CS 457L – Data modeling and Implementation techniques (Lab) Venue: Rm 211
Time Duration: 12.45 pm to 2.35 pm
Date: Feb. 27, 2024
Instructions: Open book, Open notes

Lab Mid-term exam: [Max: 70 points]

Answer all questions given below. For each question from Q1 through Q7, show the SQL query and the SQL output.

1. (3 pts) Write a SQL command that will create a table named "scores" that has the fields studentsName (string 30 characters), score (integer) and maxScore (integer).

```
MariaDB [20154mg]> CREATE TABLE scores (
    studentsName VARCHAR(30),
    score INT,
    maxScore INT
   );
Query OK, 0 rows affected (0.010 sec)
```

2. (3 pts) Write a SQL command that will insert a record into the "scores" table above for a student whose name is "Kyle", with a score of 80, in a test with a maximum score of 200.

```
MariaDB [20154mg]> INSERT INTO scores (studentsName, score, maxScore)
                        VALUES ('Kyle', 80, 200);
Query OK, 1 row affected (0.003 sec)
```

3. (3 pts) Write a SQL command that will display the name and score (not maxScore) of students where the maximum score of the test is 200.

```
SELECT studentsName, score
      FROM scores
      WHERE maxScore = 200;
+--------------+-------+
| studentsName | score |
+--------------+-------+
| Kyle         |    80 |
+--------------+-------+
1 row in set (0.000 sec)
```

4. (3 pts) Write a SQL command that will create a table named "appts" that has the fields **student** (string 14 characters), **advisor** (string 3 characters), and **room** (integer). MariaDB [20154mg]> CREATE TABLE appts (student VARCHAR(14), advisor VARCHAR(3), room INT
                        );

```
Query OK, 0 rows affected (0.030 sec)
```

5. (3 pts) Write a SQL command that will insert a record into the "appts" table above for a student named "Kelly", where the advisor is "JSR", and the room number is 5.

```
MariaDB [20154mg]> INSERT INTO appts (student, advisor, room)
   -> VALUES ('Kelly', 'JSR', 5);
```

Query OK, 1 row affected (0.003 sec)

6. (3 pts) Write a SQL command that will display the name of students that are associated with the advisor named “JSR”.

```
MariaDB [20154mg]> SELECT student
    -> FROM appts
    -> WHERE advisor = 'JSR';
+---------+
| student |
+---------+
| Kelly   |
+---------+
1 row in set (0.000 sec)
```

7. (7 pts) Use the `FRIENDS` table to answer the following questions.

```
LASTNAME        FIRSTNAME        AREACODE PHONE    ST ZIP -----
---------- --------------- -------- -------- -- -----BUNDY
AL                    100 555-1111 IL 22333 MEZA            AL
200 555-2222 UK MERRICK         BUD                   300 555-
6666 CO 80212 MAST            JD                    381 555-
6767 LA 23456 BULHER          FERRIS                345 555-
3223 IL 23332 PERKINS         ALTON                 911 555-
3116 CA 95633 BOSS            SIR                   204 555-
2345 CT 95633
```

a. Write a query that returns everyone in the database whose last name begins with `M`.

Creating the table FRIENDS

```
MariaDB [20154mg]> CREATE TABLE FRIENDS ( LASTNAME
VARCHAR(50),FIRSTNAME VARCHAR(50),AREACODE INT,PHONE
VARCHAR(15),ST VARCHAR(2),ZIP VARCHAR(10) );        Query
OK, 0 rows affected (0.012 sec)

MariaDB [20154mg]> INSERT INTO FRIENDS VALUES
    -> ('BUNDY', 'AL', 100, '555-1111', 'IL', '22333'),
    -> ('MEZA', 'AL', 200, '555-2222', 'UK', NULL),
    -> ('MERRICK', 'BUD', 300, '555-6666', 'CO', '80212'),
    -> ('MAST', 'JD', 381, '555-6767', 'LA', '23456'),
    -> ('BULHER', 'FERRIS', 345, '555-3223', 'IL', '23332'),
    -> ('PERKINS', 'ALTON', 911, '555-3116', 'CA', '95633'),
    -> ('BOSS', 'SIR', 204, '555-2345', 'CT', '95633');
Query OK, 7 rows affected (0.002 sec)
```

Records: 7 Duplicates: 0 Warnings: 0
MariaDB [20154mg]> select * from FRIENDS;

LASTNAME	FIRSTNAME	AREACODE	PHONE	ST	ZIP
BUNDY	AL	100	555-1111	IL	22333
MEZA	AL	200	555-2222	UK	NULL
MERRICK	BUD	300	555-6666	CO	80212
MAST	JD	381	555-6767	LA	23456
BULHER	FERRIS	345	555-3223	IL	23332
PERKINS	ALTON	911	555-3116	CA	95633
BOSS	SIR	204	555-2345	CT	95633

7 rows in set (0.000 sec)

Below is the query and output
MariaDB [20154mg]> SELECT *
-> FROM FRIENDS
-> WHERE LASTNAME LIKE 'M%';

LASTNAME	FIRSTNAME	AREACODE	PHONE	ST	ZIP
MEZA	AL	200	555-2222	UK	NULL
MERRICK	BUD	300	555-6666	CO	80212
MAST	JD	381	555-6767	LA	23456

3 rows in set (0.000 sec)

b. Write a query that returns everyone who lives in Illinois with a first name of `AL`.

MariaDB [20154mg]> SELECT *
-> FROM FRIENDS
-> WHERE ST = 'IL' AND FIRSTNAME = 'AL';

LASTNAME	FIRSTNAME	AREACODE	PHONE	ST	ZIP
BUNDY	AL	100	555-1111	IL	22333

1 row in set (0.000 sec)

c. Given two tables (`PART1` and `PART2`) containing columns named `PARTNO`, how would you find out which part numbers are in both tables? Write the query.

Use the INTERSECT. Remember that INTERSECT returns rows common to both queries. MariaDB [20154mg]> SELECT PARTNO

FROM PART1

INTERSECT

SELECT PARTNO

FROM PART2;

d. What shorthand could you use instead of `WHERE a >= 10 AND a <=30`?
WHERE a BETWEEN 10 AND 30;

e. What will this query return?

```
SELECT FIRSTNAME
FROM FRIENDS
WHERE FIRSTNAME = 'AL'
  AND LASTNAME = 'BULHER';
```

MariaDB [20154mg]> SELECT FIRSTNAME
FROM FRIENDS
WHERE FIRSTNAME = 'AL'
AND LASTNAME = 'BULHER';

Empty set (0.000 sec)

After Executing the query, It returned an empty set.

f. Using the FRIENDS table, write a query that returns the following:

```
NAME                 ST ------------------- -AL
IL
```

SELECT CONCAT(first_name, ' ', last_name) AS NAME, state_abbreviation AS ST
FROM FRIENDS;

g. Using the FRIENDS table, write a query that returns the following:

```
NAME                        PHONE -------------------------- ---
--------MERRICK, BUD               300-555-6666 MAST, JD
381-555-6767 BULHER, FERRIS             345-555-3223
```

SELECT name, phone
FROM FRIENDS
WHERE name IN ('MERRICK, BUD', 'MAST, JD', 'BULHER, FERRIS');

Questions 8 through 52 carry 1 point each: [45 points]

8. SQL is the ____ _Structured Query _____ standard language to access relational databases.

9. (Projection / Selection) is done by listing column names in a select list of a query.

   Selection is done by listing column names in a select list of a query.

   Selection is the process of choosing specific rows or records based on a certain condition, and it is typically performed using the WHERE clause in a SQL query. Projection, on the other hand, involves selecting specific columns from a table, and it is done by listing column names in the select list. I appreciate your understanding.

10. To remove duplications within the result set, you should use which keyword after the word select.

    a. DISTINCT

    b. UNIQUE
    c. Either of the above.
    d. NONE of the above.

    Option a is the answer

11. Which statement(s) below would likely fail?

    a. SelectT * FROM employees; (two T's in the select word)
    b. SELECT * FROM "employees" (unless employees created with double quotes)
    c. SELECT * FROM employ- ees;
    d. Select *

    All options will fail

12. Number columns returned in queries are normally displayed (Left, Right, Center) justified.

    True

13. Which query(s) would return a result of 50?

    a. Select (100*2+50)/5 from dual;
    b. Select 100*2 +50/5 from dual;
    c. Select (100)*2+(50/5) from dual;
    d. Select ((100 *2)+50)/5 from dual;

    Answer is a and d

14. Consider the statement:

    "SELECT salary + commission_pct as compensation, 'Commission is '||commission_pct as "Commission" FROM employees;"

What is the value of the compensation and commission in the result set for a row where the value of the salary column is 1000 and the commission_pct column is null? (ignore double quotes)

a. compensation: “1000” commission: “null”
b. compensation: “null” commission: “null”
c. compensation: “null” commission: “Commission is “
d. compensation: “0” commission: “Commission is 0”

ANSWER is b

15. For a column alias to contain a space or retain case, it must (choose the best answer):

a. Be enclosed within the ampersand symbol.
b. Be enclosed with single quotes.
c. Be enclosed within parenthesis
d. Be enclosed with double quotes

Answer is d

16. A SQL query must have both a list of items following the keyword ____SELECT_____ and a data source following the keyword _____FROM_____.

17. (True / False) In the where clause of a query, the column name and value are interchangeable on either side of the operator, therefore department_id = 90 or 90 = department_id is interchangeable.

True

18. Literal values for text or dates must be enclosed within _____single quotes_____.

19. “Between 900 and 1100” would include how many integers? (199 / 200 / **201**) (circle one) Answer is 201

20. A SQL condition “Where manager id IN (100, 101, 201)” would be equivalent to three compound conditions using the (**OR** / AND) operator. Answer is OR

21. In the LIKE operator, which symbol is used to represent a single text character or numeric digit?

a. "_"

b. "/"
c. "&"
d. "%"
Answer is a

22. Which of the following has the highest precedence? (AND, **NOT**, OR , “all are equal must use parenthesis” Answer is NOT

23. By default in an ORDER BY clause, where would rows with a null value appear? (beginning of result set, **end of result set**, not listed in result set) Answer is **end of result set**

24. To reverse the default order of a sorting operation in the ORDER BY clause we use which word __DESC_____. **True**
25. A column may be sorted in an ORDER BY clause by: (circle all true answers) a column name or expression in the select list.
    a. a column alias in the select list.
    b. a number representing the column position in the select list.
    c. a column found in the data source but not in the select list.

    Answer is a ,b and c

26. Row functions return (a value for each row in the data source, a value for each row in the result set, always only a single value).

    ANSWER is a value for each row in the result set

    The most accurate statement is that row functions typically return a distinct value for each row in the final result set, reflecting calculations or comparisons performed within the context of that specific row and its group .

27. To always return "capitalized" text, use the function ____UPPER()_____.

28. The result of "SELECT SUBSTR('abcdefg', 3,1) FROM dual;" is

    a. Abc
    b. c
    c. d
    d. none of the above

    ANSWER is b

29. The result of "SELECT TRIM('x' from 'xxAxx') FROM dual; is

    a. Axx
    b. xxA
    c. **A**
    d. xAx

    Answer is c

30. Which function(s) would result in a value of 46?

    a. Select substr(46.567, 1, 2) from dual; (works because of implicit conversion-not if in doubles quotes)

b. Select round(46.567, -1) from dual;
c. Select round(46.567) from dual;
d. Select trunc(46.567) from dual;

Answer is d

31. To add one hour to the current time, we should use:

a. sysdate + 1
b. to_char(sysdate, 'HH:MI:SS')+1
c. sysdate + 1/24
d. to_char(sysdate) + 1/24

Answer is c

32. Which format model was used to convert 25-MAY-04 to May Twenty-Fifth, Two Thousand Four?

a. TO_CHAR('25-MAY-04','DD-MON-YY'), 'Month Ddspth, Year'
b. TO_CHAR(TO_DATE('25-MAY-04','DD-MON-YY'), 'Month Dd, Year')
c. TO_DATE(TO_CHAR('25-MAY-04','Dd-Month-YYYY'), 'Month Ddspth, YYYY')
d. TO_CHAR(TO_DATE('25-MAY-04','DD-MON-YY'), 'Month Ddspth, Year')

Answer is d

33. In the arithmetic expression: salary*12 - 400, which operation will be evaluated first?

The * operation will be evaluated first

34. In date formats to use Oracle's built in algorithm for determining the century digits of the year when only providing the last two digits, we should use which format element? (HH, CC, RR, YY)

Answer is RR

35. (Projection / Selection) is done by using a WHERE clause in a SQL statement

36. Which of the following can be used in the SELECT statement to return all columns of data in a table?

a. ALL
b. Columns
c. *
d. DISTINCT

ANSWER is c

37. Which of the following is the Order of Precedence for arithmetic expressions?

a. addition, subtraction, multiplication, division

b. subtraction, multiplication, addition, division
c. division , multiplication, addition, subtraction
d. multiplication, division, addition, subtraction

Answer is d

38. Mr. /Ms. Steven King is an employee of our company. hich statement below will return a list of employees in the following format?

a. SELECT 'Mr./Ms. '||first_name||' '||last_name ||' '||'is an employee of our company.' AS "Employees"
   FROM employees;
b. SELECT "Mr./Ms."||first_name||' '||last_name 'is an employee of our company.' AS "Employees"
   FROM employees;
c. SELECT Mr./Ms. ||first_name||' '||last_name ||' '||"is an employee of our company." AS "Employees"
   FROM employees;
d. SELECT 'Mr./Ms. 'first_name,last_name ||' '||'is an employee of our company.' FROM employees;

Answer is a

39. For a column alias to contain a space or retain the proper case, it must:

a. Be enclosed with single quotes.
b. Be enclosed within parentheses.
c. Be enclosed with double quotes
d. Be enclosed within the ampersand symbol

Answer is c

40. If any column value in an arithmetic expression is null,

a. The query will create an error message.
b. The result will be zero.
c. The result is null.
d. The SQL interpreter cannot process the query.

Answer is c

41. Which query will return three columns each with UPPER CASE column headings?

a. SELECT "Department_id", "Last_name", "First_name"
   FROM employees;
b. **SELECT DEPARTMENT_ID, LAST_NAME, FIRST_NAME**
   FROM employees;
c. SELECT department_id, last_name, first_name AS UPPER CASE

FROM employees;

d. SELECT department_id, last_name, first_name
FROM employees;
Answer is b

42. When used in a WHERE clause, which logical condition operator will return TRUE, only if both conditions are TRUE?

a. OR
b. NOT
c. **AND**
d. BETWEEN
Answer is c

43. In this database, product_id values are stored like XY01, XY02 while quantity values are stored as numbers. After executing this query, which statement below is TRUE?

```
SELECT quantity, product_id
FROM products
ORDER BY quantity and product_id
```

a. The results are sorted numerically.
b. The results are sorted first numerically then alphabetically.
c. The results are sorted first alphabetically then numerically.
d. The results are sorted alphabetically.

Answer is b

44. The following query will return which result?

```
SELECT last_name AS "Employee Name", job_id, code_number, hire_date FROM
employees
ORDER BY code_number ASC;
```

a. Results for the hire_date column will be displayed from smallest to largest date.
b. All column results will be ordered from smallest to largest value.
c. Results for the code_number column will be displayed from the smallest number to the largest number.
d. Only the code_number column will be returned.

Answer is c

45. You want to produce query results that display the last_name, first_name, department_id and salary of all employees. Display the first_name, last_name and department _id in ACS but for employees in the same department display the salary results in descending order. Also, if two employees have the same last_name, you want the first names to be displayed in ascending order.

a. ORDER BY department_id, salary ASC, last_name, first_name DESC;
b. ORDER BY last_name, first_name,department_id, salary DESC
c. ORDER BY department_id, salary, last_name, first_name DESC;
d. ORDER BY department_id DESC, salary , last_name||' '||first_name ASC

All options are incorrect, the correct way to write this is ORDER BY department_id, salary DESC, last_name, first_name

For instance

SELECT last_name, first_name, department_id, salary

FROM employees

ORDER BY department_id ASC, salary DESC, last_name ASC, first_name ASC;

46. In the following query, what will be evaluated first?

```
SELECT job_id, salary, hire_date
FROM employees
WHERE salary = 4000 OR job_id = 'AD_PRES' AND hire_date LIKE '03-JUN-04';
```

a. job_id = 'AD_PRES' AND hire_date LIKE '03-JUN-04';
b. salary = 4000 OR job_id = 'AD_PRES
c. salary = 4000
d. LIKE '03-JUN-04'

Answer is a

47. In the LIKE operator, which symbols can be used?

a. & and %
b. % and _
c. $ and /
d. * and _

Answer is b

48. The following query will return what values?

```
SELECT employee_id "number", salary "pay"
FROM employees
WHERE employee_id = 103 OR salary = 4000;
```

a. All employees plus those with employee id's of 103 whose salary is 4000.
b. Only employees with employee id's of 103 whose salary is 4000.
c. Any employee with an employee_id of 103 and also any employee whose salary is 4000.
d. Employees with an employee_id equal to " number" whose salary values are also equal to "pay".

Answer is c

49. What value(s) could be displayed?

```
SELECT prefix
FROM phone
WHERE prefix BETWEEN 360 AND 425
OR prefix IN(515, 206, 253)
AND BETWEEN 555 AND 904);
```

a. 625
b. 902
c. 410
d. 499

Answer is c

50. Which query will display of all employees whose last names start with "S" and have an 'ae' anywhere in their last name?

a. SELECT last_nameFROM
employees
WHERE last_name LIKE '_S%ae%';
b. SELECT last_nameFROM
employees
WHERE last_name LIKE 'S_ae%';
c. SELECT last_nameFROM
employees
WHERE last_name LIKE 'S&ae&';
d. SELECT last_nameFROM
employees
WHERE last_name LIKE 'S%ae%';

Answer is d

51. A column may be sorted in an ORDER BY clause by: (choose all true answers)

a. column name or expression in the SELECT list.
b. A column alias in the SELECT list.
c. Placing the ORDER BY clause before the SELECT statement.
d. Putting a column number in the SELECT list.

Answer is a, b and b

52. The following query will return which result?

```
SELECT last_name, job_id, department_id, hire_date
FROM employees
ORDER BY 4 DESC;
```

a. Only column 4 will be displayed.
b. All 4 columns will be displayed in descending order.
c. Four columns will be displayed with hire_dates displayed with the most recent dates listed first.
d. The hire_date column

Answer is c