A. OLAP and Data Warehouse (25%)

Consider the following table called **GDP**:

Place	Population	GDPperCapita	NATO	FirstCredited	Density
USA	320M	53K	Y	1776	34
Switzerland	8M	84K	N	1848	198
France	66M	45K	Y	1791	116
Italy	60M	35K	Y	1861	202
Denmark	6M	62K	Y	1849	131
China	1357M	7K	N	1912	279
Luxembourg	0.5M	112K	Y	1815	194

and the following query called $\mathbf{Q_1}$

```
SELECT NATO, Sum(Population) AS SumPop
FROM GDP
WHERE Density >= 100 AND GDPperCapita < 100K
GROUP BY NATO
```

1) Show the result of query $\mathbf{Q_1}$ by filling in the table below (you may not need to use all the rows and columns).

NATO	SumPop		
N	1365M		
Y	132M		

2) On the result you obtained in point 1), perform now a **drill-down** operation on the **Place** dimension, keeping it at the *continent* level, and show the result by filling in the table below (you may not need to use all the rows and columns)

Place	NATO	SumPop	
Europe	Y	132M	
Europe	N	8M	
Asia	N	1357M	

3) On the result you obtained in point 2), perform now a **drill-down** operation on the **FirstCredited** dimension, keeping it at the *century* level, and show the result by filling in the table below (you may not need to use all the rows and columns)

Place	FirstCredited	NATO	SumPop
Europe	1700s	Y	66M
Europe	1800s	Y	66M
Europe	1800s	N	8M
Asia	1900s	N	1357M

4) On the result you obtained in point 3), perform now a **rollup** operation on **NATO** and show the result by filling in the table below (you may not need to use all the rows and columns)

Place	**FirstCredited**	**SumPop**	
Europe	1700s	66M	
Europe	1800s	74M	
Asia	1900s	1357M	

5) Let $\mathbf{Q_2}$ be the same query as $\mathbf{Q_1}$ but with the "WITH CUBE" clause at the end. Show the result of query $\mathbf{Q_2}$ by filling in the table below (you may not need to use all the rows and columns)

NATO	**SumPop**		
N	1365M		
Y	132M		
All	1497M		