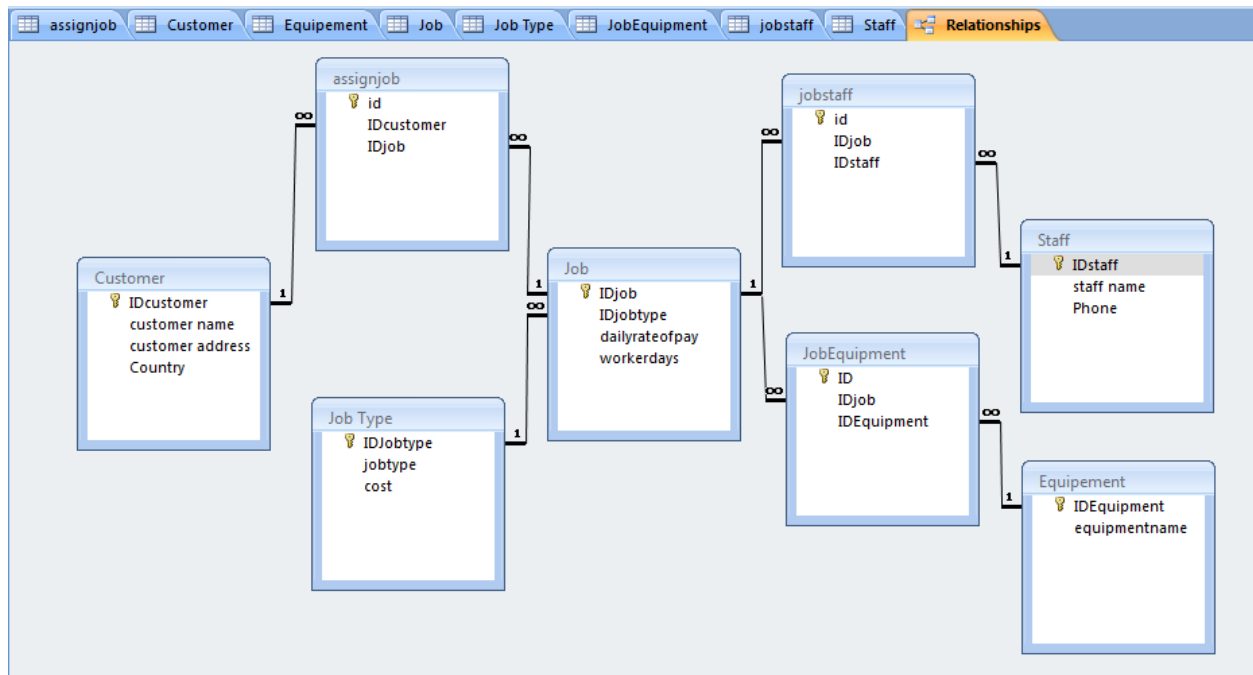


Figure No-1.2: Diagram of Entity Relationship Model.

**(2) Data Dictionary:**

Data dictionary contains the Meta data that means data about data. The diagram of the database is stored here.

Entity Name	Attributes	Length	Key	Type
assignjob	id	Long Integer	Primary Key	AutoNumber
	IDcustomer	Long Integer	Foreign Key	Number
	IDjob	Long Integer	Foreign Key	Number
Customer	IDcustomer	Long Integer	Primary Key	Number
	Customer name	255	No	Text
	Customer address	255	No	Text
	Country	255	No	Text
Equipment	IDEquipment	Long Integer	Primary Key	Number
	equipmentname	255	No	Text
	costing	Long Integer	No	Number
Job	IDjob	Long Integer	Primary Key	Number
	IDjobtype	Long Integer	Foreign Key	Number
	Dailyrateofpay	Long Integer	No	Number
	workerdays	255	No	Text
JobEquipment	ID	Long Integer	Primary Key	AutoNumber
	IDjob	Long Integer	Foreign Key	Number
	IDEquipment	255	Foreign Key	Number
Job Type	IDJobtype	Long Integer	Primary Key	Number
	jobtype	255	No	Text
	cost	Long Integer	No	Number
jobstaff	id	Long Integer	Primary Key	AutoNumber
	IDjob	Long Integer	Foreign Key	Number
	IDstaff	255	Foreign Key	Text
Staff	IDstaff	255	Primary Key	Text
	Staff name	255	No	Text
	phone	255	No	Text

Figure No-1.3: Table of Data Dictionary.

(Begg, n.d.)

## Task-2

### Implementation and data:

(3) Create all the tables using SQL. Show your Create scripts and the finished tables:

Create script for assignjob

```
CREATE TABLE [assignjob] (
    [id] INT NOT NULL IDENTITY,
    [IDcustomer] INT NOT NULL,
    [IDjob] INT NOT NULL,
    PRIMARY KEY ([id])
)
```

Table for assignjob

assignjob			
	id	IDcustomer	IDjob
	1	1	28434
	2	2	29000
	3	3	28501

Figure No-2.1: Table for assignjob

Create script for Customer

```
CREATE TABLE [Customer] (
    [IDcustomer] INT NOT NULL DEFAULT 0,
    [customer name] NVARCHAR(255),
    [customer address] NVARCHAR(255),
    [Country] NVARCHAR(255),
    PRIMARY KEY ([IDcustomer])
)
```

Customer				
	IDcustomer	customer name	customer address	Country
+	1	Arnold Layne	23 Wroxtton Road, SE15	London
+	2	Emily pink	Moonstance House, Andover, Hants, HA3	Hampshire
+	3	Floyd Barret	23 Goring Street, EG4	Essex

Figure No-2.2: Table for Customer



## Create script for Equipement

```

CREATE TABLE [Equipement] (
    [IDEquipment] INT NOT NULL DEFAULT 0,
    [equipmentname] NVARCHAR(255),
    PRIMARY KEY ([IDEquipment])
)

```

## Table for Equipement

Equipement			
	IDEquipmen	equipmentname	costing
+	1	Heavy duty traps	50
+	2	Wainscot seals	40
+	3	poison	60
+	4	Steam fumigatorPrimary Key	100
+	5	Light traps	30

Figure No-2.3: Table for Equipement

## Create script for Job

```

CREATE TABLE [Job] (
    [IDjob] INT NOT NULL,
    [IDjobtype] INT DEFAULT 0,
    [dailyrateofpay] INT DEFAULT 0,
    [workerdays] NVARCHAR(255),
    PRIMARY KEY ([IDjob])
)

```

## Table for Job

Job				
	IDjob	IDjobtype	dailyrateofpay	workerdays
+	28434	1	100	1
+	28501	2	75	2
+	29000	3	250	2

Figure No-2.4: Table for Job

## Create script for Job Type

```
CREATE TABLE [Job Type] (
    [IDJobtype] INT NOT NULL DEFAULT 0,
    [jobtype] NVARCHAR(255),
    [cost] INT,
    PRIMARY KEY ([IDJobtype])
)
```

## Table for Job Type

Job Type			
	IDJobtype	jobtype	cost
+	1	Rats	100
+	2	Mice	75
+	3	Wasp Nest	250

Figure No-2.5: Table for Job Type

## Create script for JobEquipment

```
CREATE TABLE [JobEquipment] (
    [ID] INT NOT NULL IDENTITY,
    [IDjob] INT,
    [IDEquipment] INT,
    PRIMARY KEY ([ID])
)
```

## Table for JobEquipment

JobEquipment			
	ID	IDjob	IDEquipmen
	1	28434	1
	2	28434	2
	3	28434	3
	4	29000	4
	5	28501	5
	6	28501	2

Figure No-2.6: Table for JobEquipment

Create script for jobstaff

```
CREATE TABLE [jobstaff] (
    [id] INT NOT NULL IDENTITY,
    [IDjob] INT NOT NULL,
    [IDstaff] NVARCHAR(255) NOT NULL,
    PRIMARY KEY ([id])
)
```

Table for jobstaff

jobstaff			
	id	IDjob	IDstaff
	1	28434	S100
	2	28434	S801
	3	28434	S20
	7	29000	S11
	8	29001	S100
	9	28501	S801
	10	28501	S100

Figure No-2.7: Table for jobstaff

Create script for Staff

```
CREATE TABLE [Staff] (
    [IDstaff] NVARCHAR(255) NOT NULL,
    [staff name] NVARCHAR(255),
    [Phone] NVARCHAR(255),
    PRIMARY KEY ([IDstaff])
)
```

Create script for Staff

Staff			
	IDstaff	staff name	Phone
+	S100	Ronald Smith	+441234567444
+	S11	Manny Sinclair	+441234567000
+	S20	Curtis Stand	+441234567432
+	S801	Muhammad Ya	+441234567455

Figure No-2.8: Table for Staff

**(4) Input data on all the jobs and the details of those jobs. Give a listing of this:**

Here I use insert values command to input the data in the table:

Insert value for Customer table

```
INSERT INTO [Customer] ([IDcustomer], [customer name], [customer address], [Country]) VALUES (1, N'Arnold Layne', N'23 Wroxtton Road, SE15', N'London')
INSERT INTO [Customer] ([IDcustomer], [customer name], [customer address], [Country]) VALUES (2, N'Emily pink', N'Moonstance House,Andover,Hants,HA3', N'Hampshi
INSERT INTO [Customer] ([IDcustomer], [customer name], [customer address], [Country]) VALUES (3, N'Floyd Barret', N'23 Goring Street,EG4', N'Essex')
```

Output Result:

Customer				
	IDcustomer	customer name	customer address	Country
+	1	Arnold Layne	23 Wroxtton Road, SE15	London
+	2	Emily pink	Moonstance House,Andover,Hants,HA3	Hampshire
+	3	Floyd Barret	23 Goring Street,EG4	Essex

Figure No-2.9: Table for Customer

Insert value for Job table

```
INSERT INTO [Job] ([IDjob], [IDjobtype], [dailyrateofpay], [workerdays]) VALUES (28434, 1, 100, N'1')
INSERT INTO [Job] ([IDjob], [IDjobtype], [dailyrateofpay], [workerdays]) VALUES (29000, 3, 250, N'2')
INSERT INTO [Job] ([IDjob], [IDjobtype], [dailyrateofpay], [workerdays]) VALUES (28501, 2, 75, N'2')
INSERT INTO [Job] ([IDjob], [IDjobtype], [dailyrateofpay], [workerdays]) VALUES (29001, NULL, NULL, NULL)
```

Output Result:

Job				
	IDjob	IDjobtype	dailyrateofpay	workerdays
+	28434	1	100	1
+	28501	2	75	2
+	29000	3	250	2

Figure No-2.10: Table for Job

Insert value for Job Type table

```
INSERT INTO [Job Type] ([IDJobtype], [jobtype], [cost]) VALUES (1, N'Rats', 100)
INSERT INTO [Job Type] ([IDJobtype], [jobtype], [cost]) VALUES (3, N'Wasp Nest', 250)
INSERT INTO [Job Type] ([IDJobtype], [jobtype], [cost]) VALUES (2, N'Mice', 75)
```

Output Result:

Job Type			
	IDJobtype	jobtype	cost
+	1	Rats	100
+	2	Mice	75
+	3	Wasp Nest	250

Figure No-2.11: Table for Job Type

**(5) Input data for the members of staff including those listed in the scenario and assign staff to jobs. Give a listing of this:**

Insert value for assignjob table

```
INSERT INTO [assignjob] ([id], [IDcustomer], [IDjob]) VALUES (1, 1, 28434)
INSERT INTO [assignjob] ([id], [IDcustomer], [IDjob]) VALUES (2, 2, 29000)
INSERT INTO [assignjob] ([id], [IDcustomer], [IDjob]) VALUES (3, 3, 28501)
```

Output Result:

assignjob			
	id	IDcustomer	IDjob
	1	1	28434
	2	2	29000
	3	3	28501

Figure No-2.12: Table for assignjob

Insert value for Staff table

```
INSERT INTO [Staff] ([IDstaff], [staff name], [Phone]) VALUES (N'S100', N'Ronald Smith', N'+441234567444')
INSERT INTO [Staff] ([IDstaff], [staff name], [Phone]) VALUES (N'S801', N'Muhammad Ya', N'+441234567455')
INSERT INTO [Staff] ([IDstaff], [staff name], [Phone]) VALUES (N'S20', N'Curtis Stand', N'+441234567432')
INSERT INTO [Staff] ([IDstaff], [staff name], [Phone]) VALUES (N'S11', N'Manny Sinclair', N'+441234567000')
```

Output Result:

Staff			
	IDstaff	staff name	Phone
+	S100	Ronald Smith	+441234567444
+	S11	Manny Sinclair	+441234567000
+	S20	Curtis Stand	+441234567432
+	S801	Muhammad Ya	+441234567455

Figure No-2.13: Table for Staff

Insert value for jobstaff table

```
INSERT INTO [jobstaff] ([id], [IDjob], [IDstaff]) VALUES (1, 28434, N'S100')
INSERT INTO [jobstaff] ([id], [IDjob], [IDstaff]) VALUES (2, 28434, N'S801')
INSERT INTO [jobstaff] ([id], [IDjob], [IDstaff]) VALUES (3, 28434, N'S20')
INSERT INTO [jobstaff] ([id], [IDjob], [IDstaff]) VALUES (7, 29000, N'S11')
INSERT INTO [jobstaff] ([id], [IDjob], [IDstaff]) VALUES (8, 29001, N'S100')
INSERT INTO [jobstaff] ([id], [IDjob], [IDstaff]) VALUES (9, 28501, N'S801')
INSERT INTO [jobstaff] ([id], [IDjob], [IDstaff]) VALUES (10, 28501, N'S100')
```

Output Result:

jobstaff			
	id	IDjob	IDstaff
	1	28434	S100
	2	28434	S801
	3	28434	S20
	7	29000	S11
	8	29001	S100
	9	28501	S801
	10	28501	S100

Figure No-2.14: Table for jobstaff

(6) Input data on the equipment and materials that are used on a job. Give a listing of this:

Insert value for Equipement table

```
INSERT INTO [Equipement] ([IDEquipment], [equipmentname]) VALUES (1, N'Heavy duty traps')
INSERT INTO [Equipement] ([IDEquipment], [equipmentname]) VALUES (2, N'Wainscot seals')
INSERT INTO [Equipement] ([IDEquipment], [equipmentname]) VALUES (3, N'poison')
INSERT INTO [Equipement] ([IDEquipment], [equipmentname]) VALUES (4, N'Steam fumigator')
INSERT INTO [Equipement] ([IDEquipment], [equipmentname]) VALUES (5, N'Light traps')
```

Output Result:

Equipement	
IDEquipmen	equipmentname
1	Heavy duty traps
2	Wainscot seals
3	poison
4	Steam fumigator
5	Light traps

Figure No-2.15: Table for Equipement

Insert value for JobEquipment table

```
INSERT INTO [JobEquipment] ([ID], [IDjob], [IDEquipment]) VALUES (1, 28434, 1)
INSERT INTO [JobEquipment] ([ID], [IDjob], [IDEquipment]) VALUES (2, 28434, 2)
INSERT INTO [JobEquipment] ([ID], [IDjob], [IDEquipment]) VALUES (3, 28434, 3)
INSERT INTO [JobEquipment] ([ID], [IDjob], [IDEquipment]) VALUES (4, 29000, 4)
INSERT INTO [JobEquipment] ([ID], [IDjob], [IDEquipment]) VALUES (5, 28501, 5)
INSERT INTO [JobEquipment] ([ID], [IDjob], [IDEquipment]) VALUES (6, 28501, 2)
```

Output Result:

JobEquipment		
ID	IDjob	IDEquipmen
1	28434	1
2	28434	2
3	28434	3
4	29000	4
5	28501	5
6	28501	2

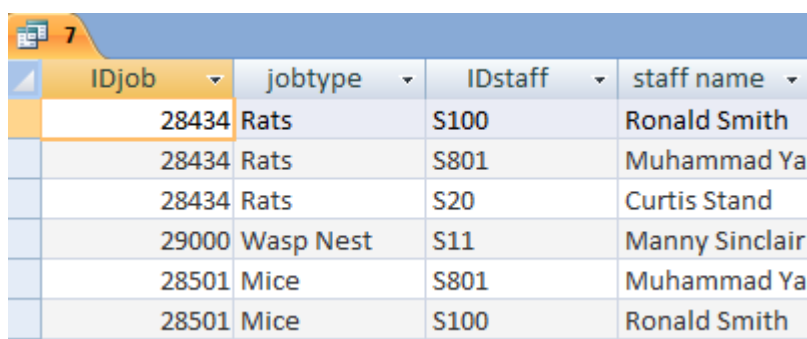
Figure No-2.16: Table for JobEquipment

**Queries:****(7) All the jobs and which staff have worked on them:**

SQL code for selected all the jobs which staff have worked on them.

```
SELECT Job.IDjob, [Job Type].jobtype, Staff.IDstaff, Staff.[staff name]
FROM ([Job Type] INNER JOIN Job ON [Job Type].[IDJobtype] = Job.[IDjobtype])
INNER JOIN (Staff INNER JOIN jobstaff ON Staff.[IDstaff] = jobstaff.[IDstaff]) ON Job.[IDjob] = jobstaff.[IDjob];
```

Table for queries number seven



IDjob	jobtype	IDstaff	staff name
28434	Rats	S100	Ronald Smith
28434	Rats	S801	Muhammad Ya
28434	Rats	S20	Curtis Stand
29000	Wasp Nest	S11	Manny Sinclair
28501	Mice	S801	Muhammad Ya
28501	Mice	S100	Ronald Smith

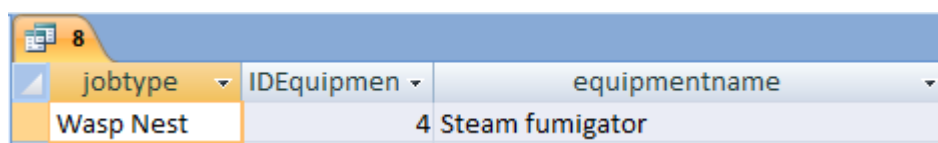
Figure No-2.17: Table for seven

**(8) That selects the equipment and materials that are used on jobs of type 'Wasp Nest':**

SQL code for the equipment and materials that are used on jobs of type 'Wasp Nest'.

```
SELECT [Job Type].jobtype, Equipement.IDEquipment, Equipement.equipmentname
FROM ([Job Type] INNER JOIN Job ON [Job Type].[IDJobtype] = Job.[IDjobtype])
INNER JOIN (Equipement INNER JOIN JobEquipment ON Equipement.IDEquipment = JobEquipment.IDEquipment) ON Job.IDjob = JobEquipment.IDjob
WHERE ((([Job Type].jobtype)="Wasp Nest"));
```

Table for queries number Eight



jobtype	IDEquipmen	equipmentname
Wasp Nest	4	Steam fumigator

Figure No-2.18: Table for eight

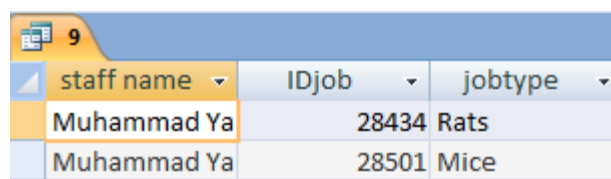


**(9) All the jobs that Muhammad Ya has worked on:**

SQL code for all the jobs that Muhammad Ya has worked on

```
SELECT Staff.[staff name], Job.IDjob, [Job Type].jobtype
FROM ([Job Type] INNER JOIN Job ON [Job Type].[IDJobtype] = Job.[IDjobtype])
INNER JOIN (Staff INNER JOIN jobstaff ON Staff.[IDstaff] = jobstaff.[IDstaff]) ON Job.[IDjob] = jobstaff.[IDjob]
WHERE ((Staff.[staff name])="Muhammad Ya");
```

Table for queries number nine



staff name	IDjob	jobtype
Muhammad Ya	28434	Rats
Muhammad Ya	28501	Mice

Figure No-2.19: Table for nine

**(10) All jobs that have taken place in Essex :**

SQL code for all jobs that have taken place in Essex.

```
SELECT Customer.Country, Job.IDjob, [Job Type].jobtype
FROM ([Job Type] INNER JOIN Job ON [Job Type].IDJobtype = Job.IDjobtype)
INNER JOIN (Customer INNER JOIN assignjob ON Customer.IDcustomer = assignjob.IDcustomer) ON Job.IDjob = assignjob.IDjob
WHERE ((Customer.Country)="Essex");
```

Table for queries number ten



Country	IDjob	jobtype
Essex	28501	Mice

Figure No-2.20: Table for ten

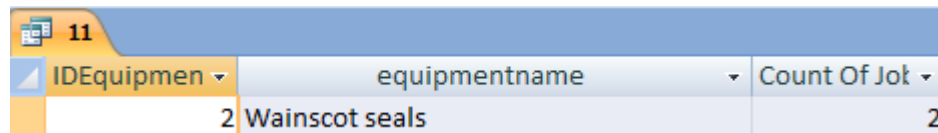
(Anon., n.d.)

**(11) Counts the number of jobs that have used Wainscot Seals:**

SQL code for Counts the number of jobs that have used Wainscot Seals

```
SELECT DISTINCTROW Equipment.IDEquipment, Equipment.equipmentname, Count(*) AS [Count Of Job]
FROM Job INNER JOIN (Equipment INNER JOIN JobEquipment ON Equipment.IDEquipment = JobEquipment.IDEquipment) ON Job.IDjob = JobEquipment.IDjob
GROUP BY Equipment.IDEquipment, Equipment.equipmentname
HAVING (((Equipment.equipmentname)="Wainscot seals"));
```

Table for queries number eleven



IDEquipmen	equipmentname	Count Of Job
2	Wainscot seals	2

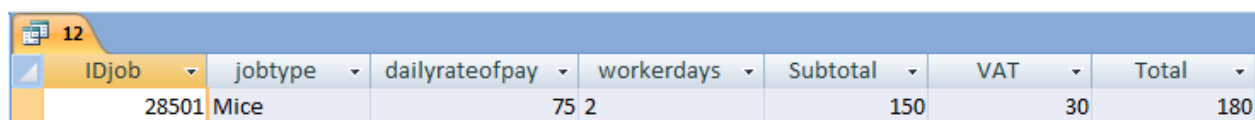
Figure No-2.21: Table for eleven

**(12) Produces the output that could be used to prepare an invoice:**

SQL Code for Produces the output that could be used to prepare an invoice

```
SELECT Job.IDjob, [Job Type].jobtype, Job.dailyrateofpay, Job.workerdays,
([dailyrateofpay]*[workerdays]) AS Subtotal, ([Subtotal]*20/100) AS VAT, ([Subtotal]+[VAT]) AS Total
FROM [Job Type] INNER JOIN Job ON [Job Type].[IDJobtype] = Job.[IDjobtype]
WHERE (((Job.IDjob)=28501));
```

Table for Queries number twelve



IDjob	jobtype	dailyrateofpay	workerdays	Subtotal	VAT	Total
28501	Mice	75	2	150	30	180

Figure No-2.22: Table for twelve

## Queries code for twelve numer

```
SELECT Job.IDjob, Job Type.jobtype, Job.dailyrateofpay,  
Job.workerdays, (dailyrateofpay*workerdays) AS Subtotal,  
((dailyrateofpay*workerdays)*20/100) AS VAT,  
((dailyrateofpay*workerdays)+((dailyrateofpay*workerdays)*20/100)) AS Total  
FROM Job Type INNER JOIN Job ON Job Type.IDJobtype = Job.IDjobtype  
WHERE (((Job.IDjob)=28501));
```

Figure No-2.23: code for twelve

(Benyon-Davis, n.d.)

### Task-3

#### (13)Derived Data:

(13) As per the requirement of Han well pest Control Company the database need to be extended. The charge information needs to be included. The charge is for per day by day for all jobtypes. Such as, 180 pounds for Rats jobtype, 168 pounds for Mice jobtype and 240 pounds for Wasp Nest jobtype.

#### SQL code for Derived data:

```
SELECT DISTINCTROW Job.IDjob, [Job Type].jobtype, Job.workerdays, Sum(Equipement.costing) AS EquipmentCost, Count(*)
AS totaleui, ([workerdays]*[EquipmentCost]) AS SubTotal, ([SubTotal]*20/100) AS vat, ([SubTotal]+[vat]) AS Total
FROM ([Job Type] INNER JOIN Job ON [Job Type].[IDJobtype] = Job.[IDjobtype])
INNER JOIN (Equipement INNER JOIN JobEquipment ON Equipement.[IDEquipement] = JobEquipment.[IDEquipement]) ON Job.[IDjob] = JobEquipment.[IDjob]
GROUP BY Job.IDjob, [Job Type].jobtype, Job.workerdays, ([workerdays]*[EquipmentCost]), ([SubTotal]*20/100), ([SubTotal]+[vat]);
```

#### Queries table for thirteen

13								
IDjob	jobtype	workerdays	EquipmentCos	totaleui	SubTotal	vat	Total	
28434	Rats	1	150	3	150	30	180	
28501	Mice	2	70	2	140	28	168	
29000	Wasp Nest	2	100	1	200	40	240	

Figure No-3.1: Table thirteen

#### Queries code for alter table Equipement:

```
--alter code

alter table Equipement
add costing double (18,2)
```

Figure No-3.2: Queries code for alter table Equipement

## Queries code for update

```

update Equipement set costing=50 where IDEquipment=1;
update Equipement set costing=40 where IDEquipment=2;
update Equipement set costing=60 where IDEquipment=3;
update Equipement set costing=100 where IDEquipment=4;
update Equipement set costing=30 where IDEquipment=5;

```

Figure No-3.3: Queries code for update

## Queries code

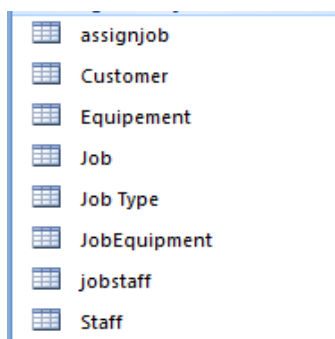
```

SELECT DISTINCTROW Job.IDjob, Job Type.jobtype, Job.workerdays,
Sum(Equipement.costing) AS EquipmentCost,
Count(*) AS totaleui, (workerdays*(Sum(Equipement.costing))) AS SubTotal,
((workerdays*(Sum(Equipement.costing)))*20/100) AS vat,
((workerdays*(Sum(Equipement.costing)))+(workerdays*(Sum(Equipement.costing)))*20/100) AS Total
FROM (Job Type INNER JOIN Job ON Job Type.IDJobtype = Job.IDjobtype)
INNER JOIN (Equipement INNER JOIN JobEquipment ON Equipement.IDEquipment = JobEquipment.IDEquipment)
ON Job.IDjob = JobEquipment.IDjob
GROUP BY Job.IDjob, Job Type.jobtype, Job.workerdays;

```

Figure No-3.4: code for Queries

## Show all tables:











	assignjob
	Customer
	Equipement
	Job
	Job Type
	JobEquipment
	jobstaff
	Staff

Figure No-3.5: All tables

(Dietrich, n.d.)

**Task-4:****Evaluation:**

At last in task- 4 I have discussed every one tasks performed to complete the database as asked. Here I have designed a table that shows the requirements of the company and the achievement taken to fulfill the requirements.

Requirement	Performed tasks	Remarks
Design Entity Relationship model	Entity Relationship model is designed and add in task-1	Performed
Data dictionary creating	Described data dictionary in task-1	Performed
Creating all the table using SQL	Described all the table in task-1	Performed
Created scripts and finished table	Described created scripts and finish table in task-2	Performed
Create Input data on all the jobs and the details of those jobs.	Described input data all jobs and details of those jobs in task-2	Performed
Create Input data for the members of staff and assign staff to jobs.	Described input data members of staff and assign staff to jobs in task-2	Performed
Create Input data on the equipment and materials that are used on a job.	Described input data equipment and materials that are used on a job in task-2	Performed
Create queries all the jobs and which staff have worked on them	Described all jobs and which staff have worked on them in task-2	Performed
Create queries the equipment and materials that are used on jobs of type 'Wasp Nest'	Described equipment and materials that are used on jobs of type 'Wasp Nest' in task-2	Performed
Create queries all the jobs that Muhammad Ya has worked on.	Described all jobs that Muhammad Ya has worked on in task-2	Performed
Create queries Shows all jobs that have taken place in Essex	Described all jobs that have taken place in Essex in task-2	Performed
Create queries counts the number of jobs that have used Wainscot Seals	Described counts the number of jobs that have used Wainscot Seals in task-2	Performed
Create queries include a calculation for VAT charged on a job.	Described a calculation for VAT charged on a job in task-2	
Create queries addition to charging per day by job type.	Described addition to charging per day by job type in task-3	Performed

(education, 2011)

**Conclusion:**

The database is designed to complete the requirements of Hanewll pest control. In task- 1 ER diagram and data dictionary is designed and in task 2 using SQL the database is designed and implemented. All other asked records are also added here. Queries are in addition added here. Task- 3 is about the derived data. at last in task- 4 I have performed an analysis to make sure that how much I have succeed to whole the requirements of Hanewll pest control company . I have tried my best to fulfill all the requirement of the assignment.

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