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# Case

# 1. Top $n$ Clients Accounting for Half of the Total Sales in This Year

## 1. Problem

The table below is the historic sales contracts of an enterprise:

ContractNo	ActualSale	SellDate	Product	Quantities	Amount	Client	ApplyArea	ApplyMethod
10023	7	2008-08-08	74	1147	\$261,516.00	JX	JPN	RESELE
10028	30	2008-08-10	23	1789	\$71,560.00	JPH	JPN	RESELE
10043	23	2008-08-10	45	50	\$14,400.00	ALLIANZ	GER	SELF_USE
10061	20	2008-08-10	50	742	\$43,036.00	CNPC	CHN	RESELE
10077	24	2008-08-10	45	3139	\$904,032.00	G	ITA	RESELE
10086	14	2008-08-10	45	1412	\$406,656.00	ARAMCO	KSA	SELF_USE
10093	27	2008-08-10	48	22	\$5,280.00	ARAMCO	KSA	SELF_USE
10108	17	2008-08-10	76	744	\$80,352.00	HONDA	JPN	RESELE
10119	16	2008-08-12	29	3854	\$38,540.00	BP	GBR	RESELE
10128	3	2008-08-15	6	52	\$1,040.00	TOYOTA	JPN	RESELE
10138	3	2008-08-15	78	88	\$15,664.00	PANASONIC	JPN	RESELE
10139	27	2008-08-16	31	2109	\$84,360.00	VOW	GER	SELF USE

The table below is the Client table:

Abbr	Name	City	State	Country	SaleGoal
AAPL	Apple Inc.	Cupertino	California	United States	16
ALLIANZ	Allianz	Munich	Munich	Germany	26
ARAMCO	Saudi Aramco	Dhahran	Dhahran	Saudi Arabia	20
AXA	AXA	Paris	Paris	France	25
BAC	Bank of America	Charlotte	North Carolina	United States	15
BP	BP	London	London	United Kingdom	17
BRK	Berkshire Hathaway	Omaha	Nebraska	United States	21
CA	Carrefour	Levallois-Perret	Levallois-Perret	France	20
CARGILL	Cargill	Wayzata	Minnesota	United States	16
CNPC	PetroChina	Beijing	Beijing	China	20
COP	ConocoPhillips	Houston	Texas	United States	16
CVX	Chevron	San Ramon	California	United States	16

Clients ranked by sales value in a certain year. The top  $n$  clients accounting for half of the total sales value is called as Key account. Please list the key account of this enterprise in the year of 2009.

## 2. Tip

Rough train of thought: Firstly, filter the Contract data, retaining only that of 2009. Then group the Contract table by Client, compute the total sales value achieved by each client and arrange the results in descending order, then work out the half value of the total sales value.

Finally, scan this table and aggregate sales value during this process till reaching half of the total sales value. Then, the a few top clients will be the key accounts.

1. Filter the Contract records, retaining the data in the 2009.
2. Group by Client for the screened table. Then, the sales contract of each client will be grouped together, and a new Client level will be generated.
3. Sum up the amount of each group in the Client row.
4. Sort the Client groups by the amount in ascending order
5. Shrink to the Client level. Then append a 0-level slave row, and compute the total sales volume of all clients, that is, half of the total annual sales value.
6. Sum up the amount of Clients one by one.
7. Filter the Client groups, retainint the clients whose sumup-amount is greater than half of the total sum.
8. Join the name of top  $n$  clients from the Client table with the Client group by abbreviation name.

### 3. Solution

1. Filter

0	1		A	B	C	D	E	F	G	
1-		1	ContractNo	ActualSale	SellDate	Product	Quantities	Amount	Client	Ap
	2		10023	7	2008-08-08	74	1147	\$261,516.00	JX	JF
	3		10028	20	2008-08-10	23	1700	\$71,560.00	JBU	JF
	4									G
	5									C
	6									IT
	7									K
	8									K
	9									JF
	10									G
	11									JF
	12									JF
	13									G
	14									U
	15									JF
	16		10163	29	2008-08-19	51	87	\$10,266.00	RDSA	G

Filter

Condition

☐ Cell value
 

==2008-08-08

☒ Expression
 

year(@)==2009

Action to unsatisfied band

☒ Delete
 ☐ Hide

Action scope

☒ Work scope
 ☐ Under parent row

OK

Cancel

Show

2. Group



0	1	A	B	C	D	E	F	G	
1-	1	ContractNo	ActualSale	SellDate	Product	Quantities	Amount	Client	App
	2	12083	9	2009-01-02	48	1176	\$282,240.00	VOW	GEF
	3	12101							GEF
	4	12121							USA
	5	12128							USA
	6	12137							GEF
	7	12145							CHN
	8	12161							USA
	9	12181							USA
	10	12193							ITA
	11	12206	4	2009-01-10	26	8	\$880.00	SZE	FRA

**Group**

☒ Sort before group

☐ Use Locale

☐ Regroup

OK Cancel

3. Calculate the Sum of each Client

	D	E	F	G	
	ProductQuantities	Amount	Client	App	
			=({F3}.sum())	AAPL	
-19	28	502	\$14,056.00	AAPL	USA

4. Sort

0	1	2	A	B	C	D	E	F	G	
1-	1		ContractNo	ActualSale	SellDate	Product	Quantities	Amount	Client	App
	2							\$882,126.00	AAPL	
	3									
	4									
	5									
	6									
	7									
	8									
	9									
	10									
	11									
1-	12									
	13									
	14									
	15									
	16		13572	3	2009-04-20	40	2452	\$681,656.00	ALLIANZ	GEF

**Sort**

Cell Asc

F2 ☒

Action scope

☒ Work scope ☐ Under parent row

☐ Use Locale

OK Cancel Up Down

5. Shrink and Calculate

0	1	2	A	B	C	D	E	F	G	
1-	1		ContractNo	ActualSale	SellDate	Product	Quantities	Amount	Client	App
2-	2							=({F3}.sum())/2		
1+	3							\$440,168.00	TOT	
1+	13							\$447,620.00	S&M	ING



## 6. Sum up

D	E	F	G	H	I
ProductQuantities	Amount	Client	ApplyArea	ApplyMethod	
	\$41,361,627.00				
	\$440,168.00	TOT		=F3+A2[H3;-1]	
	\$447,620.00	SAMSUNG			
	\$490,360.00	COP			

## 7. Filter

C	D	E	F	G	H	I
elIDate	ProductQuantities	Amount	Client	ApplyArea	ApplyMethod	
		\$41,361,627.00				
		\$440,168.00	TOT		\$440,168.00	
		\$447,620.00	SAMSUNG		\$887,788.00	
		\$490,360.00	COP		\$1,378,148.00	

Filter

Condition

☐ Cell value
 

=

440168

☒ Expression
 

@>F2

...

Action to unsatisfied band

☒ Delete
 ☐ Hide

Action scope

☒ Work scope
 ☐ Under parent row

OK

Cancel

Show

## 8. Join

0	1	2	A	B	C	D	E	F	
1		1	ContractNo	ActualSale	SellDate	ProductQuantities	Amount	Cl	
2-		2					\$41,361,627.00		
	+	3					\$2,018,110.00	EOAI	
	1+	13					\$2,184,260.00	TESC	
	1+	27						NESM	
	1+	38						VOVA	
	1+	50						MCK	
	1+	67						HPQ	
	1+	78						CARC	
	1+	89						GLEM	
	1+	105					\$2,742,534.00	SINC	

Join

☒ Left join
 ☐ Full join

OK

Cancel

## 4. Result



0	1	2	A	B	C	D	E	F	G	H	I
1		1	ContractNo	ActualSale	SellDate	Product	Quantities	Amount	Client	ApplyArea	ApplyMethod
2		2						\$41,361,627.00			
	1+	3	E.ON					\$2,018,110.00	EOAN		\$41,660,344.00
	1+	13	Tesco					\$2,184,260.00	TESCO		\$43,844,604.00
	1+	27	Nestle					\$2,197,658.00	NESN		\$46,042,262.00
	1+	38	Volkswagen Group					\$2,286,744.00	VOWV		\$48,329,006.00
	1+	50	McKesson Corporation					\$2,304,630.00	MCK		\$50,633,636.00
	1+	67	Hewlett-Packard					\$2,416,642.00	HPQ		\$53,050,278.00
	1+	78	Cargill					\$2,520,936.00	CARGILL		\$55,571,214.00
	1+	89	Glencore					\$2,561,158.00	GLEN		\$58,132,372.00
	1+	105	Sinopec					\$2,742,534.00	SINOPEC		\$60,874,906.00
	1+	118	Honda					\$2,809,560.00	HONDA		\$63,684,466.00
	1+	128	Allianz					\$2,874,872.00	ALLIANZ		\$66,559,338.00
	1+	143	General Electric					\$3,035,240.00	GE		\$69,594,578.00
	1+	160	PetroChina					\$3,163,134.00	CNPC		\$72,757,712.00
	1+	172	Toyota Motors					\$3,188,296.00	TOYOTA		\$75,946,008.00
	1+	192	Gazprom					\$3,338,522.00	GAZP		\$79,284,530.00
	1+	208	GDF Suez					\$3,438,724.00	SZE		\$82,723,254.00

## 2. Stock Rise to the Specified Rate for 3 Consecutive Days in a Month

### 1. Problem

To list the daily closing price record of a stock exchange in a month, in which the , CODE column is used to contain the stock code, DT is the date, and CL is the closing price level.

0	1	A	B	C
1		DT	CODE	CL
2		01/03/2012	FAK006582873	\$21.48
3		01/03/2012	FAK005299633	\$77.23
4		01/03/2012	FAK008326818	\$62.50
5		01/03/2012	FAK002611906	\$7.27
6		01/03/2012	FAK000953025	\$6.94
7		01/03/2012	FAK005977188	\$6.79
8		01/03/2012	FAK008201268	\$25.67
9		01/03/2012	FAK000520386	\$7.48
10		01/03/2012	FAK004987118	\$74.21
11		01/03/2012	FAK005460787	\$19.54
12		01/03/2012	FAK002736361	\$6.12

Please select out the stock rise at least 3.5% for 3 consecutive days in this month.

### 2. Tip










Rough train of thought: Sort the record by code and date, and group by the stock code. Thus, you will get a monthly price list of a stock. In this way, you can easily compute the rate of ups and downs for each stock. By comparing the rate of ups and downs, you can judge if the stock rises to the specified rate, and make the final statistics on stocks rising to the specified rate for 3 consecutive days.

1. First, add 2 columns to the cellset to calculate the rate of ups and downs comparing with that of the previous day, and the consecutive days of rising.
2. Sort by code and date in the table. The purpose of this operation is to guarantee the grouped sequence in the step followed. In each group, the data is sorted by date.
3. Group by stock code in the table. Because the table is already sorted by code, no sorting will be performed again.
4. For each record in each group, work out the rate of ups and downs. Please note if this is the first record in the group, then there will be no previous record. The rise and drop shall be taken as 0.
5. For each record in each group, calculate the consecutive days of rising at least 3.5%. Then work out the max consecutive days in each group.
6. Select the stock rising at least 3.5% for consecutive 3 days for once or above times, and retrieve the code.

### 3. Solution

1. Add Columns

A	B	C
DT	CODE	CL
11/03/2012	FAK006582873	
11/03/2012	FAK005299633	
11/03/2012	FAK008326818	
11/03/2012	FAK002611906	
11/03/2012	FAK000953025	
11/03/2012	FAK005977188	
11/03/2012	FAK008201268	
11/03/2012	FAK000520386	
11/03/2012	FAK004987118	
11/03/2012	FAK005460787	

 Copy	Ctrl-C
 Paste	Ctrl-V
 Property	
 Autosize	
 Hide	
 Show	
 Insert column	
 Append column	Ctrl-I
 Remove column	

2. Sort



0	1	A	B	C	D	E
1-	1	DT	CODE	CL		
	2	01/03/2012	FAK006582873	\$21.48		
	3					
	4					
	5					
	6					
	7					
	8					
	9					
	10					
	11					
	12					
	13					
	14					

**Sort**

Cell	Asc
B2	<input checked="" type="checkbox"/>
A2	<input checked="" type="checkbox"/>

Action scope

☒ Work scope
 ☐ Under parent row

☐ Use Locale

### 3. Group

0	1	A	B	C	D	E
1-	1	DT	CODE	CL		
	2	01/03/2012	FAK000168643	\$83.51		
	3	01/04/2012				
	4	01/05/2012				
	5	01/06/2012				
	6	01/09/2012				
	7	01/10/2012				
	8	01/11/2012				
	9	01/12/2012				
	10	01/13/2012	FAK000168643	\$107.85		

**Group**

☐ Sort before group

☐ Use Locale

☐ Regroup

### 4. Calculate rate of rise

0	1	2	A	B	C	D	E
1-		1	DT	CODE	CL		
	1-	2		FAK000168643			
		3	01/03/2012	FAK000168643	\$83.51		
		4	01/04/2012	FAK000168643	\$84.46	=if(##=1,0,(C4-C3)/C3)	
		5	01/05/2012	FAK000168643	\$82.54		

### 5. Calculate the consecutive days



0	1	2	A	B	C	D	E
1-		1	DT	CODE	CL		
	1-	2		FAK000168643			
	1	3	01/03/2012	FAK000168643	\$83.51	0.00%	
	1	4	01/04/2012	FAK000168643	\$84.46	1.14%	=if(D4<0.035,0,E3+1
	1	5	01/05/2012	FAK000168643	\$82.54	-2.27%	

6. Calculate the maximum consecutive days in each group

0	1	2	A	B	C	D	E
1-		1	DT	CODE	CL		
	1-	2		FAK000168643			=({E3}.max())
	1	3	01/03/2012	FAK000168643	\$83.51	0.00%	0
	1	4	01/04/2012	FAK000168643	\$84.46	1.14%	0
	1	5	01/05/2012	FAK000168643	\$82.54	-2.27%	0

7. Shrink and Filter

0	1	2	A	B	C	D	E
1-		1	DT	CODE	CL		
	1+	2		FAK000168643			3
	1+	23		FAK000172313			1
	1+	44					
	1+	65					
	1+	86					
	1+	107					
	1+	128					
	1+	149					
	1+	170					
	1+	191					
	1+	212					
	1+	233					
	1+	254					
	1+	275					

Filter

Condition

☒ Cell value
 >= 3

☐ Expression
 @>=3

Action to unsatisfied band

☒ Delete
 ☐ Hide

Action scope

☒ Work scope
 ☐ Under parent row

OK

Cancel

Show

## 4. Result

0	1	2	A	B	C	D	E
1-		1	DT	CODE	CL		
	1+	2		FAK000168643			3
	1+	23		FAK003063678			3
	1+	44		FAK004164455			3

## 3. Prepare the Olympic Games Gold Medal List

### 1. Problem

The tables below records a game data of a certain Olympic Games.

The **Country** table is as given below:

0	1		A	B
1-		1	Code	Nation
	1	2	AFG	Afghanistan
	1	3	AHO	Netherlands Antilles
	1	4	ALB	Albania
	1	5	ALG	Algeria
	1	6	AND	Andorra
	1	7	ANG	Angola
	1	8	ANT	Antigua and Barbuda
	1	9	ARG	Argentina
	1	10	ARM	Armenia
	1	11	ARU	Aruba

The **Athlete** table records the country of each athlete, as given below:

0	1		A	B	C	D
1-		1	ID	Name	Country	Gender
	1	2	922	Rohullah Nikpai	AFG	M
	1	3	443	Churandy Martina	AHO	M
	1	4	131	Romela Begaj	ALB	F
	1	5	61	Soraya Haddad	ALG	F
	1	6	263	Amar Benikhlef	ALG	M
	1	7	7	Paula Pareto	ARG	F
	1	8	852	Juan Curuchet	ARG	M
	1	9	976	Santiago Lange  Carlos Espinola	ARG	M
	1	10	1060	Argentina Women's hockey Team	ARG	F
	1	11	1112	Argentina Men's football Team	ARG	M

The **MatchResult** table records the results of matches, as given below:



0	1	A	B	C	D	E
1-	1	Competition	Event	Athlete	Score	Rank
1	2	Cycling	Men's road race	1	06:23:49	1
1	3	Cycling	Men's road race	3	06:23:49	2
1	4	Cycling	Men's road race	4	06:23:49	3
1	5	Judo	Women's 48 kg	5	1	1
1	6	Judo	Women's 48 kg	6	2	2
1	7	Judo	Women's 48 kg	7	3	3
1	8	Judo	Women's 48 kg	8	3	3
1	9	Judo	Men's 60 kg	9	1	1
1	10	Judo	Men's 60 kg	10	2	2
1	11	Judo	Men's 60 kg	11	3	3

Please make the gold medal list for the current Olympics Games, including the numbers of gold medals, silver medals, and bronze medals of each country/district respectively; sort the list by the number of gold medals and display the ranking. Please note that two or more countries may be in a tie in placing.

## 2. Tip

Rough train of thought: First, associate Ranking with CountryCode by join the CountryCode of the athletes in the Athlete table with the corresponding AthleteID in the MatchResult table, and then replacing the values of the CountryCode with corresponding Country/Region names in the Country table. After that, group the MatchResult table by Country/Region, and count the numbers of gold medals, silver medals, and bronze medals won by countries respectively. Then sort the groups composed of three variables: the number of gold medals, the number of silver medals, and the number of bronze medals.

1. Append two columns in the MatchResult cellset to fill in the Country Code and Name.
2. Set ID as the master cell in the Athlete table, and set Athlete as the master cell in the MatchResult table. Then fill in the corresponding CountryCode in the result by join operation.
3. Set Code as the master cell in the Country table, and reset the CountryCode as the master cell in the MatchResult table. Then fill in the corresponding CountryName in the result by join operation.
4. Group the MatchResult table by Country.
5. Count the numbers of gold medals, silver medals, and bronze medals won by countries respectively.
6. Sort the groups composed of three variables (keywords): the number of gold medals, the number of silver medals, and the number of bronze medals.
7. Calculate the ranking.

## 3. Solution

1. Add Columns



B	C	
Event	Athlete	Score
Men's road race	1	06:23:49
Men's road race	3	06:23:49
Men's road race	4	06:23:49
Women's 48 kg	5	
Women's 48 kg	6	
Women's 48 kg	7	
Women's 48 kg	8	
Men's 60 kg	9	
Men's 60 kg	10	
Men's 60 kg	11	

- Copy Ctrl-C
- Paste Ctrl-V
- Property
- Autosize
- Hide
- Show
- Insert column
- Append column Ctrl-I
- Remove column

2. Fill in the CountryCode by Join

0	1	A	B	C	D
1-	1	ID	Name	Country	Gender
	2	922	Rohullah Nikpai	AFG	M
	3	443	Churandy Martina	ANT	M

0	1	A	B	C	D	E	F	G
1-	1	Competition	Event	Athlete	Score	Rank	Code	Country
	2	Cycling	Men's road race	1	06:23:49	1		
	3	Cycling						
	4	Cycling						
	5	Judo						
	6	Judo						
	7	Judo						
	8	Judo						
	9	Judo						

**Join**

☒ Left join

☐ Full join

OK

Cancel

3. Fill in the Country/Region Name by Join

0	1	A	B
1-	1	Code	Nation
	2	AFG	Afghanistan
	3	AHO	Netherlands Antilles

0	1	A	B	C	D	E	F	G
1-	1	Competition	Event	Athlete	Score	Rank	Code	Country
	2	Cycling	Men's road race	1	06:23:49	1	ESP	
	3						SUI	
	4						RUS	
	5						ROU	
	6						CUB	
	7						ARG	
	8						JPN	
	9	Judo	Men's 60 kg	9		1	KOR	

**Join**
☒ Left join
 ☐ Full join
 OK
Cancel

#### 4. Group

0	1	A	B	C	D	E	F	G
1-	1	Competition	Event	Athlete	Score	Rank	Code	Country
	2	Cycling	Men's road race	1	06:23:49	1	ESP	Spain
	3	Cycling	Men's road race	3	06:23:49	2	SUI	Switzerland
	4	Cycling	Men's road race					
	5	Judo	Women's 52 kg					
	6	Judo	Women's 52 kg					
	7	Judo	Women's 52 kg					
	8	Judo	Women's 52 kg					
	9	Judo	Men's 60 kg					
	10	Judo	Men's 60 kg					
	11	Judo	Men's 60 kg	11		3	UZB	Uzbekistan
	12	Judo	Men's 60 kg	12		3	AFG	Afghanistan

**Group**
☒ Sort before group
 ☐ Use Locale
 ☐ Regroup
 OK
Cancel

#### 5. Calculate the numbers of medals

0	1	2	A	B	C	D	E	F	G
1-		1	Competition	Event	Athlete	Score	Rank	Code	Country
	1-	2		=({E3}.count(~==1))					Afghanistan
		3	Taekwondo	Men's 58 kg	922	3	3	AFG	Afghanistan
	1-	4							Albania
		5	Weightlifting	Women's 58 kg	131	216	6	ALB	Albania
	1-	6							Algeria
		7	Judo	Women's 52 kg	61	3	3	AFG	Algeria

#### 6. Shrink and Sort



0	1	2	A	B	C	D	E	F	G
1		1	Competition	Event	Athlete	Score	Rank	Code	Country
2-		2	Rank	Gold	Silver	Bronze			Country
	1+	3		0	0	1			Afghanistan
	1+	5							
	1+	7							
	1+	10							
	1+	17							
	1+	24							
	1+	90							
	1+	99							
	1+	108							
	1+	112							
	1+	115							
	1+	144							
	1+	150							
	1+	172							

**Sort**

Cell	Asc
B3	<input type="checkbox"/>
C3	<input type="checkbox"/>
D3	<input type="checkbox"/>

Action scope

☒ Work scope ☐ Under parent row

☐ Use Locale

OK Cancel Up Down

7. Calculate the Rank

A131 =if(B131==B3&&C131==C3&&D131==D3,A3,#)

0	1	2	A	B	C	D	E	F	G
1		1	Competition	Event	Athlete	Score	Rank	Code	Country
2-		2	Rank	Gold	Silver	Bronze			Country
	1+	3		51	21	28			China
	1+	131		36	38	36			United States
	1+	268		23	21	29			Russia
	1+	381		19	13	15			Great Britain
	1+	445		16	10	15			Germany
	1+	507		14	15	17			Australia

## 4. Result



0	1	2	A	B	C	D	E	F	G
2-		2	Rank	Gold	Silver	Bronze			Country
1+		3	1	51	21	28			China
1+		131	2	36	38	36			United States
1+		268	3	23	21	29			Russia
1+		381	4	19	13	15			Great Britain
1+		445	5	16	10	15			Germany
1+		507	6	14	15	17			Australia
1+		573	7	13	10	8			South Korea
1+		611	8	9	6	10			Japan
1+		650	9	8	9	10			Italy
1+		694	10	7	16	18			France
1+		750	11	7	5	15			Ukraine

## 4. Compute The Tax Amount Of Employees

### 1. Problem

The finance department of an enterprise needs to estimate the staff tax of 2012. To compute the tax, **firstly**, compute the **FICA** (Federal Insurance Contributions Act) **tax** base on the employees' **AGI** (Adjusted Gross Income). The detail rule is as follows:

Social Security portion:  $\text{if}(\text{AGI} > 110100, 110100 * 4.2\%, \text{AGI} * 4.2\%)$

Medicare portion:  $\text{AGI} * 1.45\%$

**Second**, compute the **Federal income tax**. The computation method of Federal income tax is a bit complicated: deduct **Standard Deduction** and **Personal Exemption** from the income, and the remaining part is the **Taxable Income** base for which the tax will be calculated according to the **tax bracket**.

The standard deduction will be calculated according to the employees' AGI and **Filing Status**:

ID	Filing Status	StatusID	Standard Deduction
1	Single	1	5950
2	Married Filing Jointly	2	11900
3	Married Filing Separately	3	5950
4	Head of Household	4	8700

The personal exemption is:

$\$3800 * \text{household size}$

The tax rate of each period is as given below:



0	1	A	B	C	D	E
1-	1	StatusID	Over	But Not Over	Tax Rate(%)	Tax Plus
	2	1	0	8700	10	0
	3	1	8700	35350	15	870
	4	1	35350	85650	25	4867.5
	5	1	85650	178650	28	17442.5
	6	1	178650	388350	33	43482.5
	7	1	388350		35	112683.5
	8	2	0	17400	10	0
	9	2	17400	70700	15	1740
	10	2	70700	142700	25	9735
	11	2	142700	217450	28	27735
	12	2	217450	388350	33	48665

For example, suppose a single employee's adjusted gross income is 50000 dollars, . Subtracting 5950 dollars of the standard deduction, and 3800 dollars of the personal exemption, the taxable income is 40250. According to the tax brackets, the total federal income tax is:

$$(40250-35350)*25%+(35350-8700)*15%+8700*10%=6092.5 \text{ dollars}$$

You can also compute in another way:

$$(40250-35350)*25%+4867.5=6092.5 \text{ dollars}$$

After the calculation of total federal income tax, we will calculate the tax credits. The **Child Tax Credit** is a credit up to \$1,000 per qualifying child for families making less than \$130,000, and the total credit decreases by \$50 for each \$1,000 earned above \$110,000. The **Child and Dependent Care Credit**, the maximum creditable expense available is \$6,000, and the applicable percentage is 20% to 35%, the credit is reduced by one percentage point for each \$2,000 of AGI over \$15,000.

Subtracting the tax credits from the previous total federal income tax, we will get the actual federal income tax.

The table below is the employee information table of the enterprise:





0	1	A	B	C	D	E	F	G
1-	1	ID	Name	Gender	Children	Filing Status	AGI	Child and Dependent Care
1	2	1	Roy Price	Male	2	2	122880	1000
1	3	2	Daniel Wilson	Male	1	2	134000	0
1	4	3	Jerry Wilson	Male	1	2	62800	0
1	5	4	Roger Lee	Male	0	2	98000	0
1	6	5	James Gonzalez	Male	0	1	50630	0
1	7	6	Elizabeth Morris	Female	0	1	60000	0
1	8	7	David Cox	Male	0	1	47230	0
1	9	8	Harold Evans	Male	0	1	55080	0
1	10	9	Mildred Lopez	Female	0	1	41030	0
1	11	10	Charles Gonzalez	Male	1	2	138000	100
1	12	11	Kenneth Thomas	Male	0	1	44370	0

Please estimate the tax amount for every employee, and export the result as a TXT file for the bank. The format of TXT file should be:

COUT= *Number of employee*

-----  
*Tax Count | AGI | Name*

*Tax Count | AGI | Name*

## 2. Tip

Rough train of thought:

1. Create a new .gex file based on the existing files.
2. Append a slave row in the employee's band, to calculate the tax.
3. Compute the FICA tax of each employee directly.
4. Compute the standard deduction by the filing status ID.
5. Compute the personal exemption.
6. Then compute the taxable income of each employee.
7. Compute the total federal income tax for every employee. Firstly, find the bracket to which the employee belongs; secondly, calculate the total federal income tax.
8. Compute the tax credits: the child credit and the child and dependent care credit.
9. Compute the actual federal income tax.
10. Compute the tax amount.
11. Calculate the output string of each employee and the number of employees.
12. Create a TXT file

## 3. Solution

1. Copy all data into a new .gex file



0	1	A	B	C	D	E	F	G
1+	1	SID	Over	But Not Over	Tax Rate(%)	Tax		
2+	26	SID	Standard Deduction					
3-	31	ID	Name	Gender	Children	Filing Status	AGI	Child and Dependent Care
1	32	1	Roy Price	Male	2	2	122880	1000
1	33	2	Daniel Wilson	Male	1	2	134000	0
1	34	3	Jerry Wilson	Male	1	2	62800	0
1	35	4	Roger Lee	Male	0	2	98000	0
1	36	5	James	Male	0	1	50630	0
1	37	6	Elizabeth	Female	0	1	60000	0
1	38	7	David Cox	Male	0	1	47230	0
1	39	8	Harold Evans	Male	0	1	55080	0
1	40	9	Mildred Lopez	Female	0	1	41030	0

2. Append a slave row

3-	31	ID	Name	Gender	Children	Filing Status	AGI	Child and Dependent Care
1	32	1	Roy Price	Male	2	2	122880	1000
2	33							
1	34	2	Daniel Wilson	Male	1	2	134000	0
2	35							

3. The FICA tax

B33

=

=F32\*0.0145

D:\files\gex\Cases\Ca04a.gex

0	1		A	B	C	D	E	
		32	1	Roy Price	Male	2	2	12
		33	1624					

4. The standard deduction

C33

=

=(B27)\*(E32)

D:\files\gex\Cases\Ca04a.gex

0	1		A	B	C	D	E	
	1	32	1	Roy Price	Male	2	2	12
	2	33	4624	1782				

5. The personal exemption

D33

=

=3800\*(D32+if(E32=2,2,1))

D:\files\gex\Cases\Ca04a.gex

0	1	A	B	C	D	E	
	32	1	Roy Price	Male	2	2	122880
	33		4624	1782	11900		

6. The taxable income

E33 = =F32-C33-D33

D:\files\gex\Cases\Ca04a.gex

0	1		A	B	C	D	E
1	32	1	Roy Price		Male	2	2
2	33		4624	1782	11900	15200	

7. The total federal income tax

F33 = =(x={B2}(to(E32\*6-5,E32\*6)).pselect@z(E33>~),p=E32\*6+x-6,(E33-{B2}(p))\*(D2)(p)/100+(E2)(p))

D:\files\gex\Cases\Ca04a.gex

0	1		A	B	C	D	E	F	G
1	32	1	Roy Price		Male	2	2	122880	1000
2	33		4624	1782	11900	15200	95780		
3	34	2	Daniel Wilson		Male	1	2	134000	0

8. The tax credits

H33 = =(amount=if(F32>=130000,0,1000\*D32),desc=if(F32>110000&&F32<130000,ceil((F32-110000)/1000)\*50,0),amount-desc)

D:\files\gex\Cases\Ca04a.gex

0	1		C	D	E	F	G	H	I
1	32		Male	2	2	122880	1000		
2	33		11900	15200	95780	16005	200		

9. The actual federal income tax

I33 = =C33+D33+F33-G33-H33

D:\files\gex\Cases\Ca04a.gex

0	1		C	D	E	F	G	H	I
1	32		Male	2	2	122880	1000		
2	33		11900	15200	95780	16005	200	1350	

10. Calculate the employee info

H32-I32 = =string(int(I33))+ " | "+string(F32)+ " | "+B32

D:\files\gex\Cases\Ca04a.gex

0	1		C	D	E	F	G	H	I
31			Gender	Children	Filing Status	AGI	Child and Dependent Care		1000
32			Male	2	2	122880	1000		
33			11900	15200	95780	16005	200	1350	41555

11. Copy the employee info



AGI	Child and Dependent Care	1000	
122880	1000	1555	122880.1
16005	200	1350	
134000	0	43035	
19735	0	0	
62800	0	27355	
5055	0	1000	
98000	0	31185	
11685			

## 4. Result

COUT=1000		
-----		
41555	122880	Roy Price
43035	134000	Daniel Wilson
27355	62800	Jerry Wilson
31185	98000	Roger Lee
16000	50630	James Gonzalez
18342	60000	Elizabeth Morris
15150	47230	David Cox

# 5. Prepare Test Data for Sales Management System

## 1. Problem

To prepare the simulation data for a sales management system, you are required to generate 4 txt files with a table in each file (**test\_Sale** table, **test\_Client** table, **test\_Product** table, and **test\_Contract** table), the data requirement as given below:

The salesperson table of **test\_Sale** is structured as given below:

ID	Name	Education	State

In the table, there are 50 salesperson (Name and ID), 51 states (State, 50 states and DC), and 4 educational backgrounds (Education) of Senior High School, Associate Degree, Bachelor, and Master.

The client table of **test\_Client** is structured as given below:

ID	Name	Contact	Address	Phone

There are 200 client records in the table.

The product table of **test\_Product** is structured as given below:

ID	Name	UnitPrice

There are records about 20 types of products in the table.

The contract table of **test\_Contract** is structured as given below:

ContractNo.	Client	Product	Sale	SellDate	Quantity

There are 10000 sales records for the whole year of 2011.

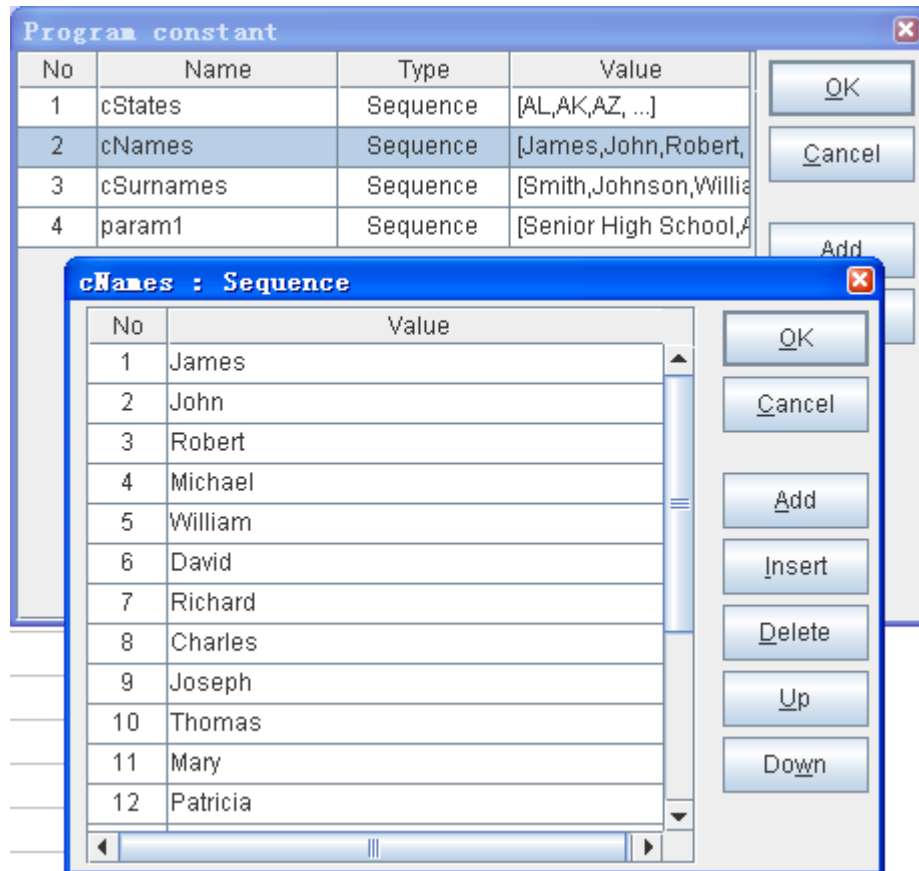
## 2. Tip

Rough train of thought: There are two key problems on constructing the test data: first, how to input mass of data, second, how to guarantee that the randomness of data to be inserted. You can use the **Expand** operation and the expression in the homocells of esCalc to solve the first problem and the rand function to solve the second problem.

1. Define 4 cellset constants: **cStates**, **cNames**, **cSurnames**, and **cEducation**, cStates is the sequence of state abbreviations, cNames is the sequence of 20 common names, cSurname is the sequence of 20 common surnames, and cEducation is the sequence of 4 educational backgrounds.
2. Construct a **test\_Sale** slave row. In its subrows, the **ID** values can be expanded from a ISeq which is from 1 to 50. The **Name** values are calculated by the expression in the homocells which is just select out a name and a surname randomly then concatenated them. The values of the **Education** and **State** fields are randomly selected from cStates and cEducation by calling the rand function.
3. Construct a **test\_Client** slave row. In its subrows, the **ID** values are expanded from a ISeq from 1 to 200; the values of the **Name** field are just concatenated character strings and ID; the values of the **Contact** and **Address** fields are not important so you can just use multiple "-" as values. Similarly, the values of the **Phone** field are not important either, and they can be any numbers.
4. Construct a **test\_Product** slave row. In its subrows, the rule for **ID** and **Name** values are similar to **test\_Client**. The value of the Price field is generated by calling the rand function, taking 1000 as the lower limit so as to increase the sense of reality.
5. Construct a **test\_Contract** slave row. In its subrows, the values of **ID** are sequence numbers. The values of the **Client**, **Product**, and **Sales** fields are picked randomly with the rand function from the above tables generated along with the **ID** field values retrieved. The values of the **SellDate** field can be generated with the relDate and rand functions to guarantee that the values are for the year of 2011. The values of the **Quantity** field are randomly picked out within a certain range. In this case, they are picked from 1 to 5.
6. Copy the corresponding data to the new calculation cellsets, and save these files as txt format.

### 3. Solution

1. Define cellset constants



The screenshot shows two overlapping dialog boxes from the RAQSOFT software. The background dialog is titled 'Program constant' and contains a table with four columns: 'No', 'Name', 'Type', and 'Value'. It lists four constants: 'cStates' (Sequence, [AL,AK,AZ, ...]), 'cNames' (Sequence, [James,John,Robert, ...]), 'cSurnames' (Sequence, [Smith,Johnson,Willia...]), and 'param1' (Sequence, [Senior High School,A...]). The 'cNames' row is selected. Overlaid on top of this is a smaller dialog titled 'cNames : Sequence'. This dialog has a table with two columns: 'No' and 'Value'. It lists 12 names: James, John, Robert, Michael, William, David, Richard, Charles, Joseph, Thomas, Mary, and Patricia. To the right of the 'cNames : Sequence' table are several buttons: 'OK', 'Cancel', 'Add', 'Insert', 'Delete', 'Up', and 'Down'.

No	Name	Type	Value
1	cStates	Sequence	[AL,AK,AZ, ...]
2	cNames	Sequence	[James,John,Robert, ...]
3	cSurnames	Sequence	[Smith,Johnson,Willia...]
4	param1	Sequence	[Senior High School,A...]

No	Value
1	James
2	John
3	Robert
4	Michael
5	William
6	David
7	Richard
8	Charles
9	Joseph
10	Thomas
11	Mary
12	Patricia

2. Construct data of **test\_Sale**

Expand the **ID** values

A2 = =to(1,50)

D:\files\gex\Cases\Ca05a.gex

0	1		A	B	C	D	E	F
1-		1	ID	Name	Education	State		
		2	1,2,3,4,5,6,7					
2-		3				ss	Phone	
		4						
3-		5						
		6						
4-		7	Cor					Quantity
		8						

Context menu options:

- Set/Cancel work scope
- Select homocell
- Copy (Ctrl-C)
- Homocell copy (Ctrl+Alt-C)
- Paste (Ctrl-V)
- Homocell paste (Ctrl+Alt-V)
- Band paste (Ctrl-B)
- Cell
- Homocell
- Structure
- Band
- Operation
- Quick operation
- Expand
- Locate
- Filter
- Distinct
- Sort
- Group
- Align
- Join
- Union
- Annex

Calculate the **Name** values

B2 = =cNames(int(rand()\*20+1))+ " "+cSurnames(int(rand()\*20+1))

D:\files\gex\Cases\Ca05a.gex

0	1		A	B	C	D	E	F
1-		1	ID	Name	Education	State		
		2	1					
		3	2					

Calculate the **Education** values

C2 = =cEducation(int(rand()\*4+1))

D:\files\gex\Cases\Ca05a.gex

0	1		A	B	C	D	E	
1-		1	ID	Name	Education	State		
		2	1	Barbara Wilson				
		3	2	Barbara Taylor				

Calculate the **State** values

D2 = =c\$states(int(rand()\*51+1))

0	1		A	B	C	D	E
1-	1		ID	Name	Education	State	
	2		1	Barbara Wilson	Bachelor		
	3		2	Barbara Taylor	Bachelor		

### 3. Construct data of test\_Client

B53 = ="Client"+string(A53)

0	1		A	B	C	D	E	F
1+	1		ID	Name	Education	State		
2-	52		ID	Name	Contact	Address	Phone	
	53		1					
	54		2					

E53 = =string(int(200+rand()\*800))+ "-" +string(int(100+rand()\*900))+ "-" +string(int(1000+rand()\*9000))

0	1		A	B	C	E
1+	1		ID	Name	Education	State
2-	52		ID	Name	Contact	Address
	53		1	Client1	-----	-----
	54		2	Client2	-----	-----
	55		3	Client3	-----	-----

### 4. Construct data of test\_Product

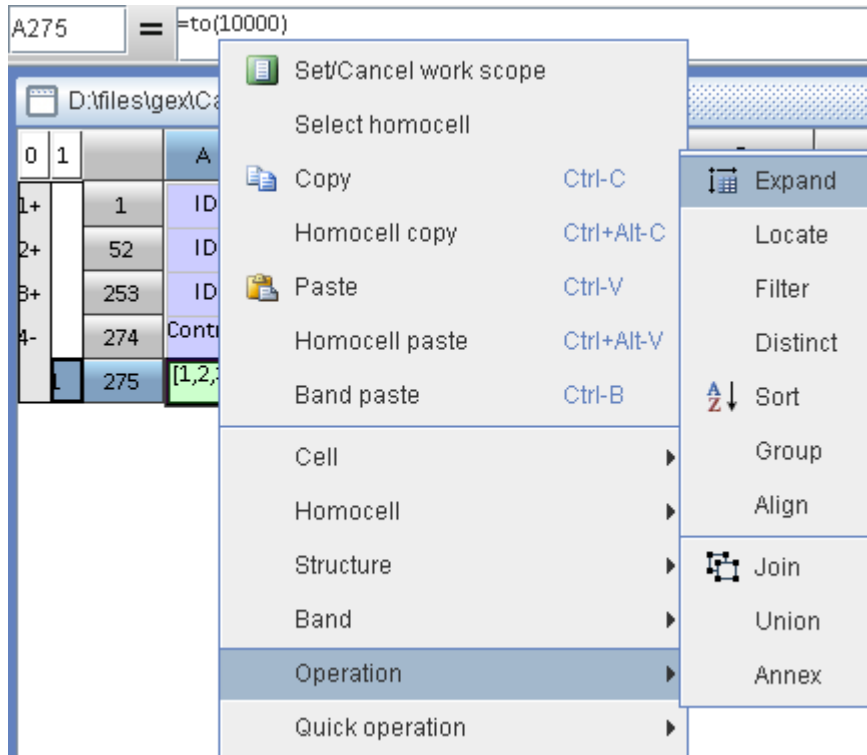
C254 = =int(rand()\*90)\*100+1000

0	1		A	B	C	D
1+	1		ID	Name	Education	Sta
2+	52		ID	Name	Contact	Add
3-	253		ID	Name	UnitPrice	
	254		1	Product1		
	255		2	Product2		
	256		3	Product3		

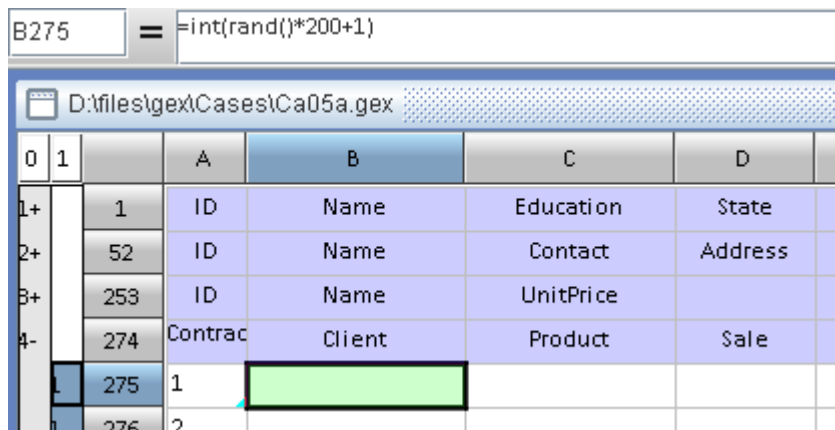
### 5. Construct data of test\_Contract

Expand the **ID** values

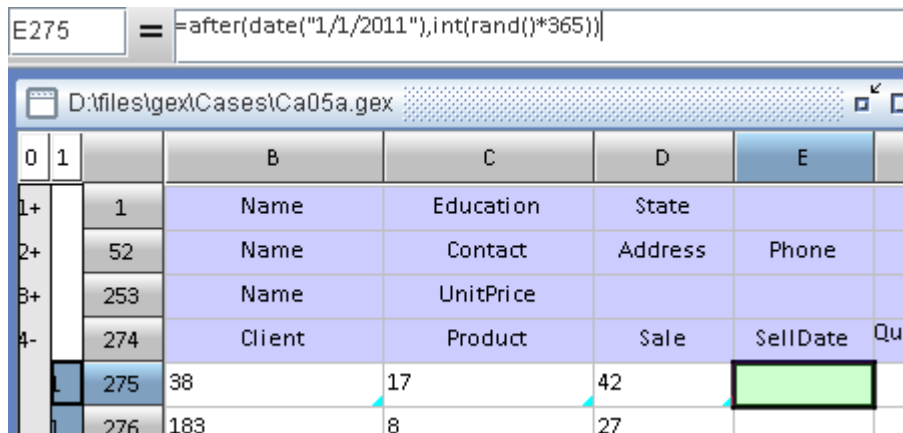




Calculate the **Client** ID values



Calculate the **SellDate** values



Calculate the **Quantity** values

F275 =int(rand()\*5)+1

D:\files\gex\Cases\Ca05a.gex

0	1		C	D	E	F
1+		1	Education	State		
2+		52	Contact	Address	Phone	
3+		253	UnitPrice			
4-		274	Product	Sale	SellDate	Quantity
		275	17	42	02/22/2011	
		276	8	27	12/15/2011	

6. Copy the corresponding data and save as txt format

0	1		A	B	C	D
1-		1	ID	Name	Education	State
		2				

Set/Cancel work scope

Select homocell

Copy Ctrl-C

Homocell copy Ctrl+Alt-C

Paste Ctrl-V

Homocell paste Ctrl+Alt-V

Band paste Ctrl-B

Cell

File	Edit	Structure	Data	Operation	Tool	Window	Help
New Ctrl-N							
Open Ctrl-O							
Open file in other format							
Duplicate Ctrl-F4							
Close							
Close all							
Save Ctrl-S							
Save as							
Save as other format							
Save all							
Page setup							
Print							

Text

Excel

HTML

## 4. Result

(Since data are picked randomly, the data generated after each run may vary.)

The test\_Sale table is as below:

ID	Name	Education	State
1	Barbara Wilson	Bachelor	SD
2	Barbara Taylor	Bachelor	OR
3	Elizabeth Thomas	Senior High School	AZ
4	Thomas Jackson	Associate Degree	SC
5	Michael Miller	Senior High School	NM
6	Dorothy Jackson	Bachelor	NE
7	William Wilson	Master	SD
8	Richard Thomas	Associate Degree	RI

The test\_Client table is as below:

ID	Name	Contact	Address	Phone
1	Client1	-----	-----	624-984-7478
2	Client2	-----	-----	303-667-5228
3	Client3	-----	-----	681-285-9168
4	Client4	-----	-----	646-733-4792
5	Client5	-----	-----	357-678-9947
6	Client6	-----	-----	938-630-8245
7	Client7	-----	-----	731-248-2369
8	Client8	-----	-----	627-636-1307

The test\_Product table is as below:

ID	Name	UnitPrice
1	Product1	7400
2	Product2	2900
3	Product3	3900
4	Product4	9700
5	Product5	2700
6	Product6	4600
7	Product7	1500
8	Product8	3700

The test\_Contract table is as below:

ContractNo.	Client	Product	Sale	SellDate	Quantity
1	38	17	42	02/22/2011	2
2	183	8	27	12/15/2011	1
3	19	17	11	05/09/2011	4
4	81	18	25	05/22/2011	1
5	113	16	33	03/06/2011	1
6	46	5	38	07/01/2011	1
7	106	4	4	01/13/2011	3
8	4	2	43	09/12/2011	2
9	105	14	34	09/10/2011	3

## 6. Mean Period between the Same Customer Buy an F-Series Pickup and an

# Escape Sedan

## 1. Problem

The **Ford** table is used to list the auto sales records:

Customer	Model	Date
F001963	Fiesta	01/01/2001
F008548	Fusion	01/03/2001
F006781	Fusion	01/04/2001
F004066	F - Series	01/05/2001
F003249	F - Series	01/06/2001
F002981	Crown Victoria	01/06/2001
F002198	Escape	01/06/2001
F004353	F - Series	01/06/2001
F007124	Crown Victoria	01/06/2001
F003677	Focus	01/08/2001
F003410	Escape	01/08/2001
F008476	Fusion	01/09/2001
F003694	F - Series	01/10/2001

Please find customers who had bought an F-Series pickup before the purchase of an Escape sedan, and calculate the average interval of the two buys for these customers.

## 2. Tip

1. Filter the transaction records; retain the records of "F - Series" and "Escape".
2. Sort the records in the table by **Customer** and **Date**;
3. Calculate the interval between the Date value of the current record and that of the previous record in column D, the interval will be set to zero unless the records satisfy the following conditions:
  - i. The value of **Customer** of the current record is identical to that of the previous record;
  - ii. The value of **Model** of the previous record is F - Series;
  - iii. The value of **Model** of the current record is Escape.
4. Filter the records; retain the records whose interval is greater than zero.
5. Calculate the average of the intervals.

## 3. Solution

1. Filter



**Filter**

Condition

☐ Cell value == F - Series

☒ Expression series" || @=="Escape" ...

Action to unsatisfied band

☒ Delete ☐ Hide

Action scope

☒ Work scope ☐ Under parent row

OK Cancel Show

0	1		A	B	C	D
1-		1	Customer	Model	Date	
		2	F004066	F - Series	01/05/2001	
		3	F003249	F - Series	01/06/2001	
		4	F002198	Escape	01/06/2001	
		5	F004353	F - Series	01/06/2001	
		6	F003410	Escape	01/08/2001	
		7	F003694	F - Series	01/10/2001	
		8	F003489	F - Series	01/10/2001	

## 2. Sort

**Sort**

Cell	Asc
A2	<input checked="" type="checkbox"/>
C2	<input checked="" type="checkbox"/>

Action scope

☒ Work scope ☐ Under parent row

☐ Use Locale

OK Cancel Up Down



0	1		A	B	C	D
1-		1	Customer	Model	Date	
		2	F001007	F - Series	12/15/2007	
		3	F001009	F - Series	07/27/2009	
		4	F001013	F - Series	08/21/2001	
		5	F001015	F - Series	04/27/2008	
		6	F001029	F - Series	03/13/2006	
		7	F001037	Escape	04/13/2007	
		8	F001046	Escape	03/29/2005	

### 3. Calculate the intervals

D3 = =if(A2==A3&&B2=="F - Series"&&B3=="Escape",interval(C2,C3),0)

D:\files\gex\Cases\Ca06c.gex

0	1		A	B	C	D
1-		1	Customer	Model	Date	
		2	F001007	F - Series	12/15/2007	0
		3	F001009	F - Series	07/27/2009	0
		4	F001013	F - Series	08/21/2001	0

### 4. Filter the records by interval

**Filter**

Condition

☒ Cell value > 0

☐ Expression @>0

Action to unsatisfied band

☒ Delete ☐ Hide

Action scope

☒ Work scope ☐ Under parent row

OK Cancel Show

0	1		A	B	C	D
1-		1	Customer	Model	Date	
		2	F001096	Escape	09/01/2010	1361
		3	F001108	Escape	09/21/2006	1343
		4	F001197	Escape	02/11/2003	301
		5	F001245	Escape	07/17/2003	750
		6	F001289	Escape	06/28/2009	1870
		7	F001496	Escape	12/10/2005	1435
		8	F001556	Escape	01/22/2005	153



#### 5. Calculate the average

	A	B	C	D
1	Customer	Model	Date	
2	F001096	Escape	09/01/2010	1361
3	F001108	Escape	09/21/2006	1343

## 4. Result

D
1162.433333

# 7. Commodity of Out-of-Inventory in a Month

## 1. Problem

The tables below are from a simplified supermarket stock control system. To check if the purchase policy is proper, the supermarket needs to find out the commodity with the longest cumulative out-of-inventory time in June, and the commodity run out of inventory by 5 p.m. for over 10 days in a month. The supermarket opens at 8 a.m. and closes at 9:30 p.m. The out-of-inventory time of non-business hours will not be counted. The desired tables are as follows:

The table below a commodity list is to record info of various commodities.

ID	Name	Type	Price
F8160	Dried Asian Pears	Fruits & Vegetables	\$8.99
W6365	Ecco Domani Moscato 2011	Wines	\$12.00
M7883	Fresh Salmon Steak	Meats and Seafoods	\$3.99
T7650	Illy Issimo Caffè Coffee Drink, (Pack of 6)	Tea and Coffee	\$51.46
W6396	Conundrum 2010	Wines	\$19.99
E0230	Olympus PEN E-PL3 Digital Camera	Electronics	\$699.00
B1770	Once Burned: A Night Prince Novel	Books	\$6.00
F7504	Antimo Caputo '00' Flour 2.2lb / 3 bags	Foods	\$9.27
B1628	Cracking the GRE, 2013 Edition	Books	\$13.19
H5028	Verona Wall Mirror, Dark Espresso	Household supplies	\$43.05
B1599	The Help	Books	\$11.00

The supermarket replenishes its stock at 5 a.m. every day as shown in the below purchase table which records the volume of every piece of commodity.



Datetime	CID	Volume
2012-06-01 05:00:00	A5883	5
2012-06-01 05:00:00	B1487	2
2012-06-01 05:00:00	B1599	4
2012-06-01 05:00:00	B1790	3
2012-06-01 05:00:00	B1945	2
2012-06-01 05:00:00	B2033	3
2012-06-01 05:00:00	B2096	1
2012-06-01 05:00:00	D7889	87
2012-06-01 05:00:00	D7890	18
2012-06-01 05:00:00	D7893	39
2012-06-01 05:00:00	D7911	84

The table below is about the remaining stock table by the last day of May:

Date	CID	Stock
2012-5-30	F8160	43
2012-5-30	W6365	26
2012-5-30	M7883	30
2012-5-30	T7650	19
2012-5-30	W6396	16
2012-5-30	E0230	0
2012-5-30	B1770	1
2012-5-30	F7504	21
2012-5-30	B1628	1
2012-5-30	H5028	0
2012-5-30	B1599	2

The table below is a detailed sales record of the supermarket:

Datetime	CID	Commodity	Volume
2012-06-01 08:02:20	W6241	Merus Cabernet Sauvignon 2006	1
2012-06-01 08:04:31	F6870	Saf Yeast	1
2012-06-01 08:07:12	F8268	Chives per LB.	1
2012-06-01 08:07:27	M7820	Muscovy Duck Hens 4.lb	2
2012-06-01 08:09:07	M7809	All Natural Pork Loin Crown Rib Roast	2
2012-06-01 08:10:07	F6966	Jolly Rancher Fruit Chews 12 Count Box	2
2012-06-01 08:14:06	D7937	Grana Padano Parmigiano / pound	1
2012-06-01 08:14:11	F7061	Raw Sage Honey 24oz.	2
2012-06-01 08:15:09	M7791	Italian style Chicken Sausage 1b	3
2012-06-01 08:19:03	F8199	Daikon per LB.	1
2012-06-01 08:19:26	W6365	Ecco Domani Moscato 2011	2

## 2. Tips

Rough train of thought: First, create a esCalc grid A. Copy all transaction records into





the grid (product name can be left out), and calculate the inventory decrement. Delete the existing column of sales, and keep the format of sales band the same as the purchase band. Then, add the purchase bands to the same parent band. Sort all bands by the code of commodity and then group. Calculate the date of each band occurred, and group after sorting by the resulting date. To facilitate the computation, ensure that each category of commodity all includes the everyday data of June, and thus a new esCalc grid B is required to arrange the data. Homo copy the data of commodity categories from esCalc grid A and homo-paste them to the esCalc grid B. In B, add 30 sub-rows to the rows of commodity categories to ensure that all data of all days in the month are included at the date-grouping level. Add a blank sub-row under the date, and set the first cell as the master cell. Through the join operation, place the sales bands and purchase bands in A into the esCalc grid B, and then complete the computation in B. In the table of inventory data, set the code of commodity as the master cell, copy the inventory level data, and add it to the each commodity-grouping row in B through joining. In the daily grouping row, calculate the daily inventory balance and the number of transactions that day. Furthermore, in the daily grouping row, calculate the time when the commodity are all sold out that day (i.e. the inventory become 0), and check if the commodity are all sold out by the time of 5 P.M. that day. In the commodity-grouping row, calculate the cumulative time of out-of-inventory for each category of commodity. Once the commodities are sorted by the time of out-of-inventory, then you can get the result.

1. Create a new esCalc grid A, and homo-paste all transaction records to the grid without having to copy and paste the name of commodity
2. In column D, calculate the decrement resulting from the transaction
3. Delete column C to ensure that the transaction bands and the purchase bands are in the same format
4. Add a blank band after all sales bands, copy the purchase records, and homo-paste them after selecting the cells.
5. Group by the code of commodity, and select to sort before grouping
6. In column D, calculate the day of the month of each purchase and sale occurs
7. Group by date, and select to sort before grouping
8. Create a new esCalc grid B, homo-copy the data of commodity-grouping row from A to B through the homo-paste
9. In B, prepare the bands of each category of commodity of the 30 days and expand
10. In B, add a blank sub-row under the date, and set the first cell as the master cell
11. Copy the transaction bands in A, then, through the join operation, place it to the esCalc grid B
12. Filter in B, and then delete the blank sub-row
13. Set the code of commodity in the table of inventory as the master cell, copy the inventory data, join, and then paste it to the commodity-grouping row in B
14. In B, in the daily grouping row, calculate the daily inventory balance, number of purchases or sales in that day.
15. In B, calculate the time when the commodities were all sold out that day (only



count those whose inventory balance becomes 0 that day). If no purchase or sales occurred that day, then take the total business hours as the out-of-inventory time (i.e. 11.5 hours). Otherwise, take the time when the last transaction occurs for calculation.

16. Calculate and check if the commodity were all sold out by 5 p.m. that day (do not count until the inventory balance becomes 0 that day). If no purchase or sales occurred that day, then take the 5 p.m. as the time of out-of-inventory; otherwise, take the time when the last transaction occurs for calculation.
17. In the commodity-grouping row, calculate the cumulative time of out-of-inventory of each category of commodity and count the total times of out-of-inventory occurred by 5 p.m.
18. Set the code of commodity in the inventory table as the master cell. After the names of commodity are copied, join, and then paste the names of commodities to the commodity-grouping row
19. Retract the bands to the row of commodity-grouping, and sort by the cumulative time of out-of-inventory to get the answer to the problem 1
20. Sort by total times of out-of-inventory occurred by 5 p.m., and then filter to get the answer to the problem 2

### 3. Solution

1. Create a new esCalc grid A, and homo-paste all transaction record

0	1	A	B	C	D	E	F
1-	1						
1	2	2012-06-01 08:02:20	W6241	1			
1	3	2012-06-01 08:04:31	F6870	1			
1	4	2012-06-01 08:07:12	F8268	1			
1	5	2012-06-01 08:07:27	M7820	2			
1	6	2012-06-01 08:09:07	M7809	2			
1	7	2012-06-01 08:10:07	F6966	2			
1	8	2012-06-01 08:14:06	D7937	1			
1	9	2012-06-01 08:14:11	F7061	2			
1	10	2012-06-01 08:15:09	M7791	3			
1	11	2012-06-01 08:19:03	F8199	1			
		2012-06-01 08:19:06	W6365	2			

2. Calculate the inventory decrement due to the transaction. Once the calculation is finished, press Alt+Del to delete the formula in the column D



0	1		A	B	C	D	E	F
1-		1						
	1	2	2012-06-01 08:02:20	W6241	1	=C2		
	1	3	2012-06-01 08:04:31	F6870	1			
	1	4	2012-06-01 08:07:12	F8268	1			
	1	5	2012-06-01 08:07:27	M7820	2			
	1	6	2012-06-01 08:09:07	M7809	2			
	1	7	2012-06-01 08:10:07	F6966	2			
	1	8	2012-06-01 08:14:06	D7937	1			
	1	9	2012-06-01 08:14:11	F7061	2			
	1	10	2012-06-01 08:15:09	M7791	3			
	1	11	2012-06-01 08:19:03	F8199	1			
	1	12	2012-06-01 08:19:26	W6365	2			

### 3. Delete column C

0	1		A	B	C	D	E
1-		1					
	1	2	2012-06-01 08:02:20	W6241	-1		
	1	3	2012-06-01 08:04:31	F6870	-1		
	1	4	2012-06-01 08:07:12	F8268	-1		
	1	5	2012-06-01 08:07:27	M7820	-2		
	1	6	2012-06-01 08:09:07	M7809	-2		
	1	7	2012-06-01 08:10:07	F6966	-2		
	1	8	2012-06-01 08:14:06	D7937	-1		
	1	9	2012-06-01 08:14:11	F7061	-2		
	1	10	2012-06-01 08:15:09	M7791	-3		
	1	11	2012-06-01 08:19:03	F8199	-1		
	1	12	2012-06-01 08:19:26	W6365	-2		

### 4. Add a new band, copy the purchase bands, and then perform the homo-paste

1	20469	2012-06-30 21:24:	Paste	Ctrl-V
1	20470	2012-06-30 21:24:	Homocell paste	Ctrl+Alt-V
1	20471	2012-06-30 21:24:	Band paste	Ctrl-B
1	20472	2012-06-30 21:25:	Cell	▶
1	20473	2012-06-30 21:26:	Homocell	▶
1	20474	2012-06-30 21:26:	Structure	▶
1	20475	2012-06-30 21:27:	Band	▶
1	20476	2012-06-30 21:27:	Operation	▶
1	20477			
1	20478			



0	1		A	B	C	D	E
1	20471		2012-06-30 21:24:25	D7982	-1		
1	20472		2012-06-30 21:25:52	D7889	-3		
1	20473		2012-06-30 21:26:01	F8211	-2		
1	20474		2012-06-30 21:26:19	F7102	-1		
1	20475		2012-06-30 21:27:18	F7108	-1		
1	20476		2012-06-30 21:27:40	T7671	-2		
1	20477		2012-06-01 05:00:00	A5883	5		
1	20478		2012-06-01 05:00:00	B1487	2		
1	20479		2012-06-01 05:00:00	B1599	4		
1	20480		2012-06-01 05:00:00	B1790	3		
1	20481		2012-06-01 05:00:00	B1945	2		
1	20482		2012-06-01 05:00:00	B2033	3		

5. Group by the code of commodity, and sort before grouping

0	1	2	A	B	C	D	E
1-		1					
1-		2		A5731			
1		3	2012-06-02 09:38:46	A5731	-1		
1		4	2012-06-11 18:30:23	A5731	-1		
1		5	2012-06-19 20:21:03	A5731	-1		
1		6	2012-06-20 14:32:47	A5731	-1		
1		7	2012-06-26 12:36:44	A5731	-1		
1		8	2012-06-02 05:00:00	A5731	2		
1		9	2012-06-20 05:00:00	A5731	2		
1-		10		A5743			
1		11	2012-06-08 13:24:30	A5743	-1		
			2012-06-17 10:25:52	A5743	-1		

6. Calculate the day in the month of each transaction

0	1	2		A	B	C	D	E
1-		1						
	1-	2			A5731			
		3		2012-06-02 09:38:46	A5731	-1	=day(A3)	
	1	4		2012-06-11 18:30:23	A5731	-1		
	1	5		2012-06-19 20:21:03	A5731	-1		
	1	6		2012-06-20 14:32:47	A5731	-1		
	1	7		2012-06-26 12:36:44	A5731	-1		
	1	8		2012-06-02 05:00:00	A5731	2		
	1	9		2012-06-20 05:00:00	A5731	2		
	1-	10			A5743			
	1	11		2012-06-08 13:24:30	A5743	-1		
				2012-06-17 10:35:53	A5743	-1		

7. Group the bands by the resulting dates, and sort before grouping

0	1	2	3		A	B	C	D	E
1-		1							
	1-	2				A5731			
		3						2	
	1	4			2012-06-02 09:38:46	A5731	-1	2	
	1	5			2012-06-02 05:00:00	A5731	2	2	
	1-	6						11	
	1	7			2012-06-11 18:30:23	A5731	-1	11	
	1-	8						19	
	1	9			2012-06-19 20:21:03	A5731	-1	19	
	1-	10						20	
	1	11			2012-06-20 14:32:47	A5731	-1	20	
					2012-06-20 05:00:00	A5731	2	20	

8. Create a new esCalc grid B, homo-copy the categories of commodity, paste, and set the code of commodity as the master cell



0	1		A	B	C	D	E
1-		1					
1		2	A5731				
1		3	A5743				
1		4	A5750				
1		5	A5781				
1		6	A5827				
1		7	A5871				
1		8	A5883				
1		9	A5896				
1		10	A5935				
1		11	A5998				
1		12	A6020				

9. Add the sub-row before the row of category, and prepare the row of all 30 days in the month; After expanding the row of date, press Alt+Del to delete the formula, and set the number of days as the master cell

0	1	2	A	B	C	D	E
1-		1					
1-		2	A5731				
1		3	=to(30)				
1-		4	A5743				
1		5					
1-		6	A5750				
1		7					
1-		8	A5781				
1		9					
1-		10	A5827				
1		11					
			A5871				

0	1	2		A	B	C	D	E
1-		1						
	1-	2		A5731				
		3		1				
	1	4		2				
	1	5		3				
	1	6		4				
	1	7		5				
	1	8		6				
	1	9		7				
	1	10		8				
	1	11		9				

10. Add a blank sub-row under the number of days, and set the first cell as the master cell

0	1	2	3		A	B	C	D	E
1-		1							
	1-	2			A5731				
		3			1				
	1	4							
	1-	5			2				
	1	6							
	1-	7			3				
	1	8							
	1-	9			4				
	1	10							
	1-	11			5				

11. Set the time of transaction of esCalc grid A as the master cell, copy the transaction bands, and perform the full join operation in the esCalc grid B. The number of days is not required to copy when copying the transaction bands.



0	1	2	3	A	B	C	D	E
1-			1					
	1-		2		A5731			
		1-	3				2	
			4	2012-06-02 09:38:46	A5731	-1		2
		1	5	2012-06-02 05:00:00	A5731	2		2
			6				11	
		1	7	2012-06-11 18:30:23	A5731	-1		11
			8				19	
		1	9	2012-06-19 20:21:03	A5731	-1		19
			10				20	
		1	11	2012-06-20 14:32:47	A5731	-1		20
				2012-06-20 05:00:00	A5731	2		20

0	1	2	3	A	B	C	D	E
1-			1					
	1-		2	A5731				
		1-	3	1				
			4					
		1						
		1						
		1						
		1						

**Join**  
☐ Left join  
☒ Full join  
OK  
Cancel

0	1	2	3	A	B	C	D	E
1-			1					
	1-		2	A5731				
		1-	3	1				
			4					
		1	5	2				
			6					
		1	7	2012-06-02 09:38:46	A5731	-1		
			8	2012-06-02 05:00:00	A5731	2		
		1	9	3				
			10					
		1	11	4				



## 12. Filter the blank band

**Filter**

Condition

☒ Cell value

☐ Expression

Action to unsatisfied band

☒ Delete ☐ Hide

Action scope

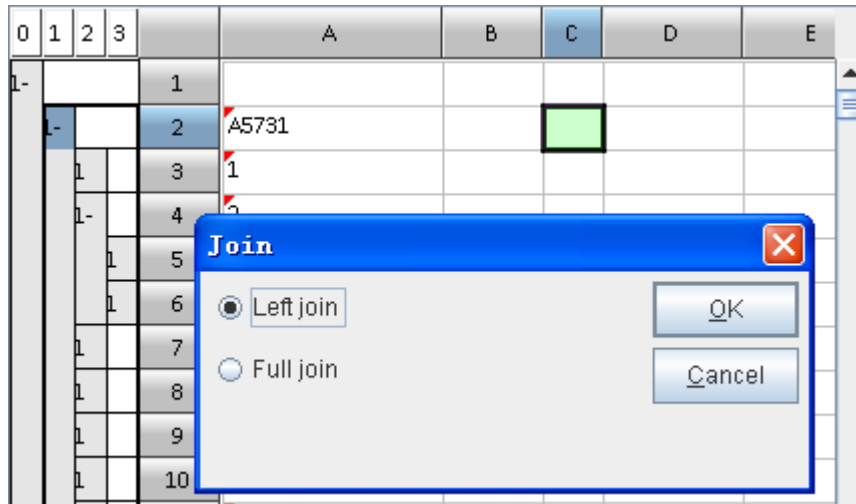
☒ Work scope ☐ Under parent row

OK Cancel Show

0	1	2	3	A	B	C	D	E
1-		1						
1-		2		A5731				
1		3		1				
1-		4		2				
1		5		2012-06-02 09:38:46	A5731	-1		
1		6		2012-06-02 05:00:00	A5731	2		
1		7		3				
1		8		4				
1		9		5				
1		10		6				
1		11		7				

13. Set the code of commodity in the inventory table as the master cell, copy the inventory data, join, and paste it to the commodity-grouping rows in B

0	1	A	B	C
1-	1	Date	CID	Stock
1	2	2012-5-30	F8160	43
1	3	2012-5-30	W6365	26
1	4	2012-5-30	M7883	30
1	5	2012-5-30	T7650	19



14. Sort the transaction and purchases bands by date, then calculate the **daily inventory balance** and **number of transaction occurred that day** in the date-grouping row

0	1	2	3	A	B	C	D	E
1-		2		A5731		1		
	1	3		1	0			
	1-	4		2	2	=if(##=1,C2,C3+(C5).sum())		
		5		2012-06-02 05:00:00	A5731	2		
		6		2012-06-02 09:38:46	A5731	-1		

0	1	2	3	A	B	C	D	E
1-		2		A5731		1		
	1	3		1	0	1		
	1-	4		2	2	2		
		5		2012-06-02 05:00:00	A5731	2		
		6		2012-06-02 09:38:46	A5731	-1		
		7		3	0	2		
		8		4	0	2		
		9		5	0	2		
		10		6	0	2		
		11		7	0	2		
		12		8	0	2		

15. Calculate the **time of out-of-inventory that day** in seconds

D4 = =if(C4==0,if(B4==0,int(3600\*13.5),interval@s({A5}(B4),after(datetime("2012-5-31 21:30:00"),A4))),0)

D:\files\gex\Cases\Ca07B.gex

0	1	2	3	A	B	C	D	E
1-		1						
1-		2		A5731		1		
1-		3		1	0	1	0	
1-		4		2	2	2	0	
1-		5		2012-06-02 05:00:00	A5731	2		

16. Calculate if out-of-inventory before 5 p.m. that day

E3 = =if(C3==0,if(B3==0,true,if(hour({#REF!}(B3))<17)),false)

D:\files\gex\Cases\Ca07B.gex

0	1	2	3	A	B	C	D	E
1-		1						
1-		2		A5731		1		
1-		3		1	0	1	0	false
1-		4		2	2	2	0	false
1-		5		2012-06-02 05:00:00	A5731	2		
1-		6		2012-06-02 09:38:46	A5731	-1		

17. Calculate the cumulative time of out-of-inventory of each category of commodity and count the total times of out-of-stock occurred by 5 p.m.

D2 = =(D3).sum()

D:\files\gex\Cases\Ca07B.gex

0	1	2	3	A	B	C	D	E
1-		1						
1-		2		A5731		1	=(D3).sum()	
1-		3		1	0	1	0	false
1-		4		2	2	2	0	false
1-		5		2012-06-02 05:00:00	A5731	2		
1-		6		2012-06-02 09:38:46	A5731	-1		



E2 = {E3}.select(\*).count()

D:\files\gex\Cases\Ca07B.gex

0	1	2	3	A	B	C	D	E
1-		1						
	1-	2		A5731		1	230533	{E3}.select(*).count()
		3		1	0	1	0	0.00
		4		2	2	2	0	false
		5		2012-06-02 05:00:00	A5731	2		
		6		2012-06-02 09:38:46	A5731	-1		

18. Set the code of commodity in the inventory table as the master cell. After the inventory name is copied, join, and then paste the names of commodities to the commodity-grouping row

0	1	A	B	
1-	1	ID	Name	Type
	2	F8160	Dried Asian Pears	Fruits
	3	W6365	Ecco Domani Moscato 2011	Wines
	4	M7883	Fresh Salmon Steak	Meats

0	1	2	3	A	B	C	D	
1-		1						
	1+	2		A5731	Essex 32-Piece Dinnerware Combo Set	1	230533	5
	1+	40		A5743	Sensations 16-Piece Dinnerware Set	0	758130	16
	1+	75		A5750	Fiesta Scarlet Dinnerware - Set of 4	0	645830	13
	1+	110		A5781	Oneida Augusta 20-Piece Flatware Set	0	453021	9
	1+	145		A5827	Lipper 10 Inch Bamboo Lazy Susan	1	393704	8
	1+	183		A5871	Tablecraft 13.75" Cake Stand / Cover Set	1	2751	0
	1+	220		A5883	Pyrex Easy Grab 9.5" Pie Plate	2	2871	0
	1+	259		A5896	Magic Chef Buffet Server	1	54525	1
	1+	297		A5935	BakerEze 6-Piece Non-stick Bakeware	0	1206148	25
	1+	332		A5998	Pyrex Portables 3-Qt Oblong Baking Dish	0	879985	18

19. Sort by the cumulative time of out-of-inventory descendingly



0	1	2	3		A	B	C	D	
1-				1					
1+				2	H5400	Performance W10056 Air Tank Manifold	0	1455645	30
1+				35	H5693	Sterilite 4-Drawer Cabinet	0	1423708	29
1+				69	H4283	Deluxe Bath Mat, Clear	0	1421013	29
1+				102	F3646	Cedar Delite Back Rest	0	1409400	29
1+				135	F2544	Nouvelle Nightstand with Drawer	0	1389824	29
1+				170	B1733	Between the Lines	0	1381650	29
1+				205	H5677	GE Indoor/Outdoor Extension Cord, 50'	0	1379145	28
1+				242	M0922	Chuck: The Complete Fourth Season	0	1372267	28
1+				279	F2175	Shoal Creek 3 Piece Bedroom Set, White	0	1360840	28
1+				314	H3825	Marlin Pumpkin Spice Bench Cushion	0	1360800	28

20. Sort by total times of out-of-inventory occurred by 5 p.m. descendingly, and filter after sorting

0	1	2	3		B	C	D	E
1+				2404	Rules of Civility	1	683651	14
1+				2443	Innovera Eight-Digit Calculator	0	680400	14
1+				2476	Trend Wipe-Off Sentence Strips, 30pk	0	680400	14
1+				2509	Fiskars Swing Arm Protractor	0	674979	14
1+				2545	Fiesta Scarlet Dinnerware - Set of 4	0	645830	13
1+				2580	ProForm Ab Glider Platinum	0	628630	13
1+				2617	your zone 5 arm floor lamp, blue multi	0	620948	13
1+				2654	Insurgent	1	617250	13
1+				2691	Shaker Dining Chairs, Set of 4, Espresso	0	595823	12
1+				2728	Zenith Cocktail Table, Espresso	0	594008	12
1+				2765	Under the Sea PEVA Shower Curtain,	0	590044	12

Filter

Condition

☒ Cell value
 

>

10

☐ Expression
 

@>10

...

Action to unsatisfied band

☒ Delete
 ☐ Hide

Action scope

☒ Work scope
 ☐ Under parent row

OK

Cancel

Show

## 4. Result

21.

CID	Commodity	OosTime	
H5400	Performance W10056 Air Tank Manifold	1455645	
H5693	Sterilite 4-Drawer Cabinet	1423708	
H4283	Deluxe Bath Mat, Clear	1421013	
F3646	Cedar Delite Back Rest	1409400	
F2544	Nouvelle Nightstand with Drawer	1389824	
B1733	Between the Lines	1381650	
H5677	GE Indoor/Outdoor Extension Cord, 50'	1379145	
M0922	Chuck: The Complete Fourth Season	1372267	
F2175	Shoal Creek 3 Piece Bedroom Set, White	1360840	
H3825	Marlin Pumpkin Spice Bench Cushion	1360800	
F2551	Elise Bunk Bed, Mahogany	1336317	
F2783	Intex Mid Rise Air Bed, Queen	1314768	
H5028	Verona Wall Mirror, Dark Espresso	1312200	
00729	Saunders SlimMate Clipboard, 1", Pink	1274942	

22.

CID	Commodity	OosTimes	
H5400	Performance W10056 Air Tank Manifold	30	
H5693	Sterilite 4-Drawer Cabinet	29	
H4283	Deluxe Bath Mat, Clear	29	
F3646	Cedar Delite Back Rest	29	
F2544	Nouvelle Nightstand with Drawer	29	
B1733	Between the Lines	29	
H5677	GE Indoor/Outdoor Extension Cord, 50'	28	
M0922	Chuck: The Complete Fourth Season	28	
F2175	Shoal Creek 3 Piece Bedroom Set, White	28	
H3825	Marlin Pumpkin Spice Bench Cushion	28	
F2551	Elise Bunk Bed, Mahogany	27	
F2783	Intex Mid Rise Air Bed, Queen	27	
H5028	Verona Wall Mirror, Dark Espresso	27	
00729	Saunders SlimMate Clipboard, 1", Pink	26	

## 8. Auto Scoring for Synchronized Diving

### 1. Problem

In a certain men's synchronized 10m platform dive competition, 8 teams of divers need to compete through 6 rounds of competitions. In each round, the 2-diver-formed team will compete in the same order. The judge panel consists of altogether 11 judges from A to K with the scoring rule as follows: Three judges of A, B, and C score the divers on the left, following a rule of discarding the highest and the lowest scores and only taking the middle score as the valid one to reduce the subjectivity of scoring; The other three judges of D, E, and F score the divers on the right and only keep one valid score as well; The five judges of G, H, I, J, and K score the synchronizations. Similarly, the highest and the lowest scores will be discarded to only keep the three middle score as the valid scores; To calculate the final scores of the 2-diver-formed teams in this round, calculate the average of altogether five valid scores, and multiply by 3, then multiply by the degree of difficulty. To this point, we may take advantage of an Auto Scoring Calculation Sheet, so that once the points of each round is

inputted, the scores of each team in this round, the ranking of this round, and the ranking of total points can all be calculated automatically.

The various codes of dives and coefficients of difficulty degrees are given below:

Code	DD	Position	Description
101B	2.0	Pike	Forward Dive
103B	2.0	Pike	Forward 1 1/2 Somersault
201B	2.0	Pike	Back Dive
201C	2.0	Tuck	Back Dive
301B	2.0	Pike	Reverse Dive
401B	2.0	Pike	Inward Dive
107B	3.0	Pike	Forward 3 1/2 Somersault
407C	3.2	Tuck	Inward 3 1/2 Somersault
5253B	3.2	Pike	Back 2 1/2 Somersault 1 1/2 Twists
5253B	3.2	Pike	Back 2 1/2 Somersault 1 1/2 Twists
207C	3.3	Tuck	Back 3 1/2 Somersault
307C	3.3	Tuck	Reverse 3 1/2 Somersault
207B	3.6	Pike	Back 3 1/2 Somersault
5255B	3.6	Pike	Back 2 1/2 Somersault 2 1/2 Twists
109C	3.7	Tuck	Forward 4 1/2 Somersault
5156B	3.8	Pike	Forward 2 1/2 Somersault 3 Twists
409C	4.1	Tuck	Inward 4 1/2 Somersault

## 2. Tips

Rough train of thought: Because the need to prepare the auto calculation sheet, the data cannot be processed through various operations manually. Only formulas can be used to calculate the total points, rankings, and other computational goal. Since it is required to change along with the data input, we need the related formulas. After inputting the scores of every team, the points can be calculated through the same way: Firstly, look up the coefficient of difficulty degree according to the dive adopted in competition; Then, sum up the 5 valid points according to the scoring rule, and calculate the scores of diver teams in this round; Add the points to the total points of previous round together to get the total points; Calculate the rankings in this round and the overall rankings of diver teams by calculating the rankings of points in the current round and the total points.

1. Create a new esCalc grid, and add a sub-row to the 3rd row
2. Homo-paste the coefficient of difficulty degree and code of dive to the sub-row, so as to get the coefficient of difficulty degree according to the code of dive in the calculation.
3. Type in the formula =to(6) in the row 2, then perform the expand operation. The scores of each round need inputting separately.
4. Add a sub-row to the second row, and reserve the room for data input. Set the

column in which every piece of data is located

5. To facilitate the input, use various background colors to differentiate. When setting the background colors, just select one row to set the color and the color will apply to all its homo-rows automatically
6. The coefficient of difficulty degree can be looked up according to the code of dives. As long as the position of the code of dives in the array is obtained first, the coefficient of difficulty degree can also be located at the same position. In the calculation, the related formula is used.
7. Calculate the valid points by the scoring rule. In the calculation, calculate the total sum first, and then deduct the invalid points, that is, the highest and the lowest points regarding the 3 types. Then, go ahead to compute the average valid points. Similarly, we can use the related formula
8. According to the valid average points, calculate the scores and the relevant rankings of diver teams in the current round
9. Add the scores of this round to the total points of previous round to get the cumulative point totaling to this round
10. Compute the rankings of all points they collected
11. On inputting the data, the scores (i.e. rankings) of divers can be calculated out instantly. Once all data are input, the final rankings can be obtained with the data from the 6th round

### 3. Solution

1. Create a new esCalc grid, and add a sub-row to the 3rd row

0	1		A	B	C	D	E	F
1-		1						
1		2						
2-		3						
1		4						

2. Homo-copy the codes of dives and coefficients of difficulty degrees, and homo-paste them to the 4th row

0	1		A	B	C	D	E	F
1-		1						
1		2						
2-		3	Code	DD				
1		4	101B	2.0				
1		5	103B	2.0				
1		6	201B	2.0				
1		7	201C	2.0				
1		8	301B	2.0				
1		9	401B	2.0				

3. Expand the 2nd row to 6 homo-rows for preparing for the input of point from each rounds



0	1		A	B	C	D
1-		1				
	1	2	=to(6)			
2-		3	Code	DD		
	1	4	101B	2.0		

0	1		A	B	C	D	E	F
1-		1						
	1	2	1					
	1	3	2					
	1	4	3					
	1	5	4					
	1	6	5					
	1	7	6					
2-		8	Code	DD				
	1	9	101B	2.0				

4. Add a sub-row for each round, and set the column well to hold every data

0	1	2		A	B	C	D	E	F	G	H	I	J
1-		1	Dive										
	1	2	1	Team	Code	A	B	C	D	E	F	G	H
	1	3											
	1	4	2	Team	Code	A	B	C	D	E	F	G	H
	1	5											
	1	6	3	Team	Code	A	B	C	D	E	F	G	H
	1	7											
	1	8	4	Team	Code	A	B	C	D	E	F	G	H

5. Use different background colors to differentiate

0	1	2		F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1-		1																
1-		2		C	D	E	F	G	H	I	J	K	DD	Avg	Score	Rank	Sum	Ran
	1	3																
1-		4		C	D	E	F	G	H	I	J	K	DD	Avg	Score	Rank	Sum	Ran
	1	5																
1-		6		C	D	E	F	G	H	I	J	K	DD	Avg	Score	Rank	Sum	Ran
	1	7																
1-		8		C	D	E	F	G	H	I	J	K		Avg	Score	Rank	Sum	Ran

6. To calculate the coefficient of difficulty degree, from the array of coefficient of difficulty degree, get the coefficient according to the position in which codes of dives are located

O3 = =if(C3!=null,{B15}{(A15).pos(C3)})

D:\files\gex\Cases\Ca08.gex

	0	1	2		C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1-			1																
1-			2		Code	A	B	C	D	E	F	G	H	I	J	K	DD	Avg	Score
1-			3																
1-			4		Code	A	B	C	D	E	F	G	H	I	J	K			
1-			5																
1-			6		Code	A	B	C	D	E	F	G	H	I	J	K	DD	Avg	Score

7. Calculate the average scores and the total scores of the 11 judges, then deduct the highest and the lowest points in each scoring range. It can also be obtained from the sorted positions. Then, the formula will be like this:

$$=([D3:F3].sort()(2)+[G3:I3].sort()(2)+[J3:N3].sort()([2,3,4]).sum())/5$$
 Please notice that it is the set of cells but not the set of homo-cells ({} instead of []) in the formula because the scores from each judge is not in the homo-cell

P3 = =([D3:N3].sum()-[D3:F3].min()-[D3:F3].max()-[G3:I3].min()-[G3:I3].max()-[J3:N3].min()-[J3:N3].max())/5

D:\files\gex\Cases\Ca08.gex

	0	1	2		G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1-			1															
1-			2		D	E	F	G	H	I	J	K	DD	Avg	Score	Rank	Sum	Rank
1-			3															
1-			4		D	E	F	G	H	I	J	K	DD					
1-			5															
1-			6		D	E	F	G	H	I	J	K	DD					

8. To calculate the points and rankings in the current round, simply multiply the average in this row by 3 and then multiply by the coefficient of difficulty degree to get the points, and then calculate the rankings of the points in this round with the ranki function

Q3 = =O3\*P3\*3

D:\files\gex\Cases\Ca08.gex

	0	1	2		C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1-			1																
1-			2		Code	A	B	C	D	E	F	G	H	I	J	K	DD	Avg	Score
1-			3																
1-			4		Code	A	B	C	D	E	F	G	H	I	J	K	DD	Avg	
1-			5																
1-			6		Code	A	B	C	D	E	F	G	H	I	J	K	DD	Avg	Score

R3    =    `={Q3}.ranki(Q3)`

			G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1-		1														
1-		2	D	E	F	G	H	I	J	K	DD	Avg	Score	Rank	Sum	Rank
1-		3												<code>={Q3}.ranki(Q3)</code>		
1-		4	D	E	F	G	H	I	J	K	DD	Avg	Score		Sum	Rank
1-		5														

9. To calculate the cumulative points of this team, add the cumulative points of a team in previous round to the point the same team scored in this round.

S3    =    `=A1[A2;-1][S3;0]+Q3`

			F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1-		1															
1-		2	C	D	E	F	G	H	I	J	K	DD	Avg	Score	Rank	Sum	Rank
1-		3													1	<code>=A1[A2;-1][S3;0]+Q3</code>	
1-		4	C	D	E	F	G	H	I	J	K	DD	Avg	Score			

10. Compute the rankings of points each team collected

T3    =    `={S3}.ranki(S3)`

			F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1-		1															
1-		2	C	D	E	F	G	H	I	J	K	DD	Avg	Score	Rank	Sum	Rank
1-		3													1		<code>=A1[A2;-1][S3;0]+Q3</code>
1-		4	C	D	E	F	G	H	I	J	K	DD	Avg	Score		Sum	<code>=A1[A2;-1][S3;0]+Q3</code>

11. Input the bands, when adding a new band, you may use the shortcut Ctrl+Enter key and the result can be viewed instantly every time you input a piece of scores

0	1	2	A	B	C	D	E	F	G	H	I	J	K
1-		1	Dive										
	1-	2	1	Team	Code	A	B	C	D	E	F	G	H
	1	3		ZAKHAROV / MINIBAEV	201B	7.5	8.5	8.5	9.0	8.5	8.5	9.0	9.0
	1	4		CAO / ZHANG	101B	9.5	9.5	9.5	9.5	9.5	9.5	10.0	9.0
	1	5		HAUSDING / KLEIN	103B	9.0	8.0	8.5	8.0	8.5	8.5	9.0	9.0
	1	6		BOUDIA / McCRORY	401B	9.0	9.0	9.5	9.5	9.5	9.0	9.5	8.5
	1-	7	2	Team	Code	A	B	C	D	E	F	G	H
	1	8											
	1-	9	3	Team	Code	A	B	C	D	E	F	G	H
	1	10											

0	1	2		E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1-	1	27		9.0	10.0	9.0	9.5	9.0	9.0	9.5	9.0	9.5	3.3	9.2	91.08	1	203.8	1	
	1	28		7.5	7.5	7.0	7.0	8.0	8.5	8.0	8.0	8.0	3.6	7.7	83.16	6	186.3	8	
		29		B	C	D	E	F	G	H	I	J	K		Avg	Score	Rank	Sum	Rank
	1	30		9.0	8.5	8.5	8.5	8.5	9.0	8.5	8.5	8.5	8.0	3.3	8.5	84.15	4	273.6	4
	1	31		9.0	9.0	10.0	9.5	9.5	10.0	9.5	9.5	9.5	9.5	3.3	9.4	93.06	2	294.5	1
	1	32		7.5	7.0	7.0	6.5	7.0	7.5	7.5	7.0	7.5	8.0	3.6	7.3	78.84	5	270.1	5
	1	33		8.5	9.0	8.0	7.5	7.5	9.0	8.5	8.5	8.5	8.0	3.7	8.3	92.13	3	283.2	3
	1	34		7.0	7.5	7.0	7.0	7.0	8.5	8.0	8.0	8.0	8.5	4.1	7.8	95.94	1	285.6	2
	1-	35		B	C	D	E	F	G	H	I	J	K	DD	Avg	Score	Rank	Sum	Rank
	36															1	273.6	1	

## 4. Result

Once all data are entered, the result will be as shown below:

0	1	2	A	B	C	D	E	F	G	H	I	J	K
	1	46		GORSHKOVOZOV / BONDAR	407C	8.0	8.5	8.0	8.5	9.0	8.5	9.0	9.0
	1-	47	6	Team	Code	A	B	C	D	E	F	G	H
	1	48		ZAKHAROV / MINIBAEV	109C	8.0	7.5	6.0	7.0	7.5	7.0	9.0	8.5
	1	49		CAO / ZHANG	5255B	8.5	8.5	9.0	9.0	9.0	8.5	9.5	9.5
	1	50		HAUSDING / KLEIN	5255B	8.0	8.5	8.5	8.5	8.5	8.0	8.5	9.0
	1	51		BOUDIA / McCRORY	5255B	8.5	9.0	8.5	9.0	9.5	9.0	9.0	8.5
	1	52		GARCIA / SANCHEZ	5156B	7.0	7.0	6.5	7.5	8.0	7.0	8.5	8.5
	1	53		AGUIRRE / GUERRA	5255B	8.5	8.5	8.5	9.0	8.0	8.5	9.0	9.0
	1	54		DALEY / WATERFIELD	5255B	8.0	8.5	8.5	8.5	8.5	8.5	8.5	8.0
	1	55		GORSHKOVOZOV / BONDAR	109C	7.5	8.0	7.5	7.5	7.5	8.0	8.5	8.0



0	1	2		F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
		1	46	8.0	8.5	9.0	8.5	9.0	9.0	8.5	9.0	8.5	3.2	8.6	82.56	8	344.5	8
	1-		47	C	D	E	F	G	H	I	J	K	DD	Avg	Score	Rank	Sum	Rank
		1	48	6.0	7.0	7.5	7.0	9.0	8.5	7.5	8.5	8.0	3.7	7.9	87.69	8	449.8	6
		1	49	9.0	9.0	9.0	8.5	9.5	9.5	9.0	9.5	9.5	3.6	9.2	99.36	1	486.7	1
		1	50	8.5	8.5	8.5	8.0	8.5	9.0	8.5	8.5	8.5	3.6	8.5	91.80	4	446.0	7
		1	51	8.5	9.0	9.5	9.0	9.0	8.5	9.0	9.5	8.5	3.6	8.8	95.04	2	463.4	3
		1	52	6.5	7.5	8.0	7.0	8.5	8.5	8.5	8.5	8.5	3.8	8.0	91.20	6	468.9	2
		1	53	8.5	9.0	8.0	8.5	9.0	9.0	8.5	9.0	8.0	3.6	8.7	93.96	3	450.9	5
		1	54	8.5	8.5	8.5	8.5	8.5	8.0	8.5	9.0	8.5	3.6	8.5	91.80	4	454.6	4
		1	55	7.5	7.5	7.5	8.0	8.5	8.0	7.5	8.5	8.5	3.7	8.0	88.80	7	433.3	8

Homo copy the diver profile, total points, rankings, and then homo-paste them to a new esCalc grid. When copying, only the scores after the 6th round are required and you may need to set the work scope. Sort by rankings. Then, the result is as follows:

0	1		A	B	C
	1-	1	Team	Score	Rank
		2	CAO / ZHANG	486.78	1
		3	GARCIA / SANCHEZ	468.90	2
		4	BOUDIA / McCRORY	463.47	3
		5	DALEY / WATERFIELD	454.65	4
		6	AGUIRRE / GUERRA	450.90	5
		7	ZAKHAROV / MINIBAEV	449.88	6
		8	HAUSDING / KLEIN	446.07	7
		9	GORSHKOVOZOV / BONDAR	433.32	8

## 9. Sales Data Summarization

### 1. Problem

A company needs to summarize the quarter sales data of several years by calculating the quarterly sequential growth rate and year-over-year quarterly growth rate of sales and gross profit, as well as the annual total sales, annual gross profit and the annual sequential sales growth rate.

The sales and cost in each quarter are as follows:



Year	Quarter	Net sales	Cost of sales
2007	Q1	78,834	60,237
2007	Q2	84,524	64,585
2007	Q3	83,543	63,765
2007	Q4	98,090	75,565
2008	Q1	85,335	65,271
2008	Q2	91,938	70,551
2008	Q3	90,826	69,251
2008	Q4	106,208	81,277
2009	Q1	94,042	71,372
2009	Q2	101,546	77,118
2009	Q3	97,619	73,621
2009	Q4	107,880	81,945
2010	Q1	93,471	70,395
2010	Q2	100,168	75,056
2010	Q3	98,667	73,915
2010	Q4	112,826	85,078
2011	Q1	99,097	74,700
2011	Q2	103,016	77,523
2011	Q3	101,239	75,906
2011	Q4	115,600	87,158

In the result spreadsheet, the data is grouped and presented by year as required. The topmost row of the annual report is the row of header, and the bottommost row is the summary row.

## 2. Tips

Rough train of thought: The given data have already been sorted so that users only need to group the data by year, then insert a slave row into the year section, and move it downward to make room and structure the spreadsheet. To calculate the data of each quarter, simply type the formula into the row; **To calculate the quarterly sequential growth rate and year-over-year quarterly growth rate of sales, users can take advantages of the displacement function  $L[A;x]$ .** To calculate the annual summary data, the summary calculation for sequence of homo-cells can be adopted to achieve the goal. The sequential growth rate of annual sales can be calculated in the same pattern as that to compute the quarterly rate.

1. Group the data by year, and select not to sort before grouping to avoid the unnecessary calculation
2. Append a slave row in the annual band, move it downward, and set the colors of foreground, background, border, and other appearance
3. Change the text in the year header to "Fiscal XXXX", which can be done all at one time with an expression. The year in the expression can simply be



represented with the child row

4. Once the computation is completed, press Alt+Del to delete the expression in the header of year
5. The data of each quarter are already in the corresponding year group, the "year" of data in each quarter can be deleted. To do so, just remove the cell
6. Calculate the profit of each quarter
7. Calculate the sequential sales growth rate in each quarter
8. Calculate the year-over-year quarterly sales growth rate
9. Calculate the total sales of each year
10. Calculate the total gross profit of each year
11. Calculate the annual sequential growth rate of each year

### 3. Solution

1. Group the data by year, and select not to sort before grouping. One thing to note is that the display format "#,###.#" is set for the sales data in the esCalc grid. Users can display it in sections to have a more clear view

0	1	A	B	C	D
1-	1	Year	Quarter	Net sales	Cost of sales
1	2	2007	Q1	78,834	60,237
1	3	2007	Q2	84,524	64,585
1					63,765
1					75,565
1					65,271
1					70,551
1					69,251
1					81,277
1					71,372

Group

☐ Sort before group
 ☐ Use Locale
 ☐ Regroup

OK

Cancel

0	1	2	A	B	C	D
1-		1	Year	Quarter	Net sales	Cost of sale
1-	2		2007			
1	3		2007	Q1	78,834	60,2
1	4		2007	Q2	84,524	64,5
1	5		2007	Q3	83,543	63,7
1	6		2007	Q4	98,090	75,5
1-	7		2008			
1	8		2008	Q1	85,335	65,2
1	9		2008	Q2	91,938	70,5
1	10		2008	Q3	90,826	69,2

2. Append a slave row under the year band, then move it downward, and set colors of foreground, background, border, and other appearance properties



1-	7	2008				
1	8					65,271
1	9					70,551
1	10					
1	11					
1-	12	20				
1	13					
1	14					
1	15					
1	16					
1-	17	20				
1	18					
1	19					
1	20					

Set/Cancel work scope  
Select homocell  
Copy Ctrl-C  
Homocell copy Ctrl+Alt-C  
Paste Ctrl-V  
Homocell paste Ctrl+Alt-V  
Band paste Ctrl-B  
Cell  
Homocell  
Structure

Append sub row  
Dismantle master row  
Insert slave row  
Append slave row  
Remove slave row  
Dup slave row  
Move slave row up  
Move slave row down

1	8					
2-	9	2008				65,271
1	10	2				
1	11	2				
1	12	2				
1	13	2				
1	14					
2-	15	2009				
1	16	2				
1	17	2				
1	18	2				
1	19	2				
1	20					

Set/Cancel work scope  
Select homocell  
Copy Ctrl-C  
Homocell copy Ctrl+Alt-C  
Paste Ctrl-V  
Homocell paste Ctrl+Alt-V  
Band paste Ctrl-B  
Cell  
Homocell  
Structure

Append sub row  
Dismantle master row  
Insert slave row  
Append slave row  
Remove slave row  
Dup slave row  
Move slave row up  
Move slave row down

0	1	2	A	B	C	D
1-		1	Year	Quarter	Net sales	Cost of sales
1-		2	2007			
1		3	2007	Q1	78,834	60,237
1		4	2007	Q2	84,524	64,585
1		5	2007	Q3	83,543	63,765
1		6	2007	Q4	98,090	75,565
2		7				
1-		8	2008			
1		9	2008	Q1	85,335	65,271
1		10	2008	Q2	84,524	70,551

- Use formula to modify the text in the header line. Please notice that number must be converted to character strings while concatenating the character strings with



the number

A2 = ="Fiscal "+string(A3)

D:\files\gex\Cases\Ca09.gex

0	1	2	A	B	C	D
1-		1	<b>Year</b>	<b>Quarter</b>	<b>Net sales</b>	<b>Cost of sales</b>
1-		2	= "Fiscal "+string(A3)			
1-		3	2007	Q1	78,834	60,237
1-		4	2007	Q2	84,524	64,585
1-		5	2007	Q3	83,543	63,765

4. Once the computation is completed, delete the formula in the year header line

B2 =

D:\files\gex\Cases\Ca09.gex

0	1	2	A	B	C	D
1-		1	<b>Year</b>	<b>Quarter</b>	<b>Net sales</b>	<b>Cost of sales</b>
1-		2	Fiscal 2007			
1-		3	2007	Q1	78,834	60,237
1-		4	2007	Q2	84,524	64,585
1-		5	2007	Q3	83,543	63,765

5. Select the data of "year" in each quarter, and press Ctrl+Del to remove this cell in the quarter band, and then this cell of all homo-rows will be removed; Then, you can notice that the corresponding changes are required since the header in the first row becomes unmatched to the data

0	1	2	A	B	C	D
1-		1	<b>Year</b>	<b>Quarter</b>	<b>Net sales</b>	<b>Cost of sales</b>
1-		2	Fiscal 2007			
1-		3	Q1	78,834	60,237	
1-		4	Q2	84,524	64,585	
1-		5	Q3	83,543	63,765	
1-		6	Q4	98,090	75,565	
2		7				
1-		8	Fiscal 2008			
1-		9	Q1	85,335	65,271	

0	1	2	A	B	C	D
1-		1		Net sales	Cost of sales	
1-	1-	2	Fiscal 2007			
		3	Q1	78,834	60,237	
		4	Q2	84,524	64,585	
		5	Q3	83,543	63,765	
		6	Q4	98,090	75,565	
2		7				
1-	1-	8	Fiscal 2008			
		9	Q1	85,335	65,271	

6. To calculate the gross profit of each quarter, simply use the data in this row to compute and formula are only required to write once

D3 = =B3-C3

0	1	2	A	B	C	D
1-		1		Net sales	Cost of sales	Gross pfofit
1-	1-	2	Fiscal 2007			
		3	Q1	78,834	60,237	=B3-C3
		4	Q2	84,524	64,585	

7. To calculate the sequential growth rate of sales in each quarter, in the formula, users can use A1[B3;-1] to represent the sales of previous quarter. Since the A1 is at the level 0, it is allowed to cross the year level. In this example, for those whose results are in percentages, the display format is set to "#.##%"

E3 = =(B3-A1[B3;-1])/A1[B3;-1]

0	1	2	A	B	C	D	E	F
1-		1		Net sales	Cost of sales	Gross pfofit	Net sales increase	
1-	1-	2	Fiscal 2007					
		3	Q1	78,834	60,237	18,597	=(B3-A1[B3;-1])/A1[B3;-1]	
		4	Q2	84,524	64,585	19,939		
		5	Q3	83,543	63,765	19,778		
		6	Q4	98,090	75,565	22,525		

8. To calculate the year-over-year quarterly growth rate of sales in each quarter, in the formula, users can use A1[A2;-1] to represent the sales of the previous year, and the A1[A2;-1][B3;0] to represent the sales in this quarter of the previous year

F3 = {B3-A1[A2;-1][B3;0]}/A1[A2;-1][B3;0]

0	1	2	A	B	C	D	E	F
1-		1		Net sales	Cost of sales	Gross pfofit	Net sales increase	
1-		2	Fiscal 2007					
1-		3	Q1	78,834	60,237	18,597		{B3-A1[A2;-1][B3;0]}/A1[A2;-1][B3;0]
1-		4	Q2	84,524	64,585	19,939	7.2%	
1-		5	Q3	83,543	63,765	19,778	-1.2%	
1-		6	Q4	98,090	75,565	22,525	17.4%	

9. To compute the total sales in each year, the {B3} in the formula represents all quarterly sales data in this year

B7 = {B3}.sum()

0	1	2	A	B	C	D	E	F
1-		1		Net sales	Cost of sales	Gross pfofit	Net sales increase	
1-		2	Fiscal 2007					
1-		3	Q1	78,834	60,237	18,597		
1-		4	Q2	84,524	64,585	19,939	7.2%	
1-		5	Q3	83,543	63,765	19,778	-1.2%	
1-		6	Q4	98,090	75,565	22,525	17.4%	
2		7		{B3}.sum()				
1-		8	Fiscal 2008					
1-		9	Q1	85,335	65,271	20,064	-13%	8.2%

10. To compute the gross profit of each year, since the computation goal is the same as that of total sales computation to sum up the sales data in the same column of this year, an alternative is to copy B7 cell and paste it to D7 to get the same result.

D7    =    ={D3}.sum()

0	1	2	A	B	C	D	E	F
1-		1		<b>Net sales</b>	<b>Cost of sales</b>	<b>Gross pfofit</b>	<b>Net sales increase</b>	
1-		2	Fiscal 2007					
	1	3	Q1	78,834	60,237	18,597		
	1	4	Q2	84,524	64,585	19,939	7.2%	
	1	5	Q3	83,543	63,765	19,778	-1.2%	
	1	6	Q4	98,090	75,565	22,525	17.4%	
2		7		<b>344,991</b>		<b>=({D3}.sum())</b>		
1-		8	Fiscal 2008					
	1	9	Q1	85,335	65,271	20,064	-13%	8.2%

11. Calculate the year-over-year sequential growth rate

E7    =    =(B7-A1[B7;-1])/A1[B7;-1]

0	1	2	A	B	C	D	E	F
1-		1		<b>Net sales</b>	<b>Cost of sales</b>	<b>Gross pfofit</b>	<b>Net sales increase</b>	
1-		2	Fiscal 2007					
	1	3	Q1	78,834	60,237	18,597		
	1	4	Q2	84,524	64,585	19,939	7.2%	
	1	5	Q3	83,543	63,765	19,778	-1.2%	
	1	6	Q4	98,090	75,565	22,525	17.4%	
2		7		<b>344,991</b>		<b>80,839</b>	<b>=(B7-A1[B7;-1])/A1[B7;-1]</b>	
1-		8	Fiscal 2008					
	1	9	Q1	85,335	65,271	20,064	-13%	8.2%

## 4. Result

The results are shown below:



0	1	2	A	B	C	D	E	F
1-		1		<b>Net sales</b>	<b>Cost of sales</b>	<b>Gross pfofit</b>	<b>Net sales increase</b>	
1-		2	Fiscal 2007					
1		3	Q1	78,834	60,237	18,597		
1		4	Q2	84,524	64,585	19,939	7.2%	
1		5	Q3	83,543	63,765	19,778	-1.2%	
1		6	Q4	98,090	75,565	22,525	17.4%	
2		7		<b>344,991</b>		<b>80,839</b>		
1-		8	Fiscal 2008					
1		9	Q1	85,335	65,271	20,064	-13%	8.2%
1		10	Q2	91,938	70,551	21,387	7.7%	8.8%
1		11	Q3	90,826	69,251	21,575	-1.2%	8.7%
1		12	Q4	106,208	81,277	24,931	16.9%	8.3%
2		13		<b>374,307</b>		<b>87,957</b>	<b>8.5%</b>	
1-		14	Fiscal 2009					
1		15	Q1	94,042	71,372	22,670	-11.5%	10.2%
1		16	Q2	101,546	77,118	24,428	8%	10.5%
1		17	Q3	97,619	73,621	23,998	-3.9%	7.5%

Homo copy the diver profile, total points, rankings, and then homo-paste them to a new esCalc grid. When copying, only the scores after the 6th round are required and you may need to set the work scope. Sort by rankings. Then, the result is as follows:

0	1	A	B	C
1-	1	<b>Team</b>	<b>Score</b>	<b>Rank</b>
1	2	CAO / ZHANG	486.78	1
1	3	GARCIA / SANCHEZ	468.90	2
1	4	BOUDIA / McCRORY	463.47	3
1	5	DALEY / WATERFIELD	454.65	4
1	6	AGUIRRE / GUERRA	450.90	5
1	7	ZAKHAROV / MINIBAEV	449.88	6
1	8	HAUSDING / KLEIN	446.07	7
1	9	GORSHKOVOZOV / BONDAR	433.32	8

## 10. Month-end Production-Supply-Sales Accounting for an Electric Appliance Store

### 1. Problem

An electric appliance store needs to calculate a list of month-end closing inventory, on the basis of the month-beginning opening inventory, sales this month, and purchase this month. In addition, calculate the capital tied up in inventory of each commodity according



to the average replenishment cost this month.

The month-beginning opening inventory is as follows:

ID	Electrical equipment	Stock
1	Element 19" Class LCD 720p 60Hz HDTV	6
2	Vizio 32" Class LCD 720p 60Hz HDTV	2
3	Philips 19" Class LCD 720p 60Hz HDTV	10
4	Sanyo 26" Class LCD 720p 60Hz HDTV	3
5	Hisense 24" Class LCD 1080p 60Hz HDTV	5
6	Vizio 42" Class 3D-LCD HDTV 1080p 120Hz	3
7	Apple iPod Touch 8GB	3
8	Apple iPod classic 160GB	10
9	Apple iPod Nano 8GB	1
10	Dell Inspiron One 2320 Desktop PC	2

A same product may be sold at various prices in various transactions. The sales data of this month are as follows:

Date	Electrical equipment	CustomerID	Quantity	Price
03/01/2012	CyberpowerPC GUA250 Desktop PC	VIP0785	1	\$498.00
03/01/2012	Lepan TC970 9.7" 1GHz 2GB	CC04778	2	\$230.00
03/01/2012	The new iPad, Wi-Fi, 32GB, Black	CC01744	4	\$599.00
03/01/2012	T-Mobile Samsung Dart T499 Prepaid	VIP0453	6	\$113.00
03/02/2012	Sanyo 26" Class LCD 720p 60Hz HDTV	CC01677	4	\$192.00
03/02/2012	Lepan TC970 9.7" 1GHz 2GB	CC01366	2	\$240.00
03/02/2012	BlackBerry PlayBook PBOOK16-N-A01 7.0"	VIP1230	4	\$499.00
03/02/2012	T-Mobile Samsung T679 4G Prepaid	CC01677	4	\$189.00
03/02/2012	LG Prepaid myTouch Q Smartphone	CC00169	7	\$211.00
03/03/2012	Lepan TC970 9.7" 1GHz 2GB	VIP0785	8	\$240.00

A same product may be purchased at various prices in various transactions. The purchase data of this month is as follows:

Date	Electrical equipment	Quantity	Supplier	Price
03/01/2012	Sanyo 26" Class LCD 720p 60Hz HDTV	6	Gilden Limited	\$160.00
03/01/2012	CyberpowerPC GUA250 Desktop PC	4	Smith Holding	\$380.00
03/01/2012	Lepan TC970 9.7" 1GHz 2GB	40	Gilden Limited	\$200.00
03/01/2012	Compaq 15.6" CQ57-339WM Laptop PC	17	Gilden Limited	\$280.00
03/01/2012	The new iPad, Wi-Fi, 32GB, Black	15	NL Wholesale	\$470.00
03/01/2012	BlackBerry PlayBook PBOOK16-N-A01 7.0"	2	TEPS Electric	\$360.00
03/01/2012	BlackBerry PlayBook PBOOK16-N-A01 7.0"	1	NL Wholesale	\$420.00
03/01/2012	BlackBerry PlayBook PBOOK16-N-A01 7.0"	1	Smith Holding	\$380.00
03/01/2012	T-Mobile Prepaid Samsung T139	9	Smith Holding	\$30.00
03/01/2012	T-Mobile Samsung T679 4G Prepaid	12	Smith Holding	\$140.00

## 2. Tips

Rough train of thought: Firstly, copy the given sales & purchase data in this month to the sub-rows of various master rows of an esCalc cellset. Then, total up the amount of every sale and purchase transaction respectively. Copy the month-beginning inventory data, paste and place them into the sub-rows of another master row. According to the names of products from the inventory data, calculate the sales & purchase volumes and amounts this month. Calculate the month-end remaining inventory, and the average purchase cost this month. Calculate the capital tied up in inventory of each commodity.

1. Build a new esCalc cellset, and append slave rows to the level 0 till the total number of slave rows at the level 0 reaches 3; Add the sub-rows to ensure that every row at 0 level has a sub-row
2. Copy the sales data of this month and homo-copy it to the esCalc cellset
3. Calculate the sales amount of each transaction
4. Copy the purchase data of this month, then homo-paste it to the esCalc cellset, and place them in the rows under various parent rows holding the sales data
5. Calculate the amount of each purchase
6. Copy the data of month-beginning opening inventory, then homo-paste it to the sub-row at the bottom most part of the esCalc cellset
7. According to the names of commodity from the inventory data, calculate the sales volume of each commodity in this month
8. Calculate the total sales amount of each commodity this month
9. Calculate the total volume of purchase in each commodity this month
10. Calculate the total amount of purchase in each commodity in this month
11. Calculate the average purchase cost of each commodity this month
12. Calculate the month-end remaining inventory of each commodity
13. Calculate the capital tied up in inventory of each commodity

### 3. Solution

1. Build a new esCalc cellset, and append slave rows and child rows

0	1		A	B	C	D
1-		1				
	1	2				
2-		3				
	1	4				
3-		5				
	1	6				

2. Copy and paste the text from the sales header line, and then copy and homo-paste the sales data of this month



0	1	A	B	C	
1-	1	<b>Date</b>	<b>Electrical equipment</b>	<b>CustomerID</b>	<b>Quantit</b>
	2	03/01/2012	CyberpowerPC GUA250 Desktop PC	VIP0785	1
	3	03/01/2012	Lepan TC970 9.7" 1GHz 2GB	CC04778	2
	4	03/01/2012	The new iPad, Wi-Fi, 32GB, Black	CC01744	4
	5	03/01/2012	T-Mobile Samsung Dart T499 Prepaid	VIP0453	6
	6	03/02/2012	Sanyo 26" Class LCD 720p 60Hz HDTV	CC01677	4
	7	03/02/2012	Lepan TC970 9.7" 1GHz 2GB	CC01366	2
	8	03/02/2012	BlackBerry PlayBook PBOOK16-N-A01 7.0"	VIP1230	4
	9	03/02/2012	T-Mobile Samsung T679 4G Prepaid	CC01677	4
	10	03/02/2012	LG Prepaid myTouch Q Smartphone	CC00169	7

3. Calculate the sales amount of each transaction

F2	=	=E2*D2
----	---	--------

D:\files\gex\Cases\Ca10.gex							
0	1	C	D	E	F	G	H
1-	1	<b>CustomerID</b>	<b>Quantity</b>	<b>Price</b>			
	2	VIP0785	1	\$498.00	=E2*D2		
	3	CC04778	2	\$230.00			
	4	CC01744	4	\$599.00			
	5	VIP0453	6	\$113.00			

4. Copy and paste the text from the purchase header line, and then copy and homo-paste the purchase data of this month

0	1	A	B	C	
1	165	03/31/2012	FujiFilm FinePix S2940 Digital Camera	CC03077	6
1	166	03/31/2012	TomTom XXL 550M 5.0" Portable GPS	CC04648	1
2-	167	<b>Date</b>	<b>Electrical equipment</b>	<b>Quantity</b>	<b>Supplier</b>
	168	03/01/2012	Sanyo 26" Class LCD 720p 60Hz HDTV	6	Gilden
	169	03/01/2012	CyberpowerPC GUA250 Desktop PC	4	Smith
	170	03/01/2012	Lepan TC970 9.7" 1GHz 2GB	40	Gilden
	171	03/01/2012	Compaq 15.6" CQ57-339WM Laptop PC	17	Gilden
	172	03/01/2012	The new iPad, Wi-Fi, 32GB, Black	15	NL
	173	03/01/2012	BlackBerry PlayBook PBOOK16-N-A01 7.0"	2	TEPS
	174	03/01/2012	BlackBerry PlayBook PBOOK16-N-A01 7.0"	1	NL

5. Calculate the amount of each purchase



F168 =E168\*C168

D:\files\gex\Cases\Ca10.gex

0	1		C	D	E	F	G	H
1	165		CC03077	6	\$155.00	\$930.00		
1	166		CC04648	1	\$184.00	\$184.00		
2-	167		<b>Quantity</b>	<b>Supplier</b>	<b>Price</b>			
1	168		6	Gilden Limited	\$160.00	=E168*C168		
1	169		4	Smith Holding	\$380.00			

6. Copy the data of month-beginning opening inventory, then homo-paste them to the sub-rows at the bottom most part of the esCalc cellset

0	1		A	B	C
1	264		03/30/2012	Nikon COOLPIX S9100 Digital Camera	6 TEPS
B-	265		<b>ID</b>	<b>Electrical equipment</b>	<b>StockBegin</b>
1	266		1	Element 19" Class LCD 720p 60Hz HDTV	6
1	267		2	Vizio 32" Class LCD 720p 60Hz HDTV	2
1	268		3	Philips 19" Class LCD 720p 60Hz HDTV	10
1	269		4	Sanyo 26" Class LCD 720p 60Hz HDTV	3
1	270		5	Hisense 24" Class LCD 1080p 60Hz HDTV	5
1	271		6	Vizio 42" Class 3D-LCD HDTV 1080p 120Hz	3
1	272		7	Apple iPod Touch 8GB	3
1	273		8	Apple iPod classic 160GB	10

7. According to the names of commodity from the inventory data, calculate the sales volume of each category of commodity this month. In the expression, {B2} represents the names of commodity involved in all transactions according to the sales data available ;{B2}.pos(B266) is to find the sequence numbers of transactions of certain commodity according to the names of the commodity in the B266. With @a option, all positions meeting the conditions will be selected out;{D2} is the sales volume of products from all sales data available; {D2}({B2}.pos(B266)) can be used to calculate the sales volumes of specified commodity among all sales data available this month; With sum() for sum-up, the total sales volume this month of the given commodity can be obtained.



D266 = {D2}({B2}.pos@a(B266)).sum()

D:\files\gex\Cases\Ca10.gex

	0	1	B	C	D
	1	264	Nikon COOLPIX S9100 Digital Camera	6	TEPS Electric \$1
B-		265	<b>Electrical equipment</b>	<b>StockBegin</b>	<b>Sale Volume</b>
	1	266	Element 19" Class LCD 720p 60Hz HDTV	6	= {D2}({B2}.pos@a(B266)).sum()
	1	267	Vizio 32" Class LCD 720p 60Hz HDTV	2	
	1	268	Philips 19" Class LCD 720p 60Hz HDTV	10	
	1	269	Sanyo 26" Class LCD 720p 60Hz HDTV	3	
	1	270	Hisense 24" Class LCD 1080p 60Hz HDTV	5	

D266 = {D2}({B2}.pos@a(B266)).sum()

D:\files\gex\Cases\Ca10.gex

	0	1	B	C	D
	1	264	Nikon COOLPIX S9100 Digital Camera	6	TEPS Electric \$1
B-		265	<b>Electrical equipment</b>	<b>StockBegin</b>	<b>Sale Volume</b>
	1	266	Element 19" Class LCD 720p 60Hz HDTV	6	15
	1	267	Vizio 32" Class LCD 720p 60Hz HDTV	2	9
	1	268	Philips 19" Class LCD 720p 60Hz HDTV	10	23
	1	269	Sanyo 26" Class LCD 720p 60Hz HDTV	3	9
	1	270	Hisense 24" Class LCD 1080p 60Hz HDTV	5	19

8. Calculate the total sales amount of each commodity this month by the same means to calculate the sales volume.

E266 = {F2}({B2}.pos@a(B266)).sum()

D:\files\gex\Cases\Ca10.gex

	0	1	C	D	E	F	G	H
	1	264	6	TEPS Electric	\$140.00	\$840.00		
B-		265	<b>StockBegin</b>	<b>Sale Volume</b>	<b>S-Amount</b>			
	1	266	6	15	\$1,950.00			
	1	267	2	9	\$2,628.00			
	1	268	10	23	\$3,585.00			
	1	269	3	9	\$1,728.00			
	1	270	5	19	\$2,395.00			

9. Calculate the purchase volume of each commodity this month



F266 = {C264}({B264}.pos@a(B266)).sum()

D:\files\gex\Cases\Ca10.gex

	0	1	C	D	E	F	G	H
	1	264	6	TEPS Electric	\$140.00	\$840.00		
B-		265	<b>StockBegin</b>	<b>Sale Volume</b>	<b>S-Amount</b>	<b>P-Volume</b>		
	1	266	6		15 \$1,950.00	21		
	1	267	2		9 \$2,628.00	13		
	1	268	10		23 \$3,585.00	31		
	1	269	3		9 \$1,728.00	12		
	1	270	5		19 \$2,395.00	26		

10. Calculate the total amount of purchase of each commodity this month

G267 = {F264}({B264}.pos@a(B267)).sum()

D:\files\gex\Cases\Ca10.gex

	0	1	C	D	E	F	G	H
	1	264	6	TEPS Electric	\$140.00	\$840.00		
B-		265	<b>StockBegin</b>	<b>Sale Volume</b>	<b>S-Amount</b>	<b>P-Volume</b>	<b>P-Amount</b>	
	1	266	6		15 \$1,950.00	21	\$2,100.00	
	1	267	2		9 \$2,628.00	13	\$3,250.00	
	1	268	10		23 \$3,585.00	31	\$3,600.00	
	1	269	3		9 \$1,728.00	12	\$1,860.00	
	1	270	5		19 \$2,395.00	26	\$2,570.00	

11. To calculate the average purchase cost of each commodity this month, just simply divide the total amount of purchase by the total purchase volume this month.

H266 = G266/F266

D:\files\gex\Cases\Ca10.gex

	0	1	D	E	F	G	H	I
	1	264	TEPS Electric	\$140.00	\$840.00			
B-		265	<b>Sale Volume</b>	<b>S-Amount</b>	<b>P-Volume</b>	<b>P-Amount</b>	<b>PAvgPrice</b>	
	1	266	15	\$1,950.00	21	\$2,100.00	\$100.00	
	1	267	9	\$2,628.00	13	\$3,250.00	\$250.00	
	1	268	23	\$3,585.00	31	\$3,600.00	\$116.13	
	1	269	9	\$1,728.00	12	\$1,860.00	\$155.00	
	1	270	19	\$2,395.00	26	\$2,570.00	\$98.85	

12. To calculate the remaining inventory of each commodity at the end of this month, add the initial inventory to the purchase volume and then deduct the sales volume.



I266 = =C266+F266-D266

D:\files\gex\Cases\Ca10.gex

		E	F	G	H	I	J
1	264	\$140.00	\$840.00				
B-	265	<b>S-Amount</b>	<b>P-Volume</b>	<b>P-Amount</b>	<b>PAvgPrice</b>	<b>StockEnd</b>	
1	266	\$1,950.00	21	\$2,100.00	\$100.00	12	
1	267	\$2,628.00	13	\$3,250.00	\$250.00	6	
1	268	\$3,585.00	31	\$3,600.00	\$116.13	18	
1	269	\$1,728.00	12	\$1,860.00	\$155.00	6	
1	270	\$2,395.00	26	\$2,570.00	\$98.85	12	

13. Calculate the capital tied up in inventory of each commodity.

J266 = =H266\*I266

D:\files\gex\Cases\Ca10.gex

		F	G	H	I	J
1	264	\$840.00				
B-	265	<b>P-Volume</b>	<b>P-Amount</b>	<b>PAvgPrice</b>	<b>StockEnd</b>	<b>Store cost</b>
1	266	21	\$2,100.00	\$100.00	12	\$1,200.00
1	267	13	\$3,250.00	\$250.00	6	\$1,500.00
1	268	31	\$3,600.00	\$116.13	18	\$2,090.32
1	269	12	\$1,860.00	\$155.00	6	\$930.00
1	270	26	\$2,570.00	\$98.85	12	\$1,186.15

## 4. Result

The result is as follows:



0	1	A	B	C	D
1-	1	ID	Electrical equipment	StockEnd	Store cost
1	2	1	Element 19" Class LCD 720p 60Hz HDTV	12	\$1,200.00
1	3	2	Vizio 32" Class LCD 720p 60Hz HDTV	6	\$1,500.00
1	4	3	Philips 19" Class LCD 720p 60Hz HDTV	18	\$2,090.32
1	5	4	Sanyo 26" Class LCD 720p 60Hz HDTV	6	\$930.00
1	6	5	Hisense 24" Class LCD 1080p 60Hz HDTV	12	\$1,186.15
1	7	6	Vizio 42" Class 3D-LCD HDTV 1080p 120Hz	9	\$4,882.50
1	8	7	Apple iPod Touch 8GB	9	\$1,195.71
1	9	8	Apple iPod classic 160GB	14	\$2,632.00
1	10	9	Apple iPod Nano 8GB	10	\$833.33
1	11	10	Dell Inspiron One 2320 Desktop PC	11	\$5,610.00
1	12	11	Vizio Silver CA27-A0 Desktop PC	10	\$8,540.00
1	13	12	ZT Affinity 870 Desktop PC	8	\$6,320.00
1	14	13	HP Pavilion p7-1003wb Desktop PC	5	\$2,888.89
1	15	14	Dell Refurbished GX520 Desktop PC	12	\$1,440.00
1	16	15	CyberpowerPC GUA250 Desktop PC	4	\$1,571.43
1	17	16	ZT Affinity 850 Desktop PC	2	\$1,053.33
1	18	17	Lenovo ThinkCentre M58 Desktop PC	8	\$1,920.00
		18	HP D53100 Desktop PC	11	\$702.00