NATIONAL INSTITUTE OF BUSINESS MANAGEMENT
BSc (Hons) Computing - 2024
Higher National Diploma in Software Engineering (HNDSE) - 24.1F
Course Module - Data Warehousing and Business Intelligence
Coursework Part C

Assessment type	Individual / Take home
Weight	30 marks, Carries 30% of the final marks for the module.
Program lecturer	Niranga Dharmaratna
Assessment setter	Niranga Dharmaratna
Hand in date	
Submission date	
Learning outcomes	Understanding, communication and presentation of the subject matter (As detailed in the module specification.)
Submission instructions	**Single (01) PDF file**. Check deliverables.
Assessment task	**Check tasks.**
Content/ Plagiarism	• Marks will be allocated for; logical flow, relevance to the subject matter, accuracy, grammar, presentation and formatting. • Plagiarism is **STRICTLY PROHIBITED**. (Turnitin similarity score **< 15%**) • **Avoid copied and AI generated content**. Penalties will be imposed for plagiarism and AI-generated content. • Violators will be capped at 40% of full marks.
Coursework Viva	**Time: 10 mins**. Interview only. NO presentations. To assess the comprehension level and ascertain that the submitted coursework has been fully understood.

Coursework: Building a Data Warehouse and Creating Visualizations with Oracle ADW and Tableau

Prerequisites:

- Oracle Cloud Infrastructure (OCI) Account
- Oracle SQL Developer (Installed)
- Tableau Desktop (Installed)

Coursework Tasks:

Task 1: Provisioning an Autonomous Data Warehouse (ADW) Instance

- Create an Oracle Autonomous Data Warehouse (ADW) instance (within **free tier**) in a preferred Oracle Cloud region.

Task 2: Connecting to ADW Using Oracle Wallet

- Establish a secure connection to your ADW instance using Oracle Wallet.

Task 3: Sourcing and Preparing Sample Data

- Download a large, publicly available sample dataset suitable for data warehousing and analytics.
- **Steps**:
    1. Search for a suitable dataset from a trusted public source (e.g., **Tableau Public** offers a variety of sample datasets). Ensure the dataset is large enough to simulate real-world analytics (minimum dataset size: 100MB).
    2. Review and clean the dataset, if necessary, to ensure it is ready for loading into your ADW instance.

Task 4: Loading Data into ADW via Oracle SQL Developer

- Load the sample dataset into your ADW instance for analysis.
- **Steps**:
    1. Open Oracle SQL Developer and connect to your ADW instance. Create the necessary tables in ADW based on the structure of your sample dataset.
    2. Use the **Data Import Wizard** in Oracle SQL Developer to load the sample data into your ADW tables. Verify that the data has been successfully loaded by running basic SQL queries.

Task 5: Exploring Data in ADW

- Explore the data loaded into the ADW instance to understand its structure and contents.
- **Steps**:
    1. Use Oracle SQL Developer to query and inspect the tables and data. Identify key patterns or insights from the data, such as trends, distributions, or anomalies.
    2. Document observations, such as row counts, data types, and key fields.

Task 6: Connecting Tableau Desktop to ADW

- Set up Tableau Desktop to securely connect and interact with the data stored in your ADW instance.
- **Steps:**
    1. Install Oracle Instant Client: After installation, configure the TNS_ADMIN environment variable to point to the directory where your Oracle Wallet is extracted. For Windows: Go to Control Panel > System > Advanced System Settings > Environment Variables, and add a new system variable TNS_ADMIN pointing to the Wallet folder.
    2. Configure Tableau to Use Oracle ODBC Driver: Once connected, Tableau will display a list of schemas and tables from your ADW instance. Select the desired schema and tables for analysis.
    3. If the connection fails, ensure that the Instant Client is correctly installed and that the TNS_ADMIN variable is properly configured.
- Oracle JDBC Connection Option: If you prefer, you can also connect using JDBC. In that case, download the Oracle JDBC driver, configure it in Tableau, and use a connection string based on the JDBC format.

Task 7: Creating Data Visualizations in Tableau Desktop

- Build meaningful data visualizations using Tableau Desktop based on the data loaded into ADW.
- **Steps**:
    1. Explore the data imported into Tableau and choose key metrics or dimensions to visualize.
    2. Create at least **three** distinct visualizations (e.g., bar charts, heat maps, line graphs) that highlight important insights from the data.
    3. Compile the visualizations into a single, cohesive **dashboard** in Tableau.
    4. Document the rationale behind each visualization and how it contributes to understanding the dataset.

Task 8: Reflective Analysis and Documentation

- Reflect on the steps involved in the process and the insights gained from the visualizations.
- **Steps**:
    1. Write a short report (**750 words**) summarizing the key insights derived from the data.
    2. Discuss any challenges encountered during the data import, connection, or visualization processes and how they were **resolved**.
    3. Include **at least two (02) screenshots from each task** and any relevant SQL queries used in the analysis.

Deliverables:

Report: Submit the final report through NIBM LMS.