**I) Introduction to Software Integration**

**II) Combining SQL and Tableau:**

\_ What SQL can but Tableau can’t:  
 +) Union of data: SQL to access and retrieve the information from your database  
 +) Stored procedures: SQL for complex table calculations  
 +) Pre-processing: SQL has a better performance  
\_ Problem structure:  
 +) Receive a business task  
 +) Use SQL to execute a query retrieving a relevant dataset from the database  
 +) Export the newly obtained data in a CSV file to be used in Tableau  
 +) Create a professional and understandable visualisation in Tableau

**III) Loading the database:**

**IV) Integrating SQL + Tableau:**

**Problem 1:**

Task: Create a visualisation that provides a breakdown between the male and female employees working in the company each year, starting from 1990.  
  
a) Query to find the total number of employees, both Male and Female, each year from 1990  
b) Exporting Your Output from SQL and Loading it in Tableau  
c) Visualizing the Solution in Tableau:  
 +) Add and adjust the colour aspect of visualisation  
 +) The graph can tell us how many employees work for the company in a certain year  
 +) How many workers were hired by the company in a certain year  
 +) The total number of employees through the years

**Problem 2:**

Task: Compare the number of active male managers to the number of active female managers from different departments for each year, starting from 1990. Create the same type of chart for each department.

a) SQL:  
 +) Use CASE Statements to classify which employees are still working for the company  
 +) USE SUBQUERIES to create a necessary field + GROUP BY to compact the outputs  
 +) CROSS JOIN and join more than two tables  
 +) Conclusion:

- The dataset is from the year 1990 to 2000  
 - It has 1000 rows  
 - The total active employees = 530

b) Tableau:  
 +) Apply filed (gender) to **detail**   
 +) The difference between **Measures** and **Dimensions**: **Dimensions** affect the level of detail in the view. **Measures** contain numeric, quantitative values that you can measure. **Measures** can be aggregated. When you drag a **measure** into the view, Tableau applies an aggregation to that **measure** (by default).  
 +) Hovering over certain parts of visualisation can show use quantitative information

**Problem 3:**

Task: Compare the average salary of female versus male employees in the entire company until year 2002, and add a filter allowing you to see that per each department

a) SQL:  
 +) Joining 4 tables

- There is no Female in Research department  
 - ‘Gender’ & ‘Department’ = text data  
 - ‘Salary’ & ‘Calendar\_year’ = numeric data

b) Tableau:   
 +) When you are using a measure in the ‘Rows’ section in Tableau you must always aggregate the data in certain way   
 +) In this exercise with filter you can perform some analytical reasonings such as:  
 - Overall the average salary of male employees is always higher than female employees  
 - The average salary of male employees > female counterparts in all departments

+) **Differences** Between Tableau Workbook ,Worksheet, Dashboard, and Story:  
 - A workbook contains sheets, which can be a worksheet, dashboard, or a story.  
 - A worksheet contains a single view along with shelves, legends, and the Data pane  
 - A dashboard is a collection of views from multiple worksheets.  
 - A story contains a sequence of worksheets or dashboards that work together to convey information

**Problem 4:**

Task: Create an SQL stored procedure that will allow you to obtain the average male and female salary per department within a certain salary range. Let this range be defined by two values the user can insert when calling the procedure.

Finally, visualize the obtained result-set in Tableau as a double bar chart.

a) SQL:  
 +) Joining 4 tables  
 +) Using a stored procedure  
 +) Create a range in the store procedure

b) Tableau:   
 +) How to know which field should be dragged? Based on the question, think of the chart that can answer the question and you know what fields belong to rows or columns  
 +) **How to create a double bar chart?**

**Problem 5:**

Task: Build a Dashboard

a) Tableau:  
 +) Stretch the dashboard automatically  
 +) What’s the difference between a legend and a filter?  
 - A **legend** can be applied to a worksheet **only**, while a **filter** can be applied to a worksheet **and** a dashboard   
 +) Apply the filter to all charts

