

**Roll No. \_\_\_\_\_ Name \_\_\_\_\_ Section \_\_\_\_\_**  
**National University of Computer and Emerging Sciences, Lahore Campus**



**Course:** Database Systems  
**Program:** BS(Computer Science)  
**Duration:** 60 Minutes  
**Paper Date:** 26-Feb-18  
**Section:** ALL  
**Exam:** Midterm-I [SOLUTION]

**Course Code:** CS203  
**Semester:** Spring 2018  
**Total Marks:** 35  
**Weight:** 15%  
**Page(s):** 5

**Instruction/Notes:** Scratch sheet can be used for rough work however, all the questions and steps are to be shown on question paper. *No extra/rough sheets should be submitted with question paper.*  
 You will not get any credit if you do not show proper working, reasoning and steps as asked in question statements.

**Consider the following State and Schema of a Retailer Store database. It keeps track of the orders placed by the customers.**

CUSTOMER

cid	cname	city
100	Ismail	Karachi
200	Isbah	Lahore
300	Tahreem	Islamabad
600	Izaan	Lahore
700	Khadija	Karachi
800	Alia	Lahore

ORDER

oid	odate	cid
1	2018-01-20	200
3	2018-01-20	600
5	2018-02-15	300
7	2018-02-20	800

PRODUCT

pid	pname	price	company
10	Nutella	250	Ferrero
20	Kinder Joy	60	Ferrero
40	Milo	30	Nestle
50	Maggi Noodle	25	Nestle
70	Donuts	50	Dunkin Brands
80	Horlicks	400	GSK

ORDER DETAIL

oid	pid	quantity	discountPercent
1	10	2	15
1	70	6	25
3	10	1	15
5	10	3	15
5	40	4	15
5	50	5	25
7	10	2	15

<pre>CREATE TABLE customer (     cid INT NOT NULL,     cname VARCHAR(30),     city VARCHAR(30),     PRIMARY KEY (cid) );</pre>		<pre>CREATE TABLE product (     pid INT NOT NULL,     pname VARCHAR(30)     UNIQUE,     price DECIMAL(9,2),     company VARCHAR(30),     PRIMARY KEY (pid) );</pre>	
<pre>CREATE TABLE order (     oid INT NOT NULL,     odate DATE,     cid INT,</pre>		<pre>CREATE TABLE order_detail (     oid INT NOT NULL,     pid INT NOT NULL,     quantity INT,     discountPercent INT,</pre>	

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	PRIMARY KEY (oid), FOREIGN KEY (cid) REFERENCES customer(cid) ON DELETE SET NULL ON UPDATE CASCADE );	PRIMARY KEY (oid, pid), CHECK (quantity>0), FOREIGN KEY (oid) REFERENCES order(oid) ON DEL CASCADE ON UPDATE CASCADE, FOREIGN KEY (pid) REFERENCES product(pid) ON D CASCADE ON UPDATE CASCADE );

**Q1. (10 points)** Apply following operations on the above database. State if the operation would be carried out successfully or not. **Explain your answer briefly.** In case of successful operation indicate the changes that will be made to the above database and in case of Reject state the error that occurred. Please note that all operations are independent.

**a) INSERT INTO ORDER\_DETAIL (oid, pid, quantity, discountPercent) VALUES (1, 70, 10,15);**

Accept ☐ **Explain:** PK-Unique constraint violation. Tuple# 2 with PK value (1, 70) already exist.  
 Reject ☐

**b) UPDATE ORDER\_DETAIL SET discountPercent = '20';**

Accept ☐ **Explain:** Modify discountpercent attribute value of all tuples of order\_detail relation to 20.  
 Reject ☐

**c) UPDATE ORDER SET oid = 4 WHERE oid=5;**

Accept ☐ **Explain:** Modify oid attribute value of all matching tuples (i.e. t# 3) of parent relation order and also matching tuples (i.e. t# 4,5,6) of child relation order\_detail to 4.  
 Reject ☐

**d) DELETE FROM customer WHERE cname = 'Izaan';**

Accept ☐ **Explain:** Remove all matching tuples (i.e. t# 4 with cid=600) of parent relation customer and also modify cid attribute value of all matching tuples (i.e. t# 2 with oid=3) of child relation order to NULL.  
 Reject ☐

**e) DELETE FROM order;**

Accept ☐ **Explain:** Remove all tuples of parent relation order and child relation order\_detail.  
 Reject ☐

**Q2. (10 points)** Write the result of the following queries for the Database State given above and explain in one sentence what these queries are doing.

**ONLY FOR SECTION (A, B, C, D)**

**a.** City  $\mathcal{F}_{COUNT(*)} ((CUSTOMER \bowtie_{CUSTOMER.cid=ORDER.cid} ORDER) \bowtie_{ORDER.oid=ORDER\_DETAIL.oid} ORDER\_DETAIL)$

**b.**  $\Pi_{Oid,Pid,Cid,Price} (\sigma_{Price>100} (ORDER \bowtie_{ORDER.oid=ORDER\_DETAIL.oid} (ORDER\_DETAIL \bowtie_{ORDER\_DETAIL.pid=PRODUCT.pid} PRODUCT)))$

**ONLY FOR SECTION (E, F)**

<p><b>a.</b> SELECT c.cname, c.city FROM customer c WHERE c.cid = (                 SELECT o.cid                 FROM order AS o                 WHERE o.oid = (                         SELECT od.oid                         FROM order_detail                         WHERE quantity =                         '1'                         )                 );</p>	<p><b>b.</b> SELECT o.oid, c.cname, o.odate FROM order o INNER JOIN customer c ON o.cid=c.cid ORDER BY o.oid DESC;</p>
--	--

**Ans:**

**a. City wise total no of order details.**

City	Count(*)
Lahore	4
Islamabad	3

**b. All products having price>100 with order details if exist.**

OID	PID	CID	PRICE
1	10	200	250
3	10	600	250
5	10	300	250
7	10	800	250
NULL	80	NULL	400

**Q3. (15 points)** Specify the following queries in **SQL**

- List the orders placed by the customer with cid =300 in the month of February 2018.
- Find the id of the customers who have bought the products of *Nestle* and *Dunkin Brands*.
- For each product, find the number of orders placed for it and also find the total quantity of each product sold till now. The output of this query (i.e. part C) for the above relational database state would be

<b>ProductID</b>	<b>No. of Orders</b>	<b>Total Quantity Sold</b>
10	4	8
70	1	6
40	1	4
50	1	5

**Ans:**

**a.**

```
SELECT *
FROM order
WHERE cid=300 AND odate LIKE '2018-02-__' ;
-- another method: odate LIKE '2018-02-%'
-- another method: DATEPART(YEAR, odate)=2018 AND
DATEPART(MONTH, odate)=02)
-- another method: odate BETWEEN '2018-02-01' AND '2018-02-28';
```

**b.**

```
SELECT cid
FROM order o JOIN order_detail d ON o.oid=d.oid JOIN product p ON d.pid=p.pid
WHERE p.company IN ('Nestle', 'Dunkin Brands');
```

-- another method:

```
SELECT cid
FROM order
WHERE oid IN (SELECT oid FROM order_detail
WHERE pid IN (SELECT pid FROM
WHERE company IN ('Nestle', 'Dunkin Brands')));
```

**c.**

```
SELECT pid AS "Product ID", COUNT(*) AS "No of Orders" , SUM(quantity) AS "Total
Quantity Sold"
FROM order_detail
GROUP BY pid;
```

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