Department of Computer Science and Informatics
CSID6853 – Data Warehousing – 2025
Practical Project - Part A

Instructions

- Ensure you have access to a SQL Server 2019 installation and instance.
- Downloads and unzip the two compressed files (CSID6853Accounting20132015.zip and CSID6853OrderProcessingSystem20132015.zip) and the csv file (ExternalBatchData.csv).
- After you uncompressed the files, restore the two SQL Server 2019 databases.
- Pages should be numbered, with 25mm side borders. Fonts should be 12 point and Times New Roman with 1.5 spacing.
- Please ensure your **name** and **student number** appears on the title page of the submission.
- Submission should be via a single Microsoft Word document (projectPartA_studentnumber_InitialsSurname.docx) uploaded to Blackboard.

The Business

Maker Inc. is a fictional company that manufactures and sells small, hand-painted figurines. The figurines are made of clay, pewter, or aluminium. These figurines are marketed through three different channels. The company operates four of its own stores dedicated to selling the product line. It also operates online and in addition sells wholesale to other retailers.

Need for Strategic Information

Maker Inc. has experienced rapid growth in the past four years, with orders increasing by over 250 percent. This growth has put a strain on Maker Inc's only current source of business intelligence namely the printed report. Reports that worked well to support decision making a few years ago, now take an hour or more to print an even longer to peruse. These reports also work at the detail level with very little summarization. Because of these issues, the company has launched a BI project to create a true data warehousing environment to support its decision making. This project includes the design of a data warehouse structure, the loading of the data warehouse from all online systems and the creation of analytical applications to serve the decision makers. The new BI platform is based on SQL Server 2019.

The Senior Manager of Production wants to analyze the statistics available from the manufacturing system and would like a decision-making tool, rather than printed reports, for this analysis.

Current Systems

Maker Inc. has three transaction systems that are expected to serve as data sources for the data warehouse.

1. Accounting System

The accounting system track all the financial transactions made. This includes the purchase of raw material. The system uses a Microsoft SQL Server database as backup.

CSID6853Accounting20132015

2. Order Processing System

The order processing system manages the inventory for all the products. It tracks orders places by retailers and also record product amounts sold by retail stores and the online store. The system uses a Microsoft SQL Server database as backend.

CSID6853OrderProcessingSystem20132015

3. Manufacturing Automation System

The manufacturing system does not use a database and logs all the transactions to a comma-delimited file instead. The file contains the BatchNumber, MachineNumber, ProductCode, Start of manufacture (TimeStarted), End of manufacture (TimeStopped), NumberProduced, and NumberRejected. These are the measured facts

ExternalBatchData.csv

Business Process

Operators log onto machines to instruct the manufacturing systems to produce a product. Along with this instruction, the batch number of the raw material being used by the machine will be provided. Finally, the operator then makes an entry into the system when a product is rejected.

Business Needs

The Senior Manager of Production wants to analyse the statistics available from the manufacturing system. He would like a decision-making tool, rather than printed reports, for this analysis. In keeping with Maker Inc.'s new business intelligence strategy, Microsoft SQL Server 2019 is the platform for this decision-making tool.

An initial interview with the senior manager of productions yielded the following requirements for effective decision making:

- Number of accepted products by day, batch, product and machine
- Number of rejected products by day, batch, product and machine
- Product Roll-up Hierarchy: Product → Product type → Product subtype

- Machine Roll-up Hierarchy #1: Machine → Machine type → Raw Material (aluminium, clay etc.)
- Machine Roll-up Hierarchy #2: Machine → Production Plant → Country
- Date Roll-up Hierarchy: Day → Month → Quarter → Year

Do not collapse the hierarchies into singular tables. Model separate dimension tables.

> *Hint: Use the data contained within the Accounting System to model the dimensions and hierarchies and BatchData.csv to model measures.*

After your initial interview, the Senior Manager of Production contacted you for a follow-up interview. At this interview, he indicated that he would also like to be able to view the current inventory levels and the number of backorders for products while analysing production figures. The inventory and backorder information must be added as a second fact table to the dimensional model.

> *Hint: Use the data contained within the Order Processing System to model additional measures that would address the Senior Manager's additional need.*

Information Package [15 marks]

Use the provided transaction systems, background information and business needs to the design a data mart:

- Identify all possible measures. The measures should be categorized in three categories namely: monetary amounts, counts and time periods. Write down the name of the measure, category, what OLTP field or fields should be used, the data type and the formula used to calculate it (if there is one).
- Identify all possible dimensions and hierarchies (drill-downs and roll-ups). Write down the name of the dimension, what OLTP field or fields should be used, the data type and the name of the parent dimension (if there is one).
- Identify all possible attributes. Write down the name of the attribute, what OLTP field or fields should be used, the data type and the name the dimension to which if applies.
- Draw an information package(s) that will outline the measures, dimensions, attributes and hierarchies.