

## EECS 495: Intro to Database Systems

### Project 3 – Data Warehouse

1. (a) Write an SQL query (run against the SQL Server Adventure Works database) that returns the aggregates needed for the given cross tabulation.

#### SQL Query:

```
SELECT geography.EnglishCountryRegionName AS Country,
CASE WHEN customer.EnglishEducation IS NULL THEN 'AllCustomers' ELSE customer.EnglishEducation END AS Education,
COUNT(customer.LastName) AS AllCustomers,
sum(CASE WHEN Gender = 'F' THEN 1 ELSE 0 END) AS Female,
sum(CASE WHEN Gender = 'M' THEN 1 ELSE 0 END) AS Male
FROM (AdventureWorksDW2012.dbo.DimCustomer customer JOIN AdventureWorksDW2012.dbo.DimGeography geography
ON customer.GeographyKey = geography.GeographyKey)
WHERE EnglishCountryRegionName = 'France' OR EnglishCountryRegionName = 'Germany'
GROUP BY geography.EnglishCountryRegionName, customer.EnglishEducation WITH rollup
HAVING geography.EnglishCountryRegionName IS NOT NULL
ORDER BY geography.EnglishCountryRegionName, customer.EnglishEducation;
```

#### Screenshot of Output:

The screenshot shows the SQL Server Enterprise Manager interface. The top pane displays the SQL query, and the bottom pane shows the results of the query execution. The results are presented as a cross-tabulation table with 12 rows and 6 columns.

	Country	Education	AllCustomers	Female	Male
1	France	AllCustomers	1810	893	917
2	France	Bachelors	336	156	180
3	France	Graduate Degree	160	83	77
4	France	High School	502	256	246
5	France	Partial College	566	277	289
6	France	Partial High School	246	121	125
7	Germany	AllCustomers	1780	874	906
8	Germany	Bachelors	430	222	208
9	Germany	Graduate Degree	172	85	87
10	Germany	High School	314	137	177
11	Germany	Partial College	642	320	322
12	Germany	Partial High School	222	110	112

Query executed successfully. | JISHNUPRADEEFAD (13.0 SP1) | JISHNUPRADEEFAD\jishnu... | AdventureWorksDW2012 | 00:00:00 | 12 rows

(b). Create now the cross-tabulation using the cube browser

Screenshot of Output:

The screenshot displays the Adventure Works cube browser interface. The left pane shows the metadata tree with dimensions like Country, Education, and Gender. The right pane shows a cross-tabulation table with columns for Country, Education, All Customers, Female, and Male. The table contains data for France and Germany across different education levels.

Country	Education	All Customers	Female	Male
France	Bachelors	336	156	180
France	Graduat...	160	83	77
France	High School	502	256	246
France	Partial C...	566	277	289
France	Partial Hi...	246	121	125
Germany	Bachelors	430	222	208
Germany	Graduat...	172	85	87
Germany	High School	314	137	177
Germany	Partial C...	642	320	322
Germany	Partial Hi...	222	110	112

**2. Rewrite the MDX-query of question 1, such that the answer becomes as given.**

MDX Query:

```
SELECT
    [Customer].[Gender].[Gender] ON COLUMNS,
    ( { [France], [Germany] }, [Customer].[Education].[Education] ) ON
ROWS
FROM [Adventure Works]
WHERE [Measures].[Customer Count];
```

Screenshot of Output:

		Female	Male
France	Bachelors	156	180
France	Graduate Degree	83	77
France	High School	256	246
France	Partial College	277	289
France	Partial High School	121	125
Germany	Bachelors	222	208
Germany	Graduate Degree	85	87
Germany	High School	137	177
Germany	Partial College	320	322
Germany	Partial High School	110	112

3. Make a cross-table between countries and education level that only includes counts of males.

MDX Query:

```
SELECT
    ([Customer].[Country].MEMBERS) ON COLUMNS,
    ([Customer].[Education].MEMBERS) ON ROWS
FROM [Adventure Works]
WHERE ([Measures].[Customer count],[Customer].[Gender].male);
```

Screenshot of Output:

MDXQuery1.mdx - J...AD\jishnupradeep)\*

```
SELECT
    ([Customer].[Country].MEMBERS) ON COLUMNS,
    ([Customer].[Education].MEMBERS) ON ROWS
FROM [Adventure Works]
WHERE ([Measures].[Customer count],[Customer].[Gender].male);
```

110 %

Messages Results

	All Customers	Australia	Canada	France	Germany	United Kingdom	United States
All Customers	9,351	1,814	804	917	906	979	3,931
Bachelors	2,728	843	187	180	208	292	1,018
Graduate Degree	1,578	152	171	77	87	131	960
High School	1,699	302	160	246	177	187	627
Partial College	2,522	373	187	289	322	254	1,097
Partial High School	824	144	99	125	112	115	229

4. Create a measure that counts the percentage of males in the customer count. Use this measure to make an overview of the percentage of males in the customer counts per country and year.

#### MDX Query:

```
WITH
MEMBER [Measures].[Male Percentage] AS ([Customer].[Gender].[Gender].[Male],[Measures].[Customer Count])
/ ((([Customer].[Gender].[Gender].[Female],[Measures].[Customer Count]) + ([Customer].[Gender].
[Gender].[Male],[Measures].[Customer Count]))),
FORMAT_STRING = 'percent'

SELECT
NON EMPTY [Date].[Calendar Year].[Calendar Year].MEMBERS ON COLUMNS,
[Country].[Country].MEMBERS ON ROWS
FROM [Adventure Works]
WHERE [Measures].[Male Percentage];
```

#### Screenshot of Output:

The screenshot shows a SQL Server Enterprise Manager window with the following MDX query:

```
WITH
MEMBER [Measures].[Male Percentage] AS ([Customer].[Gender].[Gender].[Male],[Measures].[Customer Count])
/ ((([Customer].[Gender].[Gender].[Female],[Measures].[Customer Count]) + ([Customer].[Gender].
[Gender].[Male],[Measures].[Customer Count]))),
FORMAT_STRING = 'percent'

SELECT
NON EMPTY [Date].[Calendar Year].[Calendar Year].MEMBERS ON COLUMNS,
[Country].[Country].MEMBERS ON ROWS
FROM [Adventure Works]
WHERE [Measures].[Male Percentage];
```

The results pane displays a table with the following data:

	CY 2005	CY 2006	CY 2007	CY 2008
Australia	50.25%	47.73%	50.75%	49.92%
Canada	38.30%	49.12%	53.13%	49.85%
France	50.85%	51.50%	52.25%	49.17%
Germany	55.26%	44.21%	50.62%	50.49%
United Kingdom	53.13%	53.21%	49.56%	52.56%
United States	51.03%	48.55%	49.17%	50.75%

**Note:** It has been assumed that the question asks for percentage of males in customer counts per country per calendar year. To find the same for fiscal year the following will be the MDX query and output.

### MDX Query:

```
WITH
MEMBER [Measures].[Male Percentage] AS ([Customer].[Gender].[Gender].[Male],[Measures].[Customer Count])
/ ((([Customer].[Gender].[Gender].[Female],[Measures].[Customer Count]) + ([Customer].[Gender].
[Gender].[Male],[Measures].[Customer Count])),
FORMAT_STRING = 'percent'

SELECT
NON EMPTY [Date.Fiscal Year].[Fiscal Year].MEMBERS ON COLUMNS,
[Country].[Country].MEMBERS ON ROWS
FROM [Adventure Works]
WHERE [Measures].[Male Percentage];
```

### Screenshot of Output:

The screenshot shows a SQL Server Enterprise Manager window with the following MDX query:

```
WITH
MEMBER [Measures].[Male Percentage] AS ([Customer].[Gender].[Gender].[Male],[Measures].[Customer Count])
/ ((([Customer].[Gender].[Gender].[Female],[Measures].[Customer Count]) + ([Customer].[Gender].
[Gender].[Male],[Measures].[Customer Count])),
FORMAT_STRING = 'percent'

SELECT
NON EMPTY [Date.Fiscal Year].[Fiscal Year].MEMBERS ON COLUMNS,
[Country].[Country].MEMBERS ON ROWS
FROM [Adventure Works]
WHERE [Measures].[Male Percentage];
```

The results are displayed in a table with the following data:

	FY 2006	FY 2007	FY 2008	FY 2009
Australia	49.74%	48.97%	50.50%	51.46%
Canada	50.00%	44.31%	51.47%	51.16%
France	46.81%	54.39%	50.74%	47.22%
Germany	50.00%	48.64%	50.65%	55.56%
United Kingdom	51.43%	51.39%	51.44%	41.98%
United States	50.52%	48.43%	50.33%	46.56%

5. Generate a list of the internet sales amount in all cities of France and Germany. Omit the empty cells.

MDX Query:

```
SELECT
    ([Measures].[Internet Sales Amount]) ON COLUMNS,
    NON EMPTY([Customer].[City].[City]) ON ROWS
FROM [Adventure Works]
WHERE ({[France], [Germany]});
```

Screenshot of Output:

Messages	Results
	Internet Sales Amount
Berlin	\$102,668.50
Berlin	\$32,596.49
Berlin	\$49,670.21
Berlin	\$75,995.42
Bobigny	\$90,204.45
Bonn	\$20,637.05
Bonn	\$22,068.18
Botrop	\$72,895.55
Boulogne-Billancourt	\$14,289.24
Boulogne-sur-Mer	\$11,342.92
Braunschweig	\$28,705.00
Cergy	\$46,755.90
Chatou	\$89,830.20
Colombes	\$90,268.51
Colomiers	\$54,641.72
Courbevoie	\$38,809.63
Croix	\$36,781.93
Damstadt	\$76,433.25
Drancy	\$56,031.38
Dresden	\$57,590.01
Duesseldorf	\$59,787.49
Dunkerque	\$75,474.38
Eilenburg	\$57,919.21
Erfangen	\$77,585.52
Essen	\$55,349.62
Frankfurt	\$67,852.63
Frankfurt	\$116,439.96
Frankfurt am Main	\$67,207.18
Frankfurt am Main	\$42,914.35
Grevenbroich	\$53,576.08
Hamburg	\$47,116.49
Hamburg	\$148,555.78
Hannover	\$28,792.22
Hof	\$91,915.14
Ingolstadt	\$109,037.41
Kassel	\$84,798.32
Kiel	\$67,554.62
Leipzig	\$60,193.26
Les Ulis	\$181,244.73
Lieusaint	\$57,094.80

Lille	\$65,419.93
Metz	\$94,046.23
Morangis	\$56,432.84
Mühlheim	\$52,821.22
München	\$59,916.04
München	\$62,085.04
München	\$38,080.35
München	\$162.99
Münster	\$49,718.86
Neunkirchen	\$93,896.67
Offenbach	\$84,521.13
Orleans	\$91,562.91
Orly	\$28,478.12
Paderborn	\$39,873.50
Paderborn	\$98,366.72
Pantin	\$77,603.76
Paris	\$539,725.80
Paris La Defense	\$45,350.86
Poing	\$40,132.90
Roissy en Brie	\$52,640.44
Roncq	\$38,304.87
Roubaix	\$86,282.63
Saarbrücken	\$50,324.34
Saarlouis	\$76,614.39
Saint Germain en Laye	\$76,177.34
Saint Ouen	\$34,441.73
Saint Ouen	\$21,473.74
Saint Ouen	\$29,555.28
Saint-Denis	\$63,782.59
Salzgitter	\$57,353.24
Sèvres	\$39,598.20
Solingen	\$100,217.24
Stuttgart	\$80,507.46
Sulzbach Taunus	\$66,739.77
Suresnes	\$35,099.73
Tremblay-en-France	\$91,857.57
Vernieres Le Buisson	\$41,619.61
Versailles	\$102,657.25
Villeneuve-d'Ascq	\$89,136.45
Weme	\$67,125.55

**Note:** To have countries included the following MDX query is used.

MDX Query:

```
SELECT
    [Measures].[Internet Sales Amount] ON COLUMNS,
    NON EMPTY ({ [France], [Germany] }, [city].[city].MEMBERS) ON ROWS
FROM [Adventure Works];
```

Screenshot of Output:

Messages		Results
		Internet Sales Amount
France	Bobigny	\$90,204.45
France	Boulogne-Billancourt	\$14,289.24
France	Boulogne-sur-Mer	\$11,342.92
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France	Vernieres Le Buisson	\$41,619.61
France	Versailles	\$102,657.25
France	Villeneuve-d'Ascq	\$89,136.45
Germany	Berlin	\$102,668.50
Germany	Berlin	\$32,596.49
Germany	Berlin	\$49,670.21
Germany	Berlin	\$75,995.42
Germany	Bonn	\$20,637.05

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		Internet Sales Amount
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Germany	Eilenburg	\$57,919.21
Germany	Erlangen	\$77,585.52
Germany	Essen	\$55,349.62
Germany	Frankfurt	\$67,852.63
Germany	Frankfurt	\$116,439.96
Germany	Frankfurt am Main	\$67,207.18
Germany	Frankfurt am Main	\$42,914.35
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Germany	Kassel	\$84,798.32
Germany	Kiel	\$67,554.62
Germany	Leipzig	\$60,193.26
Germany	Mühlheim	\$52,821.22
Germany	München	\$59,916.04
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