TASK – 4 : SQL for Data Analysis

A. Use SELECT, WHERE, ORDER BY, GROUP BY

Query:

SELECT Country, SUM(Quantity) **AS** TotalQuantity
FROM ecom
GROUP BY Country
ORDER BY TotalQuantity **DESC;**

O/P:

InvoiceNo	StockCode	Description	Quantity	InvoiceDate	UnitPrice	CustomerID	Country
536365	85123A	WHITE HANGING HEART T-LIGHT HOLDER	6	12/1/2010 8:26	2.55	17850	United Kingdom
536365	71053	WHITE METAL LANTERN	6	12/1/2010 8:26	3.39	17850	United Kingdom
536365	84406B	CREAM CUPID HEARTS COAT HANGER	8	12/1/2010 8:26	2.75	17850	United Kingdom
536365	84029G	KNITTED UNION FLAG HOT WATER BOTTLE	6	12/1/2010 8:26	3.39	17850	United Kingdom
536365	84029E	RED WOOLLY HOTTIE WHITE HEART.	6	12/1/2010 8:26	3.39	17850	United Kingdom
536365	22752	SET 7 BABUSHKA NESTING BOXES	2	12/1/2010 8:26	7.65	17850	United Kingdom
536365	21730	GLASS STAR FROSTED T-LIGHT HOLDER	6	12/1/2010 8:26	4.25	17850	United Kingdom
536366	22633	HAND WARMER UNION JACK	6	12/1/2010 8:28	1.85	17850	United Kingdom
536366	22632	HAND WARMER RED POLKA DOT	6	12/1/2010 8:28	1.85	17850	United Kingdom
536367	84879	ASSORTED COLOUR BIRD ORNAMENT	32	12/1/2010 8:34	1.69	13047	United Kingdom
536367	22745	POPPY'S PLAYHOUSE BEDROOM	6	12/1/2010 8:34	2.1	13047	United Kingdom
536367	22748	POPPY'S PLAYHOUSE KITCHEN	6	12/1/2010 8:34	2.1	13047	United Kingdom
536367	22749	FELTCRAFT PRINCESS CHARLOTTE DOLL	8	12/1/2010 8:34	3.75	13047	United Kingdom
536367	22310	IVORY KNITTED MUG COSY	6	12/1/2010 8:34	1.65	13047	United Kingdom
536367	84969	BOX OF 6 ASSORTED COLOUR TEASPOONS	6	12/1/2010 8:34	4.25	13047	United Kingdom
536367	22623	BOX OF VINTAGE JIGSAW BLOCKS	3	12/1/2010 8:34	4.95	13047	United Kingdom
536367	22622	BOX OF VINTAGE ALPHABET BLOCKS	2	12/1/2010 8:34	9.95	13047	United Kingdom
536367	21754	HOME BUILDING BLOCK WORD	3	12/1/2010 8:34	5.95	13047	United Kingdom
536367	21755	LOVE BUILDING BLOCK WORD	3	12/1/2010 8:34	5.95	13047	United Kingdom
536367	21777	RECIPE BOX WITH METAL HEART	4	12/1/2010 8:34	7.95	13047	United Kingdom
536367	48187	DOORMAT NEW ENGLAND	4	12/1/2010 8:34	7.95	13047	United Kingdom
536368	22960	JAM MAKING SET WITH JARS	6	12/1/2010 8:34	4.25	13047	United Kingdom
536368	22913	RED COAT RACK PARIS FASHION	3	12/1/2010 8:34	4.95	13047	United Kingdom
536368	22912	YELLOW COAT RACK PARIS FASHION	3	12/1/2010 8:34	4.95	13047	United Kingdom

Orders with unit price over 5

Query:

SELECT * **FROM** ecom
WHERE UnitPrice > 5
ORDER BY UnitPrice **DESC;**

O/P:

InvoiceNo	StockCode	Description	Quantity	InvoiceDate	UnitPrice	CustomerID	Country
536835	22655	VINTAGE RED KITCHEN CABINET	1	12/2/2010 18:06	295	13145	United Kingdom
538354	22826	LOVE SEAT ANTIQUE WHITE METAL	2	12/10/2010 15:45	175	16873	United Kingdom
536392	22827	RUSTIC SEVENTEEN DRAWER SIDEBOARD	1	12/1/2010 10:29	165	13705	United Kingdom
537859	22828	REGENCY MIRROR WITH SHUTTERS	1	12/8/2010 16:11	165	14030	United Kingdom
537859	22827	RUSTIC SEVENTEEN DRAWER SIDEBOARD	2	12/8/2010 16:11	145	14030	United Kingdom
536676	21769	VINTAGE POST OFFICE CABINET	1	12/2/2010 12:18	79.95	16752	United Kingdom
537659	21769	VINTAGE POST OFFICE CABINET	10	12/7/2010 16:43	52.77	18102	United Kingdom
536540	C2	CARRIAGE	1	12/1/2010 14:05	50	14911	EIRE
537378	C2	CARRIAGE	1	12/6/2010 13:06	50	14911	EIRE
537368	C2	CARRIAGE	1	12/6/2010 12:40	50	14911	EIRE
538002	C2	CARRIAGE	1	12/9/2010 11:48	50	14932	Channel Islands
537963	C2	CARRIAGE	1	12/9/2010 11:30	50	13369	United Kingdom
537224	22833	HALL CABINET WITH 3 DRAWERS	1	12/5/2010 16:24	49.95	13174	United Kingdom
537065	84963A	PINK PAINTED KASHMIRI CHAIR	4	12/5/2010 11:57	42.95	12567	France
536858	POST	POSTAGE	2	12/3/2010 10:36	40	13520	Switzerland
537653	22803	IVORY EMBROIDERED QUILT	2	12/7/2010 15:54	39.95	17897	United Kingdom
538529	84816	DANISH ROSE BEDSIDE CABINET	1	12/13/2010 10:24	39.95	14290	United Kingdom
537765	21686	MEDINA STAMPED METAL STOOL	1	12/8/2010 12:08	39.95	14606	United Kingdom
538171	22824	3 TIER SWEETHEART GARDEN SHELF	1	12/9/2010 20:01	35.95	17530	United Kingdom
538094	22824	3 TIER SWEETHEART GARDEN SHELF	1	12/9/2010 14:50	35.95	13117	United Kingdom
536750	22803	IVORY EMBROIDERED QUILT	2	12/2/2010 14:04	35.75	17850	United Kingdom
536752	22803	IVORY EMBROIDERED QUILT	2	12/2/2010 14:06	35.75	17850	United Kingdom

B. Use JOINS (INNER, LEFT, RIGHT)

-- Sample customer table

```
CREATE TABLE customers (
  CustomerID INT PRIMARY KEY,
  CustomerName VARCHAR(100)
  );
```

-- INNER JOIN

```
SELECT e.InvoiceNo, c.CustomerName, e.UnitPrice
FROM ecom e
INNER JOIN customers c ON e.CustomerID = c.CustomerID;
```

O/P:

InvoiceNo	CustomerName	UnitPrice

**Since the customer table doesn't have any data, so the output table is blank.

-- LEFT JOIN

SELECT e.*, c.CustomerName
FROM ecom **e**
LEFT JOIN customers **c ON e.**CustomerID **= c.**CustomerID**;**

InvoiceNo	StockCode	Description	Quantity	InvoiceDate	UnitPrice	CustomerID	Country	CustomerName
536365	85123A	WHITE HANGING HEART T-LIGHT HOLDER	6	12/1/2010 8:26	2.55	17850	United Kingdom	NULL
536365	71053	WHITE METAL LANTERN	6	12/1/2010 8:26	3.39	17850	United Kingdom	NULL
536365	84406B	CREAM CUPID HEARTS COAT HANGER	8	12/1/2010 8:26	2.75	17850	United Kingdom	NULL
536365	84029G	KNITTED UNION FLAG HOT WATER BOTTLE	6	12/1/2010 8:26	3.39	17850	United Kingdom	NULL
536365	84029E	RED WOOLLY HOTTIE WHITE HEART.	6	12/1/2010 8:26	3.39	17850	United Kingdom	NULL
536365	22752	SET 7 BABUSHKA NESTING BOXES	2	12/1/2010 8:26	7.65	17850	United Kingdom	NULL
536365	21730	GLASS STAR FROSTED T-LIGHT HOLDER	6	12/1/2010 8:26	4.25	17850	United Kingdom	NULL
536366	22633	HAND WARMER UNION JACK	6	12/1/2010 8:28	1.85	17850	United Kingdom	NULL
536366	22632	HAND WARMER RED POLKA DOT	6	12/1/2010 8:28	1.85	17850	United Kingdom	NULL
536367	84879	ASSORTED COLOUR BIRD ORNAMENT	32	12/1/2010 8:34	1.69	13047	United Kingdom	NULL
536367	22745	POPPY'S PLAYHOUSE BEDROOM	6	12/1/2010 8:34	2.1	13047	United Kingdom	NULL
536367	22748	POPPY'S PLAYHOUSE KITCHEN	6	12/1/2010 8:34	2.1	13047	United Kingdom	NULL
536367	22749	FELTCRAFT PRINCESS CHARLOTTE DOLL	8	12/1/2010 8:34	3.75	13047	United Kingdom	NULL
536367	22310	IVORY KNITTED MUG COSY	6	12/1/2010 8:34	1.65	13047	United Kingdom	NULL
536367	84969	BOX OF 6 ASSORTED COLOUR TEASPOONS	6	12/1/2010 8:34	4.25	13047	United Kingdom	NULL
536367	22623	BOX OF VINTAGE JIGSAW BLOCKS	3	12/1/2010 8:34	4.95	13047	United Kingdom	NULL
536367	22622	BOX OF VINTAGE ALPHABET BLOCKS	2	12/1/2010 8:34	9.95	13047	United Kingdom	NULL
536367	21754	HOME BUILDING BLOCK WORD	3	12/1/2010 8:34	5.95	13047	United Kingdom	NULL
536367	21755	LOVE BUILDING BLOCK WORD	3	12/1/2010 8:34	5.95	13047	United Kingdom	NULL
536367	21777	RECIPE BOX WITH METAL HEART	4	12/1/2010 8:34	7.95	13047	United Kingdom	NULL
536367	48187	DOORMAT NEW ENGLAND	4	12/1/2010 8:34	7.95	13047	United Kingdom	NULL
536368	22960	JAM MAKING SET WITH JARS	6	12/1/2010 8:34	4.25	13047	United Kingdom	NULL
536368	22913	RED COAT RACK PARIS FASHION	3	12/1/2010 8:34	4.95	13047	United Kingdom	NULL

-- RIGHT JOIN

SELECT e.*, c.CustomerName
FROM ecom **e**
RIGHT JOIN customers **c ON e.**CustomerID **= c.**CustomerID**;**

InvoiceNo	StockCode	Description	Quantity	InvoiceDate	UnitPrice	CustomerID	Country	CustomerName

C. WRITE SUBQUERIES

Query:

SELECT * **FROM** ecom
WHERE UnitPrice **> (**

```
SELECT AVG(UnitPrice) FROM ecom
);
```

O/P:

	InvoiceNo	StockCode	Description	Quantity	InvoiceDate	UnitPrice	CustomerID	Country
▶	536365	71053	WHITE METAL LANTERN	6	12/1/2010 8:26	3.39	17850	United Kingdom
	536365	84029G	KNITTED UNION FLAG HOT WATER BOTTLE	6	12/1/2010 8:26	3.39	17850	United Kingdom
	536365	84029E	RED WOOLLY HOTTIE WHITE HEART.	6	12/1/2010 8:26	3.39	17850	United Kingdom
	536365	22752	SET 7 BABUSHKA NESTING BOXES	2	12/1/2010 8:26	7.65	17850	United Kingdom
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	536367	84969	BOX OF 6 ASSORTED COLOUR TEASPOONS	6	12/1/2010 8:34	4.25	13047	United Kingdom
	536367	22623	BOX OF VINTAGE JIGSAW BLOCKS	3	12/1/2010 8:34	4.95	13047	United Kingdom
	536367	22622	BOX OF VINTAGE ALPHABET BLOCKS	2	12/1/2010 8:34	9.95	13047	United Kingdom
	536367	21754	HOME BUILDING BLOCK WORD	3	12/1/2010 8:34	5.95	13047	United Kingdom
	536367	21755	LOVE BUILDING BLOCK WORD	3	12/1/2010 8:34	5.95	13047	United Kingdom
	536367	21777	RECIPE BOX WITH METAL HEART	4	12/1/2010 8:34	7.95	13047	United Kingdom
	536367	48187	DOORMAT NEW ENGLAND	4	12/1/2010 8:34	7.95	13047	United Kingdom
	536368	22960	JAM MAKING SET WITH JARS	6	12/1/2010 8:34	4.25	13047	United Kingdom
	536368	22913	RED COAT RACK PARIS FASHION	3	12/1/2010 8:34	4.95	13047	United Kingdom
	536368	22912	YELLOW COAT RACK PARIS FASHION	3	12/1/2010 8:34	4.95	13047	United Kingdom
	536368	22914	BLUE COAT RACK PARIS FASHION	3	12/1/2010 8:34	4.95	13047	United Kingdom
	536369	21756	BATH BUILDING BLOCK WORD	3	12/1/2010 8:35	5.95	13047	United Kingdom
	536370	22728	ALARM CLOCK BAKELIKE PINK	24	12/1/2010 8:45	3.75	12583	France
	536370	22727	ALARM CLOCK BAKELIKE RED	24	12/1/2010 8:45	3.75	12583	France
	536370	22726	ALARM CLOCK BAKELIKE GREEN	12	12/1/2010 8:45	3.75	12583	France
	536370	21913	VINTAGE SEASIDE JIGSAW PUZZLES	12	12/1/2010 8:45	3.75	12583	France
	536370	POST	POSTAGE	3	12/1/2010 8:45	18	12583	France

D. Use AGGREGATE FUNCTIONS (SUM, AVG)

Query:

-- Total and average sales per country

```
SELECT Country,
    SUM(Quantity * UnitPrice) AS TotalSales,
    AVG(UnitPrice) AS AvgUnitPrice
FROM ecom
GROUP BY Country;
```

O/P:

Country	TotalSales	AvgUnitPrice
United Kingdom	326963.1300000108	3.0309301751786295
France	7362.319999999995	3.4967957746478913
Australia	617.15	4.3504545454545465
Netherlands	192.60000000000002	8.425
Germany	8044.490000000001	3.7979442508710863
Norway	3787.1199999999994	1.62469387755102
EIRE	5889.83	4.964883720930241
Switzerland	303.4	9.241666666666667
Spain	1675.7299999999998	3.599384615384613
Poland	248.16	2.37375
Portugal	1976.4699999999996	4.310531914893613
Italy	427.79999999999995	4.104166666666667
Belgium	346.1	3.1174999999999997
Lithuania	1661.06	2.8411428571428576
Japan	7705.0700000000015	1.8999999999999997
Iceland	711.79	2.8900000000000006
Channel Islands	363.53	9.449411764705884
Denmark	1281.5000000000002	4.6485

E. CREATE VIEWS FOR ANALYSIS

-- *View for Customer Spending Summary*

Query:

```
CREATE VIEW css AS
SELECT CustomerID,
    COUNT(DISTINCT InvoiceNo) AS TotalOrders,
    SUM(Quantity * UnitPrice) AS TotalSpent
FROM ecom
GROUP BY CustomerID
ORDER BY TotalSpent DESC;

SELECT * FROM css;
```

O/P:

CustomerID	TotalOrders	TotalSpent
18102	4	27834.61
15061	11	17344.780000000002
13777	9	6840.160000000001
14911	9	5567.630000000001
17850	34	5391.210000000009
16210	3	5277.74
16029	3	4271.52
13798	2	4170.66
12755	1	3794.3999999999996
12433	2	3787.1199999999994
17381	3	3603.7200000000003
12753	1	3590.5900000000006
17511	2	3470.68
12748	23	3418.3299999999995
13089	3	3230.620000000001
15032	2	2770.599999999999
17340	1	2671.27
13081	2	2366.78
12471	2	2360.41
16873	1	2157.640000000001
17450	2	2028.84
16754	1	2002.4
12567	2	1942.3799999999997
14031	2	1900.0700000000002

F. OPTIMIZE QUERIES WITH INDEXES

-- Index on InvoiceDate for faster time-based filtering

Query:

CREATE INDEX idx_country_customer **ON** ecom**(Country(50),** CustomerID**);**

SHOW INDEX FROM ecom**;**

O/P:

Table	Non_unique	Key_name	Seq_in_index	Column_name	Collation	Cardinality	Sub_part	Packed	Null	Index_type	Comment	Index_comment	Visible	Expression
ecom	1	idx_country_customer	1	Country	A	18	50	NULL	YES	BTREE			YES	NULL
ecom	1	idx_country_customer	2	CustomerID	A	651	NULL	NULL	YES	BTREE			YES	NULL