COMP 4003A 2024W
Assignment #4
Due: March 19 @11:59pm

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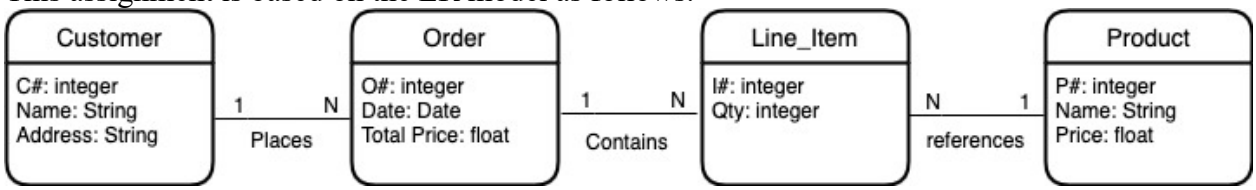
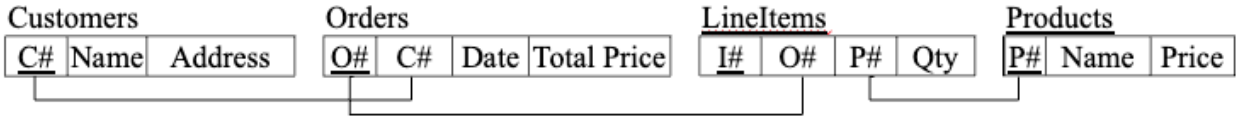
Instruction

1. You should do the assignment independently. If copying is found, the case will be reported to the office of the Dean of Science immediately.
2. You need to use Oracle VM to do this assignment and take proper screenshots of execution results for the relevant questions. If there is no screenshot, you will get 0 for the question.
3. First replace MacDiarmid below with your last name. If your last name is not showing in the screenshot, you will get a 0 for the assignment. Also, rename this document with your last name+first name.
4. Copy your screenshots into this document and submit it to Brightspace. Also submit your source codes as separate files to be tested. Make sure your uploaded file can be opened and is correct. No submission will be accepted after the deadline no matter what reason.
5. This assignment is based on the ER model as follows.



The relational database schema is as follows.



Part 1 Nested Relational Database (50)

1. Create a nested relational database that has two tables. The Customers table contains not only customer information but also order attributes as a nested table, which in turn contains line-item attributes as a nested table. The Products table contains not only product attributes but also I# as a varray. (15)

   Indicated as Part 1.1 in Part1.sql.

2. Populate this database with five customers: Smith, Jones, Blake, Clark, and MacDiarmid; five products: apple, banana, orange, peach, and watermelon; Smith ordered the first product on Jan 1, 2024, Jones the first two products on Jan 2, 2024, …, and MacDiarmid all products on Jan 5, 2024; Also, MacDiarmid ordered the last product on Feb 1, 2024, Clark ordered last two products on Feb 2, 2024, …, and Smith all products on Feb 5, 2024. (10)

   Indicated as Part 1.2 in Part1.sql.

3. Do the following queries and get query results screenshots. Each query is 4 marks and the result is 1 mark.

(1) Get each customer's C#, Name, and Address. (5)

Indicated as Part 1.3.1 in Part1.sql.

C#	NAME	ADDRESS
1	Smith	1125 Colonel By Dr
2	Jones	1125 Colonel By Dr
3	Blake	1125 Colonel By Dr
4	Clark	1125 Colonel By Dr
5	MacDiarmid	1125 Colonel By Dr

(2) Get each product's P#, Name, and Price. (5)

Indicated as Part 1.3.2 in Part1.sql.

P#	NAME	PRICE
1	apple	1.99
2	banana	0.79
3	orange	2.79
4	peach	3.25
5	watermelon	4.99

(3) Get the names of customers who ordered banana (5)

Indicated as Part 1.3.3 in Part1.sql.

NAME
Blake
Clark
Jones
Smith
MacDiarmid

(4) Get MacDiarmid's complete order details including all attributes shown in the ER model in a nested way (5)

Indicated as Part 1.3.4 in Part1.sql.

```
C#    NAME            ADDRESS
----- --------------- --------------------
ORDERS(O#, C#, ODATE, PRICE, ITEMS(I#, O#, P#, QTY))
--------------------------------------------------------------------------------
5     MacDiarmid      1125 Colonel By Dr
ORDERTABLE(ORDER_V('5', '5', 'Jan 5, 2024', '13.81', ITEMTABLE(ITEM_V('11', '5',
 '1', '1'), ITEM_V('12', '5', '2', '1'), ITEM_V('13', '5', '3', '1'), ITEM_V('14
', '5', '4', '1'), ITEM_V('15', '5', '5', '1'))), ORDER_V('6', '5', 'Feb 1, 2024
', '4.99', ITEMTABLE(ITEM_V('16', '6', '5', '1'))))
```

(5) Get the names of customers who ordered everything. (5)

Indicated as Part 1.3.5 in Part1.sql.

```
NAME
---------------
Smith
Jones
Blake
Clark
MacDiarmid
```

Part 2 Object Relational Database (50)

Redo Part 1 by using four object tables Customers, Orders, LineItems, and Products so that they all have system-generated ID instead of C#, O#, I#, and P#. The Customers table contains a set of order references, Orders contains a set of LineItem references, and Products contains a set of LineItem references.

1. Create four object table.s (15)

   Indicated as Part 2.1 in Part2.sql.

2. Populate the four object tables. (10)

   Indicated as Part 2.2 in Part2.sql.

3. Do the following queries and get query results. Each query is 4 marks and the result is 1 mark

(1) Get each customer's C#, Name, and Address. (5)

Indicated as Part 2.3.1 in Part2.sql.

```
C#                  Name       Address
------------------ ---------- --------------------
AAAG7uAABAAALGpAAA Smith      1125 Colonel By Dr
AAAG7uAABAAALGpAAB Jones      1125 Colonel By Dr
AAAG7uAABAAALGpAAC Blake      1125 Colonel By Dr
AAAG7uAABAAALGpAAD Clark      1125 Colonel By Dr
AAAG7uAABAAALGpAAE MacDiarmid 1125 Colonel By Dr
```

(2) Get each product's P#, Name, and Price. (5)

Indicated as Part 2.3.2 in Part2.sql.

```
P#                  Name       Price
------------------ ---------- ----------
AAAG74AABAAALIxAAA apple      1.25
AAAG74AABAAALIxAAB banana     0.79
AAAG74AABAAALIxAAC orange     1.75
AAAG74AABAAALIxAAD peach      3.25
AAAG74AABAAALIxAAE watermelon 4.99
```

(3) Get the names of customers who ordered banana (5)

Indicated as Part 2.3.3 in Part2.sql.

```
NAME
----------
Blake
Clark
Jones
Smith
MacDiarmid
```

(4) Get MacDiarmid's complete order details including all attributes shown in the ER model in a nested way. (5)

Indicated as Part 2.3.4 in Part2.sql.

```
NAME                O# ODATE                TOTAL                      I#
---------- ---------- -------------------- -------------------- ----------
       QTY
----------
MacDiarmid           5 Jan 5, 2024          12.03                      11
         1

MacDiarmid           5 Jan 5, 2024          12.03                      12
         1

MacDiarmid           5 Jan 5, 2024          12.03                      13
         1


NAME                O# ODATE                TOTAL                      I#
---------- ---------- -------------------- -------------------- ----------
       QTY
----------
MacDiarmid           5 Jan 5, 2024          12.03                      14
         1

MacDiarmid           5 Jan 5, 2024          12.03                      15
         1

MacDiarmid           6 Feb 1, 2024          4.99                       16
         1
```

(5) Get the names of customers who ordered everything. (5)

Indicated as Part 2.3.5 in Part2.sql.

```
NAME
----------
Smith
Jones
Blake
Clark
MacDiarmid
```