

SQL Case Study-Advance | Solutions

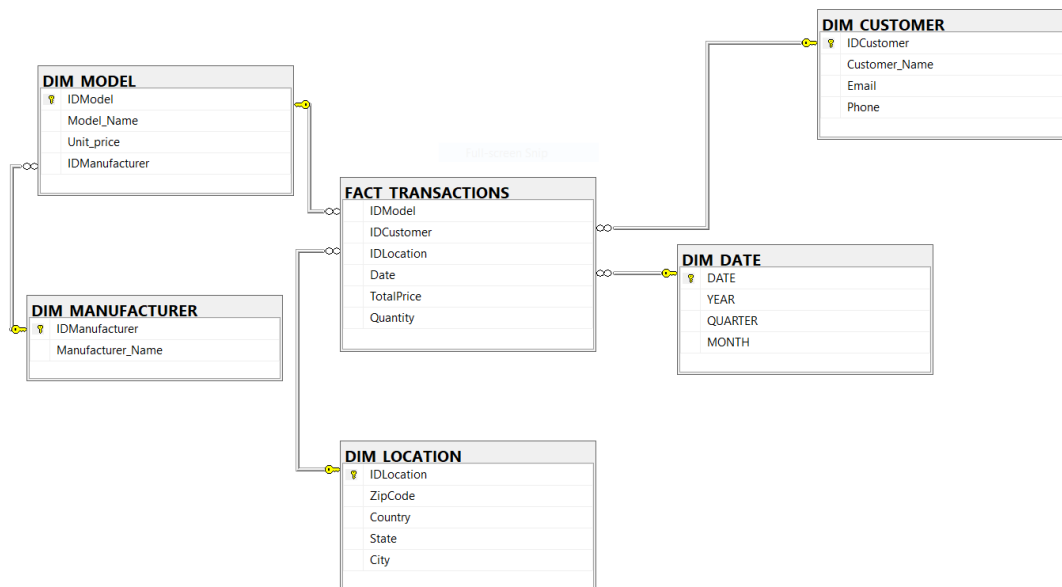
Approaches used/Concepts covered:

- Window Functions
- Aggregate Functions
- Alternate Query
- Basic & Advance Join

Business Scenario: The database “Cell phones Information” contains details on cell phone sales or transactions.

Details stored: Dim_manufacturer, Dim_model, Dim_customer, Dim_Location and Fact_Transactions. The first four store entries for the respective elements and Fact_Transactions stores all the information about sales of specific cell phones.

ER Diagram:



```

/*****
*****
Create tables in the database as per schema
*****
*****/
CREATE TABLE DIM_MANUFACTURER (
IDManufacturer INT PRIMARY KEY IDENTITY(11, 1),
Manufacturer_Name VARCHAR (20)
)

```

```

CREATE TABLE DIM_MODEL (
IDModel INT PRIMARY KEY IDENTITY(101, 1),
Model_Name VARCHAR(20),
Unit_price MONEY ,
IDManufacturer INT REFERENCES DIM_Manufacturer(IDManufacturer)
)

CREATE TABLE DIM_CUSTOMER (
IDCustomer INT PRIMARY KEY IDENTITY(10001, 1),
Customer_Name VARCHAR(30),
Email VARCHAR (40),
Phone BIGINT
)

CREATE TABLE DIM_LOCATION (
IDLocation INT PRIMARY KEY IDENTITY(2001, 1),
ZipCode INT ,
Country VARCHAR (20),
[State] VARCHAR (20),
City VARCHAR (20)
)

CREATE TABLE DIM_DATE (
[DATE] DATE PRIMARY KEY,
[YEAR] AS YEAR([DATE]),
[QUARTER] AS DATEPART(QUARTER, [DATE]),
[MONTH] AS MONTH([DATE])
)

CREATE TABLE FACT_TRANSACTIONS (
IDModel INT REFERENCES DIM_MODEL(IDModel),
IDCustomer INT REFERENCES DIM_CUSTOMER(IDCustomer),
IDLocation INT REFERENCES DIM_LOCATION(IDLocation),
Date DATE REFERENCES DIM_DATE([DATE]),
TotalPrice MONEY,
Quantity INT,
)

```

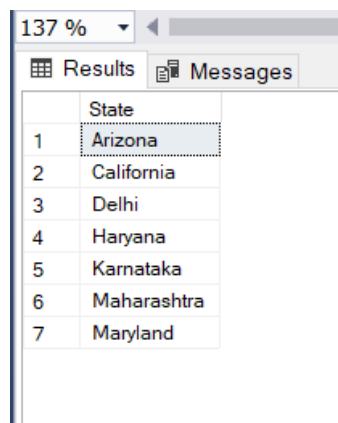
137 %

Results Messages

	TABLE_NAME
1	DIM_MANUFACTURER
2	DIM_MODEL
3	DIM_CUSTOMER
4	DIM_LOCATION
5	DIM_DATE
6	FACT_TRANSACTIONS
7	sysdiagrams

--1. List all the states in which we have customers who have bought cell phones from 2005 till today.

```
select distinct State from
(select A.STATE, Date
from DIM_LOCATION A
INNER JOIN FACT_TRANSACTIONS B ON A.IDLocation = B.IDLocation
where datepart(YEAR, Date) BETWEEN 2005 AND datepart(YEAR, SYSDATETIME()))D;
```

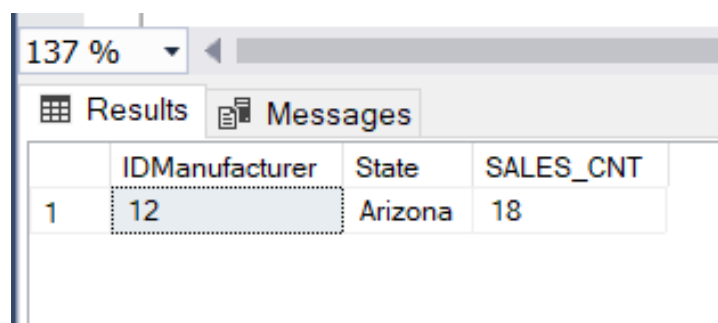


The screenshot shows a SQL Server Enterprise Manager window with a query results grid. The grid has two columns: 'State' and an unlabeled column. The results are as follows:

	State
1	Arizona
2	California
3	Delhi
4	Haryana
5	Karnataka
6	Maharashtra
7	Maryland

--2. What state in the US is buying the most 'Samsung' cell phones?

```
select TOP 1 A.IDManufacturer, D.State, count(Manufacturer_Name)SALES_CNT
from DIM_MANUFACTURER A
INNER JOIN DIM_MODEL B ON A.IDManufacturer = B.IDManufacturer AND Manufacturer_Name
= 'Samsung'
INNER JOIN FACT_TRANSACTIONS C ON B.IDModel = C.IDModel
INNER JOIN DIM_LOCATION D ON C.IDLocation = D.IDLocation AND D.Country = 'US'
group by D.State, A.IDManufacturer, Manufacturer_Name;
```



The screenshot shows a SQL Server Enterprise Manager window with a query results grid. The grid has four columns: 'IDManufacturer', 'State', and 'SALES_CNT'. The results are as follows:

	IDManufacturer	State	SALES_CNT
1	12	Arizona	18

--3. Show the number of transactions for each model per zip code per state.

```
select distinct C.Model_Name, A.ZipCode, A.State, count(State)TTL_SALES
from DIM_LOCATION A
INNER JOIN FACT_TRANSACTIONS B ON A.IDLocation = B.IDLocation
INNER JOIN DIM_MODEL C ON B.IDModel = C.IDModel
group by C.Model_Name, A.ZipCode, A.State
order by ZipCode, STATE;
```

137 %

Results Messages

	Model_Name	ZipCode	State	TTL_SALES
1	3310 (3330)	21163	Maryland	1
2	5230	21163	Maryland	3
3	6230 (6233)	21163	Maryland	1
4	C139	21163	Maryland	2
5	Droid Bionic	21163	Maryland	2
6	E1100	21163	Maryland	1
7	E250	21163	Maryland	1
8	Galaxy S	21163	Maryland	2
9	Galaxy S4	21163	Maryland	1
10	Galaxy S7	21163	Maryland	2
11	iPhone 4	21163	Maryland	1
12	iPhone 6	21163	Maryland	1
13	iPhone 7	21163	Maryland	1
14	Motorola Z	21163	Maryland	1
15	OnePlus 5	21163	Maryland	1
16	OnePlus 5T	21163	Maryland	1
17	OnePlus 6T	21163	Maryland	2
18	OnePlus X	21163	Maryland	1

Query executed successfully. DESKTOP-5211H0K\KAWAIIISERVE... DESKTOP-5211H0K\yungup... case_study1 00:00:00 188 rows

--4. Show the cheapest cell phone (Output should contain the price also)

```
select B.Manufacturer_Name, A.Model_Name, A.Unit_price
from DIM_MODEL A
JOIN DIM_MANUFACTURER B ON A.IDManufacturer = B.IDManufacturer
where UNIT_PRICE =
(select min(Unit_price) from DIM_MODEL);

select top 1 B.Manufacturer_Name, A.Model_Name, min(Unit_price)
from DIM_MODEL A
JOIN DIM_MANUFACTURER B ON A.IDManufacturer = B.IDManufacturer
group by Manufacturer_Name, Model_Name;
```

137 %

Results Messages

	Manufacturer_Name	Model_Name	Unit_price
1	Nokia	3210	14.00

--5. Find out the average price for each model in the top5 manufacturers in terms of sales quantity and order by average price.

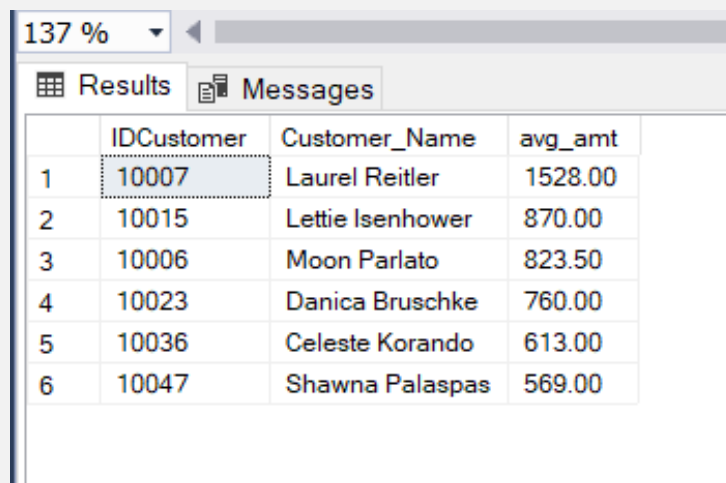
```
select Manufacturer_Name, IDManufacturer, IDModel, Model_Name, AVG(TotalPrice)AVG_PRICE from
(select A.Manufacturer_Name, A.IDManufacturer, B.IDModel, B.Model_Name, C.TotalPrice, count(C.IDModel) as
TTL_SALES
from DIM_MANUFACTURER A
LEFT JOIN DIM_MODEL B ON A.IDManufacturer = B.IDManufacturer
LEFT JOIN FACT_TRANSACTIONS C ON B.IDModel = C.IDModel
group by A.Manufacturer_Name, A.IDManufacturer, B.IDModel, B.Model_Name, C.TotalPrice)A
where A.IDManufacturer in
(
select top 5 A.IDManufacturer
from DIM_MANUFACTURER A
LEFT JOIN DIM_MODEL B ON A.IDManufacturer = B.IDManufacturer
LEFT JOIN FACT_TRANSACTIONS C ON B.IDModel = C.IDModel
group by A.IDManufacturer
order by SUM(Quantity) DESC
)
group by Manufacturer_Name, A.IDManufacturer, IDModel, Model_Name
order by AVG_PRICE;
```

137 %

	Manufacturer_Name	IDManufacturer	IDModel	Model_Name	AVG_PRICE
1	Nokia	14	112	3210	19.50
2	Nokia	14	115	3310 (3330)	31.00
3	Nokia	14	113	5230	34.00
4	Nokia	14	117	6230 (6233)	55.6666
5	Nokia	14	116	6010 (6020/6030)	58.00
6	Nokia	14	114	6600	61.75
7	Motorola	15	110	RAZR V3	98.3333
8	Motorola	15	108	C200	151.00
9	Samsung	12	119	E250	171.00
10	Motorola	15	109	Droid Bionic	189.20
11	One Plus	13	127	OnePlus 2	192.00
12	Samsung	12	118	E1100	201.1666
13	One Plus	13	126	OnePlus X	204.40
14	Motorola	15	107	C139	211.7142
15	Samsung	12	120	Galaxy Note II	218.75
16	Samsung	12	121	Galaxy S	222.25
17	Motorola	15	111	Motorola Z	286.00
18	One Plus	13	128	OnePlus 5	320.00
19	Samsung	12	123	Galaxy S5	394.00
20	Samsung	12	122	Galaxy S4	400.80
21	One Plus	13	129	OnePlus 5T	408.00
22	Apple	11	104	iPhone 6	504.00
23	Samsung	12	124	Galaxy S7	521.60
24	Apple	11	102	iPhone 4S	554.8333
25	Apple	11	103	iPhone 5	574.00
26	One Plus	13	130	OnePlus 6T	640.00
27	Samsung	12	125	Galaxy S8	665.00
28	Apple	11	105	iPhone 7	739.00
29	Apple	11	101	iPhone 4	761.40

--6. List the names of the customers and the average amount spent in 2009, where the average is higher than 500

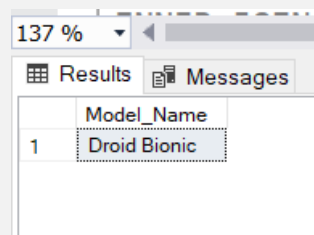
```
select A.IDCustomer, A.Customer_Name, AVG(B.TotalPrice) AS [avg_amt]
from DIM_CUSTOMER A
INNER JOIN FACT_TRANSACTIONS B ON A.IDCustomer = B.IDCustomer and datepart(YEAR,
Date) = 2009
group by A.Customer_Name, A.IDCustomer
having AVG(B.TotalPrice) >= 500
order by AVG(B.TotalPrice) DESC;
```



	IDCustomer	Customer_Name	avg_amt
1	10007	Laurel Reitler	1528.00
2	10015	Lettie Isenhower	870.00
3	10006	Moon Parlato	823.50
4	10023	Danica Bruschke	760.00
5	10036	Celeste Korando	613.00
6	10047	Shawna Palaspas	569.00

--7. List if there is any model that was in the top 5 in terms of quantity, simultaneously in 2008, 2009 and 2010

```
select * from
(select top 5 B.Model_Name
from FACT_TRANSACTIONS A
INNER JOIN DIM_MODEL B ON A.IDModel = B.IDModel where YEAR(Date) = '2008'
group by B.Model_Name
order by SUM(Quantity) desc
intersect
select top 5 B.Model_Name
from FACT_TRANSACTIONS A
INNER JOIN DIM_MODEL B ON A.IDModel = B.IDModel where YEAR(Date) = '2009'
group by B.Model_Name
order by SUM(Quantity) desc
intersect
select top 5 B.Model_Name
from FACT_TRANSACTIONS A
INNER JOIN DIM_MODEL B ON A.IDModel = B.IDModel where YEAR(Date) = '2010'
group by B.Model_Name
order by SUM(Quantity) desc)A;
```



Model_Name
1 Droid Bionic

--8. Show the manufacturer with the 2nd top sales in the year of 2009 and the manufacturer with the 2nd top sales in the year of 2010.

```
select top 2 C.Manufacturer_Name as [Name], C.IDManufacturer, DATEPART(YEAR, A.Date), sum(TotalPrice)
as [SUM],
DENSE_RANK() over (partition by A.Date order by sum(TotalPrice))
from FACT_TRANSACTIONS A
INNER JOIN DIM_MODEL B ON A.IDModel = B.IDModel
INNER JOIN DIM_MANUFACTURER C ON B.IDManufacturer = C.IDManufacturer where DATEPART(YEAR, date) in
('2009', '2010')
group by C.Manufacturer_Name, c.IDManufacturer, TotalPrice, A.Date
order by SUM(TotalPrice) desc

--please ignore this
select top 1 last_value(D.Name) over (order by D.SUM) from
(select top 2 C.Manufacturer_Name as [Name], C.IDManufacturer, sum(Quantity) as [SUM]
from FACT_TRANSACTIONS A
INNER JOIN DIM_MODEL B ON A.IDModel = B.IDModel
INNER JOIN DIM_MANUFACTURER C ON B.IDManufacturer = C.IDManufacturer where DATEPART(YEAR, date) = 2009
group by C.Manufacturer_Name, c.IDManufacturer
order by SUM(Quantity) desc) as D;

--please ignore this
select top 1 last_value(E.Name) over (order by E.SUM) from
(select top 2 C.Manufacturer_Name as [Name], C.IDManufacturer, sum(Quantity) as [SUM]
from FACT_TRANSACTIONS A
INNER JOIN DIM_MODEL B ON A.IDModel = B.IDModel
INNER JOIN DIM_MANUFACTURER C ON B.IDManufacturer = C.IDManufacturer where DATEPART(YEAR, date) = 2010
group by C.Manufacturer_Name, C.IDManufacturer
order by SUM(Quantity) desc) as E;
```

Query-1

	Name	IDManufacturer	(No column name)	SUM	(No column name)
1	Apple	11	2009	1528.00	1
2	Apple	11	2009	1524.00	1

Query-2:

	(No column name)
1	Motorola

--9. Show the manufacturers that sold cellphones in 2010 but did not in 2009.

```
select distinct C.Manufacturer_Name as [Name], C.IDManufacturer, DATEPART(YEAR, A.Date) AS [YR]
from FACT_TRANSACTIONS A
INNER JOIN DIM_MODEL B ON A.IDModel = B.IDModel
INNER JOIN DIM_MANUFACTURER C ON B.IDManufacturer = C.IDManufacturer
where C.Manufacturer_Name NOT IN
(
select distinct A.Manufacturer_Name
from DIM_MANUFACTURER A
INNER JOIN DIM_MODEL B ON A.IDManufacturer = B.IDManufacturer
INNER JOIN FACT_TRANSACTIONS C ON B.IDModel = C.IDModel where DATEPART(YEAR, C.Date) = 2009)
AND DATEPART(YEAR, A.Date) = 2010;
```

137 %

Results Messages

	Name	IDManufacturer	YR
1	HTC	16	2010

--10. Find top 100 customers and their average spend, average quantity by each year. Also find the percentage of change in their spend.

```
select top 100 c.IDCustomer, c.Customer_Name, YEAR(Date)[year],
(SUM(t.Quantity)/COUNT(c.IDCustomer)) as avg_quantity,
FORMAT(AVG(totalprice), 'N', 'EN-US') as avg_spent,
(((AVG(totalprice)-LAG(AVG(totalprice))
over(partition by c.Customer_Name order by c.Customer_Name, Year(date)))
/ LAG(AVG(totalprice))
over(partition by c.Customer_name order by c.customer_name, year(Date)))*100) as percent_change
from FACT_TRANSACTIONS t
join DIM_CUSTOMER c
on t.IDCustomer = c.IDCustomer
group by c.IDCustomer, c.Customer_Name, YEAR(Date)
order by c.IDCustomer, c.Customer_Name, YEAR(Date), AVG(TotalPrice) desc
```


137 %						
Results Messages						
	IDCustomer	Customer_Name	year	avg_quantity	avg_spent	percent_change
1	10001	Kallie Blackwood	2003	1	50.00	NULL
2	10001	Kallie Blackwood	2004	1	419.00	738.00
3	10001	Kallie Blackwood	2005	1	84.00	-79.95
4	10001	Kallie Blackwood	2006	1	583.00	594.04
5	10001	Kallie Blackwood	2009	1	381.00	-34.64
6	10002	Johnetta Abdallah	2003	1	35.00	NULL
7	10002	Johnetta Abdallah	2004	1	503.00	1337.14
8	10002	Johnetta Abdallah	2006	1	179.00	-64.41
9	10002	Johnetta Abdallah	2007	1	396.00	121.22
10	10002	Johnetta Abdallah	2008	1	180.00	-54.54
11	10002	Johnetta Abdallah	2010	1	102.50	-43.05
12	10003	Bobbye Rhym	2005	1	319.00	NULL
13	10003	Bobbye Rhym	2006	1	474.00	48.58
14	10003	Bobbye Rhym	2007	2	1,106.00	133.33
15	10003	Bobbye Rhym	2008	1	322.00	-70.88
16	10003	Bobbye Rhym	2009	1	442.00	37.26
17	10003	Bobbye Rhym	2010	1	435.00	-1.58
18	10004	Micaela Rhymes	2004	1	504.00	NULL
19	10005	Tamar Hoogland	2003	1	33.00	NULL
20	10005	Tamar Hoogland	2007	1	286.00	766.66
21	10006	Moon Parlato	2003	1	667.00	NULL
22	10006	Moon Parlato	2004	1	256.50	-61.54
23	10006	Moon Parlato	2009	2	823.50	221.05
24	10006	Moon Parlato	2010	1	226.50	-72.49
25	10007	Laurel Reitter	2003	1	410.00	NULL
26	10007	Laurel Reitter	2005	1	149.00	-63.65
27	10007	Laurel Reitter	2006	1	226.00	51.67
28	10007	Laurel Reitter	2007	1	288.00	27.43
29	10007	Laurel Reitter	2008	1	557.00	93.40
30	10007	Laurel Reitter	2009	4	1,528.00	174.32
31	10007	Laurel Reitter	2010	1	35.00	-97.70
32	10008	Delisa Crupi	2003	1	498.00	NULL
33	10008	Delisa Crupi	2004	1	178.00	-64.25
34	10008	Delisa Crupi	2005	2	404.00	126.96
35	10008	Delisa Crupi	2009	1	179.00	-55.69
36	10009	Viva Toelkes	2003	1	35.00	NULL
37	10009	Viva Toelkes	2004	1	151.00	331.42
38	10009	Viva Toelkes	2005	2	830.00	449.66
39	10009	Viva Toelkes	2006	1	200.00	-75.90

137 %						
Results Messages						
	IDCustomer	Customer_Name	year	avg_quantity	avg_spent	percent_change
38	10009	Viva Toelkes	2005	2	830.00	449.66
39	10009	Viva Toelkes	2006	1	200.00	-75.90
40	10009	Viva Toelkes	2007	1	67.00	-66.50
41	10009	Viva Toelkes	2010	1	665.00	892.53
42	10010	Elza Lipke	2003	1	42.00	NULL
43	10010	Elza Lipke	2006	1	285.00	578.57
44	10011	Deborah Chick...	2003	1	35.00	NULL
45	10011	Deborah Chick...	2009	1	286.00	717.14
46	10012	Timothy Mulque...	2006	1	556.00	NULL
47	10012	Timothy Mulque...	2007	1	218.00	-60.79
48	10012	Timothy Mulque...	2008	1	392.00	79.81
49	10012	Timothy Mulque...	2010	1	202.00	-48.46
50	10013	Arlette Honeywell	2004	1	189.00	NULL
51	10013	Arlette Honeywell	2005	1	269.00	42.32
52	10013	Arlette Honeywell	2006	1	233.00	-13.38
53	10013	Arlette Honeywell	2007	1	76.67	-67.09
54	10013	Arlette Honeywell	2008	1	502.00	554.78
55	10014	Dominique Dick...	2004	1	56.00	NULL
56	10014	Dominique Dick...	2005	2	338.00	503.57
57	10014	Dominique Dick...	2006	2	406.00	20.11
58	10014	Dominique Dick...	2007	2	920.00	126.60
59	10014	Dominique Dick...	2008	1	255.00	-72.28
60	10015	Lettie Isenhower	2004	1	219.00	NULL
61	10015	Lettie Isenhower	2005	1	52.00	-76.25
62	10015	Lettie Isenhower	2007	1	109.00	109.61
63	10015	Lettie Isenhower	2008	1	150.00	37.61
64	10015	Lettie Isenhower	2009	2	870.00	480.00
65	10016	Myra Munns	2005	1	173.00	NULL
66	10016	Myra Munns	2008	1	16.00	-90.75
67	10017	Stephaine Barfi...	2004	1	206.00	NULL
68	10017	Stephaine Barfi...	2008	1	502.00	143.68
69	10017	Stephaine Barfi...	2009	1	19.00	-96.21
70	10017	Stephaine Barfi...	2010	1	393.00	1968.42
71	10018	Lai Gato	2003	1	32.00	NULL
72	10018	Lai Gato	2004	1	169.00	428.12
73	10018	Lai Gato	2005	1	689.50	307.98
74	10018	Lai Gato	2007	1	264.00	-61.71
75	10018	Lai Gato	2008	1	122.00	-53.78
76	10019	Stephen Emigh	2003	1	286.00	NULL

137 %						
Results Messages						
	IDCustomer	Customer_Name	year	avg_quantity	avg_spent	percent_change
63	10015	Lettie Isenhower	2008	1	150.00	37.61
64	10015	Lettie Isenhower	2009	2	870.00	480.00
65	10016	Myra Munns	2005	1	173.00	NULL
66	10016	Myra Munns	2008	1	16.00	-90.75
67	10017	Stephaine Barfi...	2004	1	206.00	NULL
68	10017	Stephaine Barfi...	2008	1	502.00	143.68
69	10017	Stephaine Barfi...	2009	1	19.00	-96.21
70	10017	Stephaine Barfi...	2010	1	393.00	1968.42
71	10018	Lai Gato	2003	1	32.00	NULL
72	10018	Lai Gato	2004	1	169.00	428.12
73	10018	Lai Gato	2005	1	689.50	307.98
74	10018	Lai Gato	2007	1	264.00	-61.71
75	10018	Lai Gato	2008	1	122.00	-53.78
76	10019	Stephen Emigh	2003	1	286.00	NULL
77	10019	Stephen Emigh	2004	1	284.00	-0.69
78	10019	Stephen Emigh	2006	1	417.00	46.83
79	10019	Stephen Emigh	2007	1	289.67	-30.53
80	10019	Stephen Emigh	2008	1	461.00	59.14
81	10019	Stephen Emigh	2009	1	380.00	-17.57
82	10020	Tyra Shields	2009	1	335.50	NULL
83	10020	Tyra Shields	2010	2	832.00	147.98
84	10021	Tammara Wardr...	2005	1	90.00	NULL
85	10021	Tammara Wardr...	2007	1	434.00	382.22
86	10021	Tammara Wardr...	2009	1	160.00	-63.13
87	10022	Cory Gibes	2003	1	284.00	NULL
88	10022	Cory Gibes	2004	1	503.00	77.11
89	10022	Cory Gibes	2005	1	202.00	-59.84
90	10022	Cory Gibes	2010	1	390.00	93.06
91	10023	Danica Bruschke	2006	1	52.00	NULL
92	10023	Danica Bruschke	2008	1	392.50	654.80
93	10023	Danica Bruschke	2009	2	760.00	93.63
94	10023	Danica Bruschke	2010	1	335.00	-55.92
95	10024	Wilda Giguere	2003	1	56.00	NULL
96	10024	Wilda Giguere	2005	1	17.00	-69.64
97	10024	Wilda Giguere	2007	1	235.50	1285.29
98	10025	Elvera Benimad...	2003	3	858.00	NULL
99	10025	Elvera Benimad...	2004	1	505.00	-41.14
100	10025	Elvera Benimad...	2005	1	85.00	-83.16