COMP33111
Tutorial and lab exercise 3

Part 1: Understanding OLAP functionalities

1. Discuss the differences between OLTP and OLAP.

2. Describe the role of ranking functions (e.g. *rank*(), *dense_rank*()) in SQL.

3. Explain slice and dice operations in OLAP. Given a fact table with sales data (for example *sales*(*market#, product#, time#, amount*) – see the lecture notes) and relevant dimension tables, write an SQL statement that slices the cube to select sales only in week 2, and dice it by regions.

4. Explain ROLLUP and CUBE extensions in SQL. Calculate the following query given the table (sales) below:

```
SELECT    Time, Region, Department, sum(Profit) AS Profit
FROM      sales
GROUP BY ROLLUP(Time, Region, Department)
```

Time	Region	Department	Profit
2000	Central	VideoRental	75,000
2000	Central	VideoSales	74,000
2000	East	VideoRental	89,000
2000	East	VideoSales	115,000
2000	West	VideoRental	87,000
2000	West	VideoSales	86,000
2001	Central	VideoRental	82,000
2001	Central	VideoSales	85,000
2001	East	VideoRental	101,000
2001	East	VideoSales	137,000
2001	West	VideoRental	96,000
2001	West	VideoSales	97,000

5. Given are the fact table *PropertySale:*

   PropertySale(*branchNo, propertyType*, *yearMonth*, *saleAmount*)

and dimension table *Branch*(*branchNo*, *city*), along with the following SQL statement:

```
SELECT    propertyType, yearMonth, city, SUM(saleAmount)
FROM      Branch, PropertySale
WHERE     Branch.branchNo = propertySale.branchNo
      AND propertySale IN ('2007-01', '2007-02')
      AND branch.city IN (Manchester, Edinburgh, Birmingham)
GROUP BY CUBE (propertyType, yearMonth, city).
```

(a) Explain (in plain English) which data would the above query retrieve.

(b) If the query resulted in the table on the next page, what would be the result of the following query:

```
SELECT      propertyType, yearMonth, city, SUM(saleAmount)
FROM        Branch, PropertySale
WHERE       Branch.branchNo = propertySale.branchNo
      AND   propertySale IN ('2007-01', '2007-02')
      AND   branch.city IN ('Manchester', 'Edinburgh',
Birmingham')
GROUP BY ROLLUP (propertyType, yearMonth, city).
```

propertyType	yearMonth	city	saleAmount
flat	2007-01	Manchester	115432
flat	2007-01	Edinburgh	236573
flat	2007-01	Birmingham	7664
flat	2007-01		359669
flat	2007-02	Manchester	123780
flat	2007-02	Edinburgh	323100
flat	2007-02	Birmingham	8755
flat	2007-02		455635
flat		Manchester	239212
flat		Edinburgh	559673
flat		Birmingham	16419
flat			815304
house	2007-01	Manchester	77987
house	2007-01	Edinburgh	135670
house	2007-01	Birmingham	4765
house	2007-01		218422
house	2007-02	Manchester	76312
house	2007-02	Edinburgh	166503
house	2007-02	Birmingham	4889
house	2007-02		247713
house		Manchester	154308
house		Edinburgh	302173
house		Birmingham	9654
house			466135
	2007-01	Manchester	193419
	2007-01	Edinburgh	372243
	2007-01	Birmingham	12429
	2007-01		578091
	2007-02	Manchester	2001001
	2007-02	Edinburgh	489603
	2007-02	Birmingham	13644
	2007-02		703348
		Manchester	393520
		Edinburgh	861846
		Birmingham	26073
			1281439

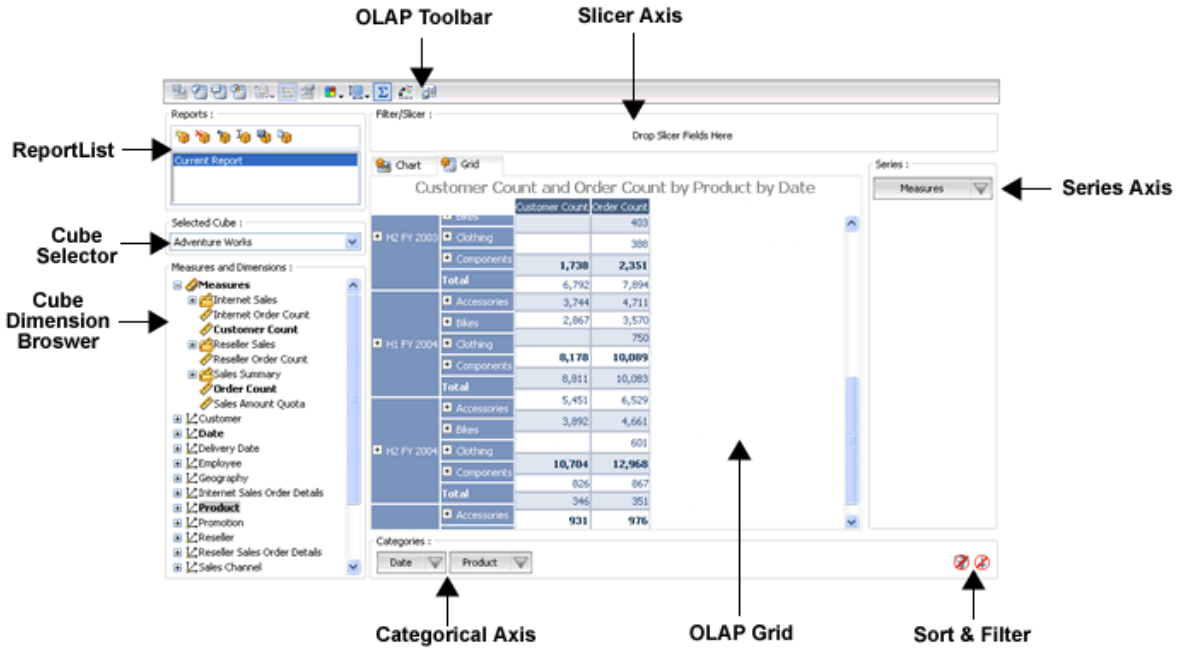
Part 2: Example OLAP services[1]

Task 1.A: Dundas OLAP Services

Dundas is an example of an OLAP framework. It provides standard OLAP functions, such as drill down, filtering, sorting and pivoting. In this exercise you need to familiarise yourself with various demos of Dundas OLAP tools.

1. Start the demo by clicking at http://demos3.dundas.com/OlapDemo62/

The following diagram represents the main elements of the workspace:



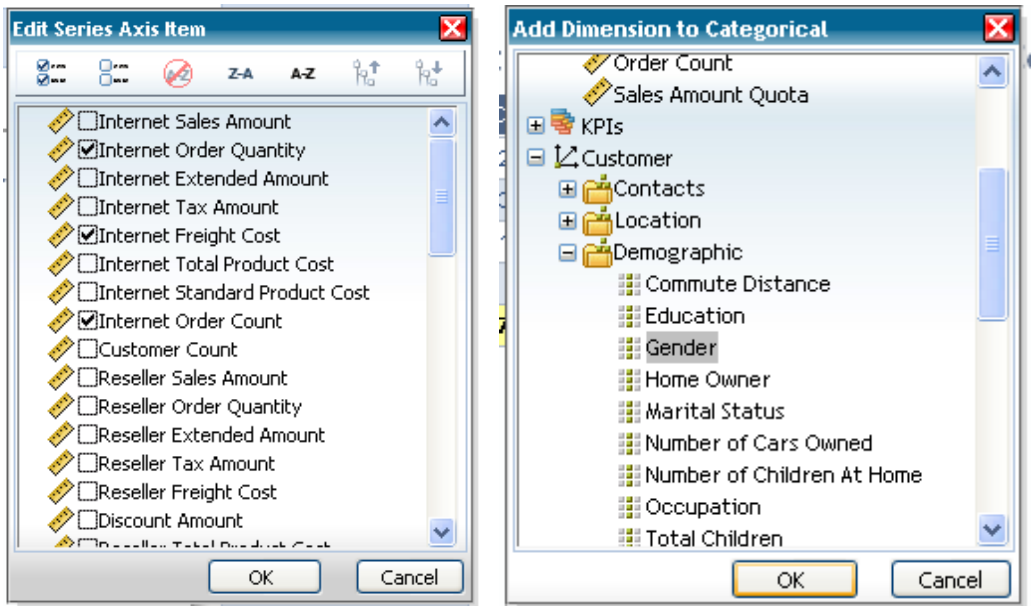
You can view the data via charts or grids.

2. Go to the Dimension Browser, located on the lower left of the demo screen, and explore some of the dimensions. For example, consider attributes used for Customer and Date dimensions. In addition, explore Sales Territory and Ship Date.

3. Items under the Measures node represent measures. Explore and familiarise yourself with all the measures. What measures are represented can be selected from the Measures menu on the right, or measures can be drag and dropped onto the series axis builder to the right of the chart. Items under the other nodes (dimensions) can be dropped on to the filter axis builder above the chart or the category axis builder below the chart. Once dropped, these items can be dragged to a different position within an axis, to another axis or back to the Dimension Browser. Options can

[1] Prepared using http://www.dundas.com/Products/Chart/NET/OLAP/QuickStart1.aspx

also be found by right clicking on an item to bring up a context menu. In addition, items can be dragged directly onto the new grid control.



The grid and chart allow to drill up or down, and the built-in context menu can be used to add, remove, filter and sort data. You can click on ⊞ where available to drill-down, or on ⊟ to roll-up (drill-up) along that dimension. More details as how to add/remove data, drill-down and roll-up, as well as how to do filtering and sorting is in the attached.

4. Using the grid, find out the amount of Customer Count and Internet Order Count (under Sales Summary) in first half of 2003 FY (fiscal year), drilled-own by customer gender.

Chart | Grid

Internet Order Count and Customer Count by Customer by Date

			Internet Order Count	Customer Count
⊞ FY 2002	Female		1,103	1,103
	Male		1,103	1,103
	Total		**2,206**	**2,206**
⊟ FY 2003	⊞ H1 FY 2003	Female	771	771
		Male	713	713
		Total	**1,484**	**1,484**
	⊞ H2 FY 2003	Female	858	858
		Male	880	880
		Total	**1,738**	**1,738**
	Total		**3,222**	**3,222**
⊞ FY 2004	Female		10,512	8,594
	Male		10,743	8,818
	Total		**21,255**	**17,412**
⊞ FY 2005	Female		498	478
	Male		478	453
	Total		**976**	**931**

Then, replace gender with the customer's country (select Geography sub-dimension and drag "country" to the grid). Explore these two measures in Australia. Compare the performance in the first and second half of 2003 (you can filter out all other countries and years).

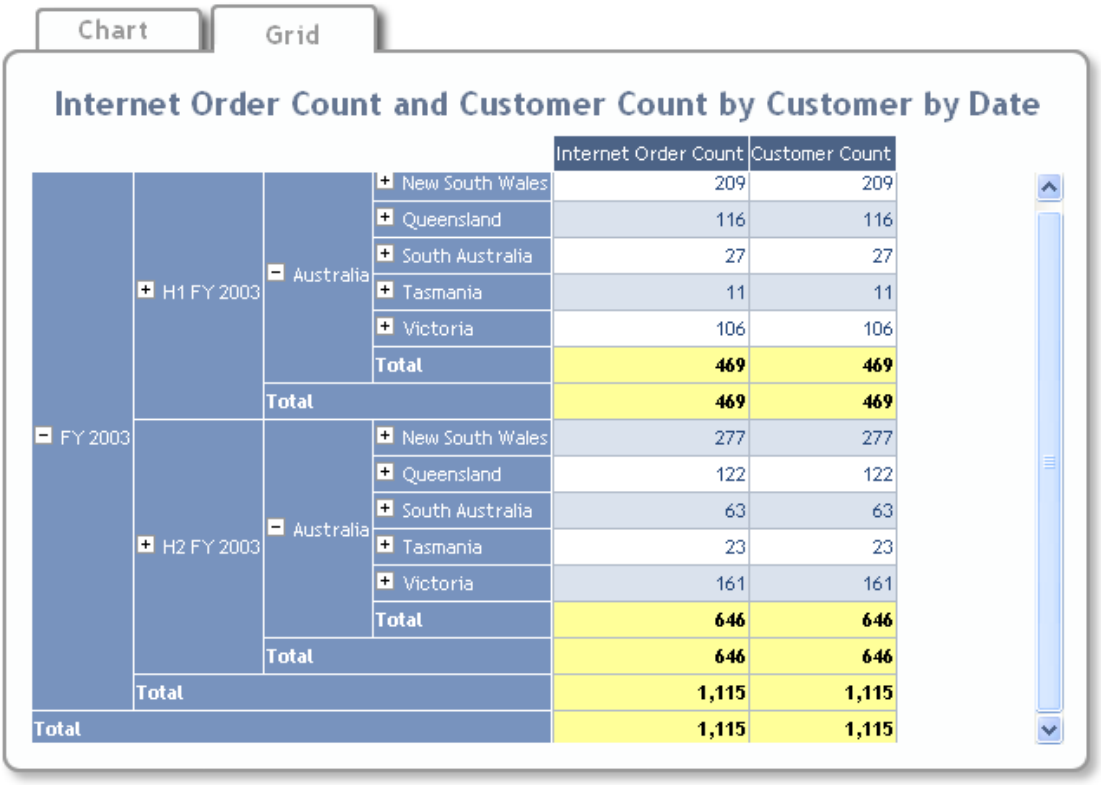


Chart Grid

Internet Order Count and Customer Count by Customer by Date

				Internet Order Count	Customer Count
FY 2003	H1 FY 2003	Australia	New South Wales	209	209
			Queensland	116	116
			South Australia	27	27
			Tasmania	11	11
			Victoria	106	106
			Total	**469**	**469**
		Total		**469**	**469**
	H2 FY 2003	Australia	New South Wales	277	277
			Queensland	122	122
			South Australia	63	63
			Tasmania	23	23
			Victoria	161	161
			Total	**646**	**646**
		Total		**646**	**646**
	Total			**1,115**	**1,115**
Total				**1,115**	**1,115**

5. Find out what was the total Internet Freight Cost in February 2004, and drill it down by Source Currency (AUD, CAD, GBP, USD) and Sales Territory. Are there any differences between February and August 2004?

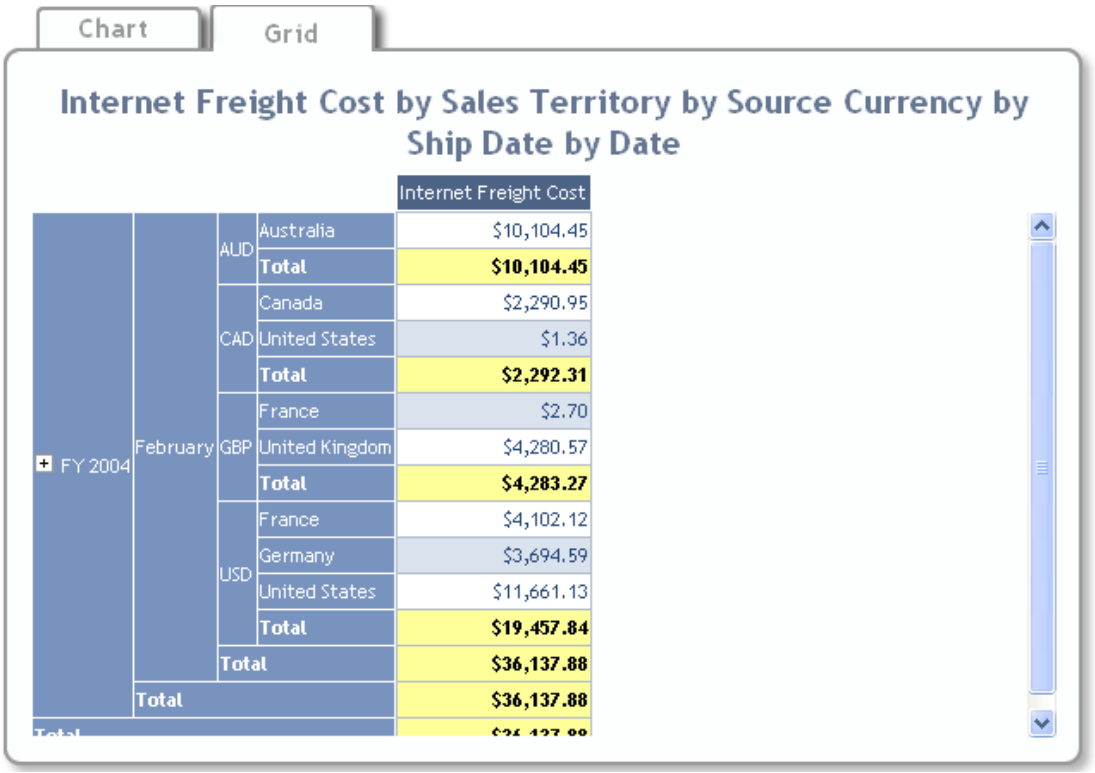


Chart Grid

Internet Freight Cost by Sales Territory by Source Currency by Ship Date by Date

				Internet Freight Cost
FY 2004	February	AUD	Australia	$10,104.45
			Total	**$10,104.45**
		CAD	Canada	$2,290.95
			United States	$1.36
			Total	**$2,292.31**
		GBP	France	$2.70
			United Kingdom	$4,280.57
			Total	**$4,283.27**
		USD	France	$4,102.12
			Germany	$3,694.59
			United States	$11,661.13
			Total	**$19,457.84**
		Total		**$36,137.88**
	Total			**$36,137.88**
Total				**$36,137.88**

Task 1.B: Radar-soft OLAP Services

In this part of the exercise, you need to explore features available at Radar-Soft OLAP and Visual Analysis solutions[2]. The solution provides a real time OLAP browser and generation of analytical reports, with graphical representation and Visual Analysis technology. Brief demos are available at

http://www.radar-soft.com/products/videos.aspx

to demonstrate the main OLAP operations (drilling, pivoting, etc.). Note that visualisation is either via grids or via charts

A demo with real data is available at http://olaponline.radar-soft.com/ . Explore what measures and dimensions are provided in this demo. Find out how you can get any slice of the data, find hot spots and drill down to the details. Consider various visualisation options.

[2] http://www.radar-soft.com/