IT1393 DATA STORAGE ADMINISTRATION

Assignment (40%)

AY2024 Semester 2

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Introduction

In the context of SQL, data definition or data description language (DDL) is a syntax for creating and modifying database objects such as tables, indexes, and users. DDL statements are similar to a computer programming language for defining data structures, especially database schemas. Common examples of DDL statements include CREATE, ALTER, and DROP.

In this assignment, you are required to form a team of **4 to 5 members** to define the database structure, constraints, views, sequences and insert data in Part 1 tasks. You are also required to generate a report in MS Excel format based on user requirements specified in the email correspondence for Part 2 tasks.

The base marks of this assignment are **100 marks** and it constitutes **40%** of your total ICA marks for this Learning Unit.

Copying work from others or any other sources (including the internet) is strictly prohibited. If proven guilty, it will be considered as an act of plagiarism, and you will be subjected to disciplinary action.

You may also wish to note that your submission may be checked for plagiarism by Brightspace. The allowable percentage for similarity should not exceed 25%.

Submission Format and Mode

Below are the required deliverables for this assignment.

Assignment Component	Deliverables
Part 1 (group: 50%)	1. Data Definition Language (DDL) Script for Task 1 – 3 (.SQL file) 2. Export of data for all tables created (.CSV file) 3. Show evidence that all the requirements are met. (in the Report)
Part 2 (individual: 50%)	1. Email correspondences on the data retrieval request from users (screen capture in the Report) 2. List of the SQL statements (in the Report) 3. Data report (attached in the email respondences)

Please be reminded to submit all the deliverables via BrightSpace System **by Week 8 Sunday, 8 Dec 2359hrs.**

Please refer to **Annex A** for assessment rubrics.

Late Submission Penalty

Late submission of assignment may subject to penalty as shown below.

No. of Calendar Days	Penalty
If submission is <=5 Calendar days	Cap at 50% (of the base marks)
If submission is > 5 Calendar days	0 mark will be given

Note: Late submission of group components will result in late penalty for all members in the group.

Project Scenario

You and your team members are working a Database Administrators (DBAs) in Oracle Data Hub. Your daily task is to administer and manipulate data in various relational databases.

Part 1: Defining Database Structure and Objects using Database Definition Language (DDL) for KeithsBike Database (50 marks)

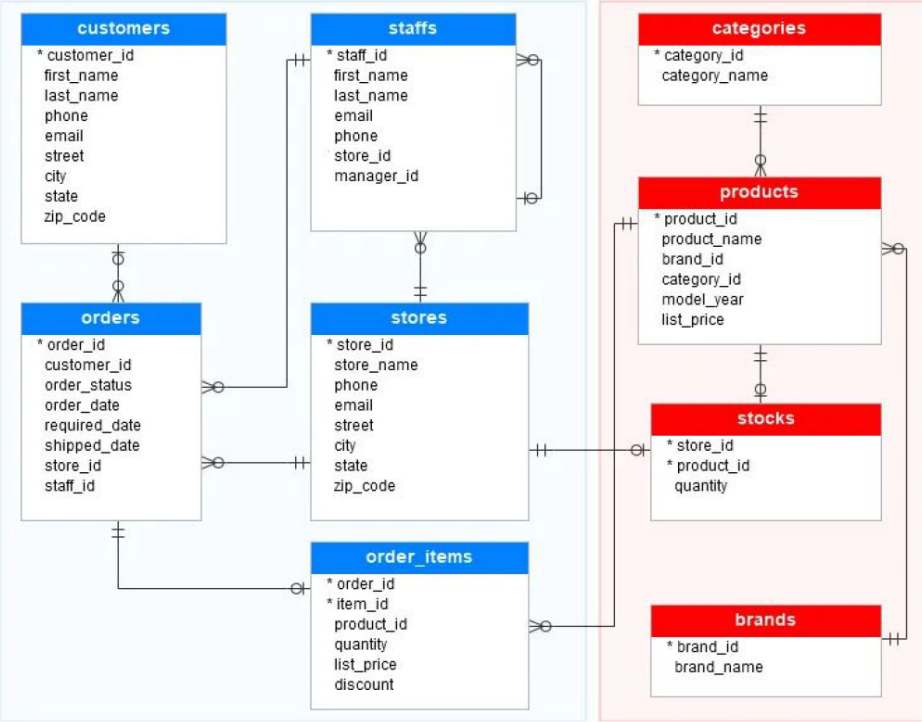
A new client, Keith Stone, the owner of Keiths'Bike, has reached out to Oracle Data Hub for help building his business a database that capture information about his customers, the orders they made, his products, his staff and stores.

You and your teammates are being assigned to implement a database solution with the following tasks listed using DDL statements. Please use your Workspace created using iacademy2.oracle.com.

Task 1: Develop DDL statements for creating the tables in the KeithsBike database

a) With the ERD produced below, you are required to create tables for the database with a prefix of "ora_" for the table name. Make sure to use reasonable data types and length for each column. The order date should default to the system date.

(12 marks)



Task 2: Creating and Managing Constraints

a) Add the following integrity constraints to what you have defined in Task 1(a).

i. Include primary key (PK) and foreign key (FK) constraints that you think the tables' columns should have.

ii. Also think through which column need to be unique and which ones are allowed to have NULL values.

iii. Create CHECK constraint on the list price of the products to make sure the price is more than $0.00.

iv. Also, to create CHECK constraint on the order status to limit status with the following: 1=Pending, 2 = Processing, 3= Rejected and 4= Completed.

Run the queries for the above constraints and show evidence that the table structure are successfully created.

(18 marks)

Task 3: Working with Sequences (Indexes and Synonyms) & Views

a) Use a sequence to generate PKs for Customers table beginning from 1001 and increment by 1.

(2 marks)

b) Use a sequence to generate PKs for Staffs table starting at 2001 and increment by 1.

Run queries from the data dictionaries for the above sequences.

(2 marks)

c) Add at least 4 records to all the tables using INSERT statements. Refer to **Annex B** for data to be inserted into some tables. Be sure to use the sequences created for the PKs

Show evidence that the data has been successfully inserted into each table.

(8 marks)

d) Add an index on the email column for the Customers table.

Show evidence that the index is created successfully.

(2 marks)

e) Create a VIEW to show the staff name and the store name that he/she works in for all orders that have not delivered out to customers. The view should not allow any DML operations.

Show evidence that the view (with data) is created successfully. (4 marks)

f) Lastly, create a synonym for the VIEW created in Task (2e).

Show evidence that the synonym is created successfully.

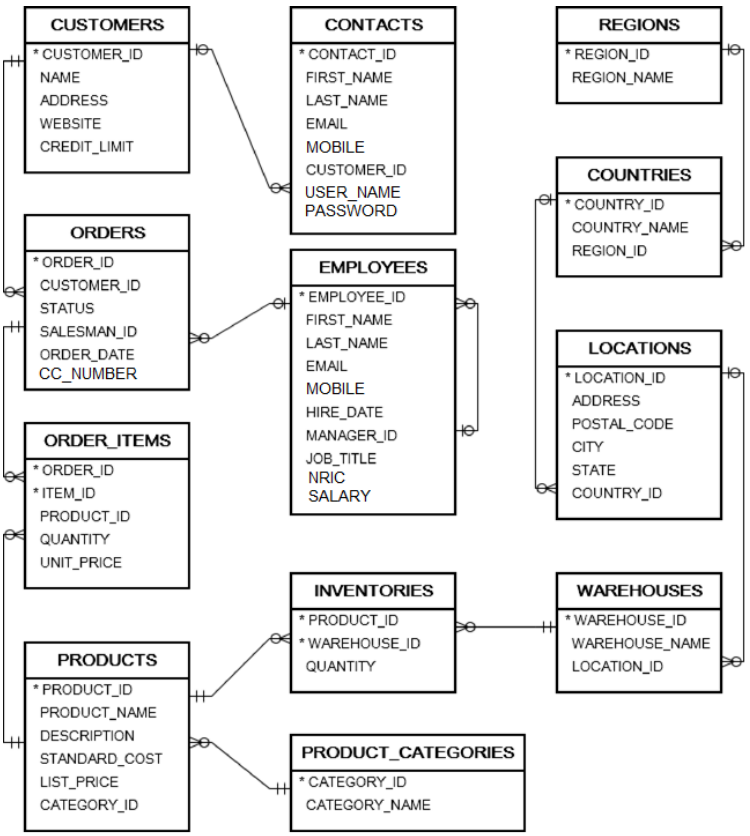
(2 marks)

Part 2: Perform Data Retrieval and Manipulation Tasks Specified in the Email Correspondences with Users (50 marks)

HardwareLand is a company that sells computer hardware including storage, motherboard, RAM, video card, and CPU. The company maintains the product information such as name, description standard cost, list price and product line. It also tracks the inventory information for all products including warehouses where products are available.

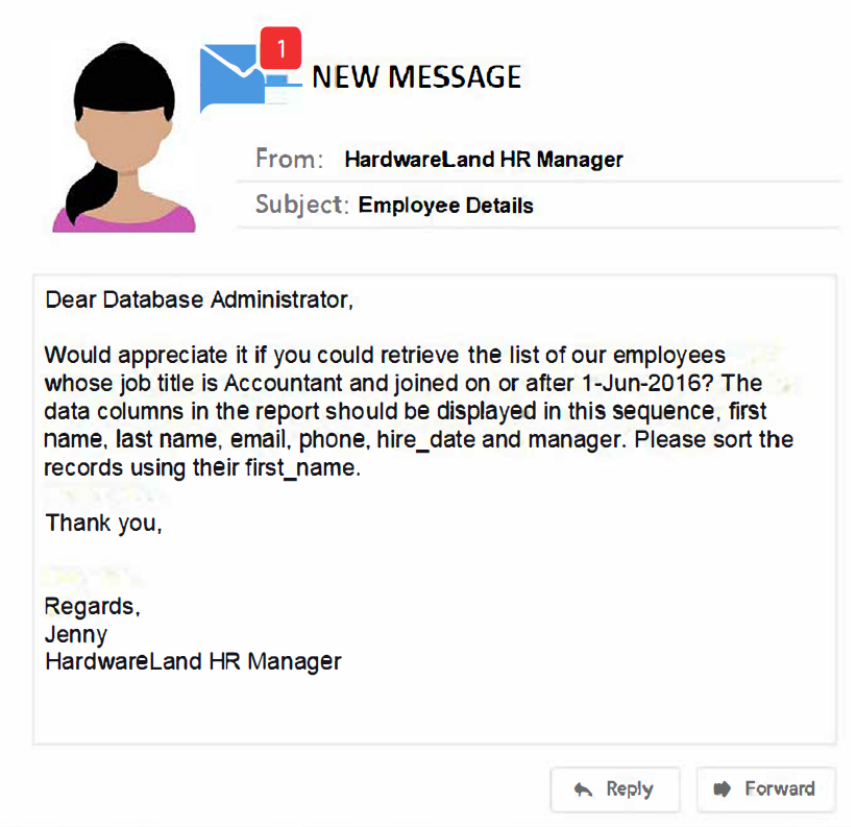
As the company operates globally, it has warehouses in various locations around the world. The company records all customer information including name, address, and website. Each customer has at least one contact person with detailed information including name, email, NRIC and mobile. The company also places a credit limit on each customer to limit the amount that customers can owe.

Whenever a customer issues a purchase order, a sales order is created in the database with the pending status. When the company ships the order, the order status becomes shipped. In case the customer cancels an order, the order status becomes cancelled.
In addition to the sales information, the employee data is recorded with some basic information such as name, email, phone, job title, manager, hire date, NRIC, salary etc. Below is the Entity-Relationship Diagram for HardwareLand database.



There is a list of reports that need to be generated by the managers in HardwareLand. As the database is maintained by Oracle Data Hub. The data retrieval request will be sent to you and your team members via email. You are required to respond via email and complete the data retrieval and manipulation tasks. Please refer to **Annex C** for more details about HardwareLand database.

Below is an example of a data retrieval request sent by a user.



Annex A: Assessment Rubrics

Criteria	Advanced	Proficient	Functional	Developing	Not Competent
Task 1- Database Table Structure (12 marks)	(10 to 12 mks) - All tables exist in the team's KeithsBike database and are labelled accordingly. - All data types and lengths are reasonably structured. - Able to show evidence that the table structures are complete at the database when queried with a command.	(7 to < 10 mks) - Most of the tables exist in the team's KeithsBike database and are labelled accordingly. - Most data types and lengths are reasonably structured. - Able to show evidence that the table structures are complete at the database when queried with a command.	(5 to < 7 mks) - At least half of the tables exist in the team's KeithsBike database and are labelled accordingly. - At least half of the required data types and lengths are reasonably structured. - Able to show evidence that the table structures are complete at the database when queried with a command.	(2. 5 to < 5 mks) - Only a few tables exist in the team's KeithsBike database and are labelled accordingly. - Only some data types and lengths are reasonably structured.	(0 to < 2.5 mks) - The tables are not labelled accordingly. - The data types and lengths are not fully structured.
Task 2- Creating and Managing Constraints (18 marks)	(15 to 18 mks) - All of the constraints including PKs and FKs are correctly created and named according to the convention in the tables. - All of the required columns are correctly labelled with UNIQUE constraints and NULL values.	(11 to < 15 mks) - Most of the constraints including PKs and FKs are correctly created and named according to the convention in the tables. - Most of the required columns are correctly labelled with UNIQUE constraints and NULL values.	(7 to < 11 mks) - At least half of the constraints including PKs and FKs are correctly created and named according to the convention in the tables. - At least half of the required columns are correctly labelled with UNIQUE constraints and NULL values.	(3to < 7 mks) - Only a few of the constraints including PKs and FKs are correctly created and named according to the convention in the tables. - Only a few of the required columns are correctly labelled with UNIQUE constraints and NULL values.	0 < 3 mks - Unable to create any constraints including the PKs and FKs according to the convention in the tables

Task 3 - Working with Sequences (Indexes and Synonyms) & Views (20 marks)	(17 to 20 mks) - All sequences are created correctly with the correct start numbers and increments along with appropriate parameters. - All data records are correctly created using the INSERT statements. - The Index is created correctly. - The View is created and display correct data. - A Synonym is created correctly. - Show evidence that all the requirements are correctly met in the implementation.	(12.5 to 17 mks) - Most sequences are created correctly with the correct start numbers and increments along with appropriate parameters. - All records are correctly created using the INSERT statements. - The Index is created correctly. - The View is created and display correct data. - A Synonym is created correctly. - Show evidence that most requirements are correctly met in the implementation.	(8 to < 12.5 mks) - At least half of the sequences are created correctly with the correct start numbers and increments along with appropriate parameters. - Not all records are correctly created using the INSERT statements. - The Index is created correctly. - The View is created correctly. - A Synonym is created correctly. - Show evidence that some requirements are met in the implementation.	(3.5 to < 8 mks) - Limited sequences are created correctly with the correct start numbers and increments . - Only a few records are correctly created using the INSERT statements. - The Index is not created correctly. - The View is not created correctly. - A Synonym is not created correctly. - Show inconsistent evidence that the requirements are met in the implementation.	(0 to < 3.5 mks - Unable to create sequences - Not all records are correctly created using the INSERT statements. - The Index is not created correctly. - The View is not created correctly. - A Synonym is not created correctly. - Show no evidence that the requirements are met in the implementation.

Part 2: Perform data retrieval and manipulation tasks specified in the email correspondences with users					
Criteria	**Advanced**	**Proficient**	**Functional**	**Developing**	**Not Competent**
SQL Statements **(10 marks–Individual)**	(8.5 to 10 mks) - All the SQL statement are optimal and achieved the desired result according to the requirements. - For the report generation, all the columns are named meaningfully as per user request from the email.	(6. to < 8.5 mks) - Most SQL statements are well-formed and achieved the desired result according to the requirements. - For the report generation, most of the columns are named meaningfully as per user request from the email.	(4 to <6.5 mks) - The SQL statement contain a few syntax errors. - For the report generation, at least half of the columns are named meaningfully as per user request from the email.	(2 to < 4 mks) - The SQL statements contain many syntax errors. - For the report generation, no or few columns are named meaningfully as per user request from the email.	(0 to < 2 mks) - The SQLtatement contain incomplete evidence on SQL statements attached in the report
Email Set-Up **(10 marks–Individual)**	Email settings related to addressing the intended parties, conveying the message clearly and protecting privacy: - To addressee(s) - Cc, Bcc - Subject line - File attachment				
	(8.5 to 10 mks) - All settings are appropriate	(6.5 to < 8.5 mks) - Most settings are appropriate	(4 to <6.5 mks) - Some inappropriate settings	(2 to < 4 mks) - Many errors in the settings but the email can be received by the intended recipients	(0 to < 2 mks) - The email cannot be received by the intended recipients

Part 2: Perform data retrieval and manipulation tasks specified in the email correspondences with users (Continued)					
Criteria	**Advanced**	**Proficient**	**Functional**	**Developing**	**Not Competent**
Email Formatting **(10 marks–Individual)**	Email formatting that helps with the presentation of the contents, which may include: - Salutation at the top - Sign off at the bottom - Use of paragraphing - Use of section headers				
	(8.5 to 10 mks) - The email is arranged and presented clearly and neatly. The formatting greatly enhances readability and comprehension.	(6.5 to < 8.5 mks) - Most parts of the email are arranged and presented clearly and neatly. The formatting enhances readability and comprehension.	(4 to < 6.5 mks) - Some parts of the email are formatted to aid reading and comprehension.	(2 to < 4 mks) - Evidence of formatting with inappropriate or missing parts. Reading or comprehension is slightly affected.	(0 to < 2 mks) - Inappropriate and inconsistent formatting, making reading and comprehension difficult.
Email Contents **(20 marks–Individual)**	Email contents to convey the key messages clearly and according to etiquette and norms, which may include: • Introduction/Greeting • Main Body - Response to queries/requests - Seek clarification • Closing				
	(17 to 20 mks) - The email is well put together to respond to queries/requests and seek clarification.	(12.5 to < 17 mks) - The email fulfils mostly its purpose of responding to queries/requests and seeking clarification.	(8 to < 2 mks) - The email fulfils some of its purpose of responding to queries/requests and seeking clarification.	(3.5 to < 8 mks) - The email gives a brief and cursory response to queries/requests. It seeks clarification but the purpose is unclear.	(0 to < 3.5 mks) - The email does not answer the queries/requests and fails in seeking clarification.

Annex B – Part 1: Sample data to be inserted into the Tables

SampleData_KeithsBike.xlsx

1. Table name: **BRANDS**

brand_id	brand_name
1	Electra
2	Haro
3	Heller
4	Pure Cycles

2. Table name: **CATEGORIES**

category_id	category_name
11	Children Bicycles
12	Electric Bikes
13	Mountain Bikes
14	Road Bikes

3. Table name: **PRODUCTS**

product_id	product_name	brand_id	category_id	model_year	list_price
1	Trek 820 - 2016	2	13	2016	379
2	Ritchey Timberwolf Frameset - 2016	2	13	2016	749.99
3	Surly Wednesday Frameset - 2016	3	13	2016	899
6	Sun Bicycles Streamway - 2017	2	12	2017	480
7	Sun Bicycles Cruz 7 - 2017	4	11	2017	420
8	Sun Bicycles Drifter 7 - Women's - 2017	4	11	2017	479.99
9	Trek 820 - 2018	4	14	2018	380
10	Trek Marlin 5 - 2018	4	14	2018	450

4. Table name: **STORES**

store_id	store_name	phone	email	street	city	state
111	Santa Bikes	831-476-4321	santa@Keithsbikes.com	3700 Portola Drive	Santa Cruz	CA
112	Cruz Bikes	516- 379-8888	Cruz@Keithsbikes.com	4200 Chestnut Lane	Baldwin	NY
113	Scarlett Bikes	972- 530-5555	Scarlett@KeithsBikes.com	8000 Fairway Avenue	Rowlett	TX

Annex C – Part 2: SQL Scripts and Information about HardwareLand databases

Please save and run the two scripts below to create the HardwareLand schema on iacademy2.oracle.com.

Part 2A - DDL Script for DB Schema.sql

Part 2B - DML Script for Record Creation.sql

You may want to use the information listed below to verify the execution of the scripts.

Table Names	Description	Records
HWL_CONTACTS	store contact person information of customers	319 records
HWL_COUNTRIES	store country information	25 records
HWL_CUSTOMERS	store customer master	319 records
HWL_EMPLOYEES	store employee master	107 records
HWL_INVENTORIES	store inventory information of products	1112 records
HWL_LOCATIONS	store locations of warehouses	23 records
HWL_ORDERS	store order header information	105 records
HWL_ORDER_ITEMS	store order line items	665 records
HWL_PRODUCT_CATEGORIES	store product categories	5 records
HWL_PRODUCTS	store product information	288 records
HWL_REGIONS	store regions where the company operates	4 records
HWL_WAREHOUSES	store warehouse information	9 records

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