SQL and Informatica Developer Test 1

Date: 8th August 2022 (Monday)

Topics:

1. Basics of RDBMS

2. Introduction to SELECT Statements

3. Filtering Data with the WHERE Clause

4. Sorting Data with the ORDER BY Clause

5. Querying Multiple Tables with joins

6. Aggregate Functions

7. Grouping Data with the GROUP BY Clause

Basics of RDBMS: (1 to 4)

1. The below is the table related to students, please observe the data carefully and answer the below questions.

Student ID	Student name	DOB	Branch Code	Branch Name	Subject name	Marks obtained
01	A	30th Feb 1998	ECE	ECE	S1	58
01	A	30th Feb 1998	ECE	Electronics	S2	NULL
02	B	March 23	CSE	Computer science	S2	1000
02	B	March 23 2002	ECE	CSE	S1	48
03	D	05/07/2002	MEC	Mechanical	S1	54
04	D	2001	EEE	EEE	S2	67
04	D	2001	EEE	EE	S2	NA
05	E	30-11-1996	CSE	CSE	S1	NULL
06	F	1998 Jan	IT	IT	S1	98
07	G	NA	CHM	Chemical	S2	
NA	H	2001/31/06	MEC	Mech	S1	65

i. What are the various challenges or disadvantages of storing data in the above excel sheet you noticed which lets the usage of relational databases to store the above data? list the examples of data integrity, inconsistency, redundancy ...etc

ii. What is the usual primary key/Composite key (irrespective of current data) that can be designed on the above table to uniquely identify the records?

     iii. What are some steps we can take to reduce the redundancy of the data in the above table?

     iv.

2. Identify the relationship between the below.

     i. Student & Student ID

     ii. Branch & Student (any number of students can belong to a branch; 1 student can choose any 1 branch)

     iii. Students & HOD (Each branch has 1 specific HOD)

3. What are the differences between the below constraints?

     i. primary key, Unique key

     ii. primary key and foreign key

     iii. primary key and Composite key

4. Student(ID, name, dept name, phone Number) In this query which attribute form the primary key?

a) ID
b) Name
c) phone Number
d) Dept

DDL & DML Commands: (5 to 8)

5. Create the table(s) which suits the below scenarios.
   "ABC" University is one of the famous universities in India, it has branches across various states/regions. The university is offering various courses like Engineering (ECE, MEC, EEE, CIV, CHE, CSE, IT only).

     i. Write the SQLs to Design/Create a table to store courses data. Courses(Course ID, Course name, Course HOD).

     ii. Design/Create a table to store students' data. Students(Student ID, Student name, date of birth, Gender, Contact number, Course ID).

     iii. Enforce a constraint on Students table which allows to insert data for only the students who already opted any course.

Note: Try to follow the best practices while naming the table, columns, using constraints, choosing data types ..etc.

6. Insert the below data to Students table. Enforce a constraint to default the DOB to 1st Jan 2000 when no DOB is available. Use "YYYY-MM-DD" format for all dates data.

Student ID	Student name	date of birth	Gender	Contact number	Course ID
ECE01	K.Kiran	1st Jan 2002	Male	1234567890	ECE
MEC01	B.Roja	July 28 2002	Female	9087654321	MEC

		1998 March 08	Female	8905674321	CSE
CSE01	S.Kamal				
CSE02	G.Vani	2001/12/12	Female	7890654321	CSE
EEE01	K.Pavani	NULL	Female	NULL	EEE

7. Write an SQL to Alter the Students table to include the other details as below.
   Students(Date of joining, home contact number)

Student ID	Student name	date of birth	Gender	Contact number	Course ID	Date of joining	Home contact no
ECE01	K.Kiran	1st Jan 2002	Male	1234567890	ECE	01/08/2022	NULL
MEC01	B.Roja	July 28 2002	Femal	9087654321	MEC	2022-08-01	9087654321
CSE01	S.Kamal	1998 March 08	Femal e	8905674321	CSE	2022-08-03	7689054321
CSE02	G.Vani	2001/12/12	Femal e	7890654321	CSE	2nd Aug 2022	NULL
EEE01	K.Pavani	NULL	Femal e	NULL	EEE	3rd Aug 2022	1234567890

8. Write an SQL to update the Gender details of MEC01 as "Male".
9. Write an SQL to delete all the students belongs to "CHM"course.

Note:

Use the above data crated as source for all the questions below (10 to 15).

Filtering Data

10. Write an SQL to fetch all student's data who are older than 20 years. You may use SQL functions or use any other approach; you may consider just a Year part to determine the age.
11. Write an SQL to fetch all students' **names** who did not have home contact number from CSE branch. The SQL output should be as below.

   Student name
   ****
   ***

Sorting Data

12. Write an SQL to display all the student's details in the order of Gender, ascending order of their date of birth. All the female students should be listed first, then male students.
13. Write an SQL to fetch details of the first **1** student joined (who joined earlier) in any of your favourite branch.

Grouping Data & Aggregate Functions

14. Write an SQL to display the total no of male & female students in all the branches, sort the data in the descending order of course/Branch. The below is some sample output.

Course ID	No_of Female students	No_of male students
MEC	10	7
IT	3	3

15. Write an SQL to display all the course IDs where at least 2 female students have joined. The below is the sample output.

Course ID
MEC
IT

Querying Multiple Tables with joins

16. What will be the output if the below 2 tables were joined using various types of joins?
    i.   Inner join
    ii.   Left join
    iii. Right join
    iv.   Full outer join

Table 1
1
1
2
3
5

Table 2
1
4
5
6
7

1. Normalise the below table to the best.

Employee_ID	Skill	Employee_Name
DTMS0001	SQL	S.Vijay
DTMS0001	Power BI	S.Vijay
DTMS0002	SQL	P.Anita
DTMS0003	Power BI	B.Ravi
DTMS0002	Informatica	P.Anita
DTMS0003	Informatica	B.Ravi

2. What are the differences between below?
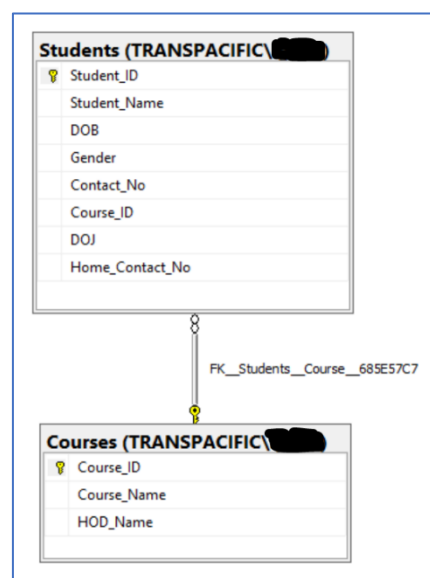
    i.   DELETE & TRUNCATE

    ii.   WHERE clause and HAVIING clause

As the prerequisite let us recollect the below from SQL Test 1.

"ABC" University is one of the famous universities in India, it has branches across various states/ regions. The university was offering below courses in Engineering.

ECE, MEC, EEE, CIV, CHE, CSE, IT

The below is the ERD (Entity relationships diagram).

Students (TRANSPACIFIC\▓▓▓▓)
- 🔑 Student_ID
- Student_Name
- DOB
- Gender
- Contact_No
- Course_ID
- DOJ
- Home_Contact_No

FK__Students__Course__685E57C7

Courses (TRANSPACIFIC\▓▓▓▓)
- 🔑 Course_ID
- Course_Name
- HOD_Name

Courses table:

	Course_ID	Course_Name	HOD_Name
1	CHE	Chemical Engineering	Atla.Shiva prasad
2	CIV	Civil engineering	Smitha sen K
3	CSE	Computer Science Engineering	Sanjay sharma
4	ECE	Electronics And Communication Engineering	Palli.Ravi Kumar
5	EEE	Electrical and Electronics Engineering	S.Uma devi
6	IT	Information Technology	S.Sandeep
7	MEC	Mechanical Engineering	Regala.Rambabu

Students table:

	Student_ID	Student_Name	DOB	Gender	Contact_No	Course_ID	DOJ	Home_Contact_No
1	DTMS0001	S.Hari Kumar	2002-08-14	Male	9876543210	CSE	2022-08-01	NULL
2	DTMS00010	Amrita Das	2000-02-29	Female	7854321085	ECE	2022-08-03	9768895432
3	DTMS0002	K.Pavan Sai	2000-01-15	Male	9345127890	MEC	2022-08-02	9986543210
4	DTMS0003	P.Anita madhuri	2001-06-29	Female	9534231837	IT	2022-08-02	
5	DTMS0004	Kumar Nikhil	2000-08-14	Male	7876543210	EEE	2022-08-02	
6	DTMS0005	R.SudhaRani	2002-09-15	Female	7788143210	ECE	2022-08-03	8735127890
7	DTMS0006	Raghu Vamsi	2001-03-03	Male	8826543210	CHE	2022-08-03	NULL
8	DTMS0007	G.Suguna	2002-12-15	Female	9976555510	CSE	2022-08-03	
9	DTMS0008	KVM.Pavani	2000-09-09	Female	7796543555	ECE	2022-08-03	NULL
10	DTMS0009	Mark butler	1999-09-09	Male	8836543452	IT	2022-08-04	NULL

Answer the following questions.

3. Write the SQL(s) to update the "Course_ID" of the "Mechanical Engineering" as "Mech" in the Students tables. (Note: Refer the data model)

4. See the below DML, what error may likely occur while inserting data in "Students" table using below SQL statement?

```
INSERT INTO [Students]
VALUES ('DTMS0006','Raghu
Vamsi','2001-03-03','Male', '8826543210','CHM','2022-08-03', '8826543210');
```

The University is considering CSE & IT courses as "IT Branches", ECE, MEC, EEE, CIV, CHE as "Non-IT Branches".

5. Write an SQL to determine the total number of students from "IT Branches", "Non-IT Branches".

Sample result:

	Branch_Type	No_Of_Students
1	IT Branches	4
2	Non-IT Branches	6

6. We have 3 SQL s below. Predict the SQL quires result based on the above two tables data.

```
SELECT
C.Course_ID, S.Student_Name
FROM
[TRANSPACIFIC\lgoka].[Courses] C WITH (NOLOCK)
LEFT JOIN
[TRANSPACIFIC\lgoka].[Students] S WITH (NOLOCK)
ON C.Course_ID = S.Course_ID
WHERE C.Course_ID IN ('ECE','CSE')
ORDER BY C.Course_ID, S.Student_Name
;
```

```sql
SELECT
C.Course_ID, S.Student_Name
FROM
[TRANSPACIFIC\lgoka].[Courses] C WITH (NOLOCK)
INNER JOIN
[TRANSPACIFIC\lgoka].[Students] S WITH (NOLOCK)
ON C.Course_ID = S.Course_ID AND C.Course_ID IN ('ECE','CSE')
ORDER BY C.Course_ID, S.Student_Name
;

SELECT
C.Course_ID, S.Student_Name
FROM
[TRANSPACIFIC\lgoka].[Courses] C WITH (NOLOCK)
LEFT JOIN
[TRANSPACIFIC\lgoka].[Students] S WITH (NOLOCK)
ON C.Course_ID = S.Course_ID AND C.Course_ID IN ('ECE','CSE')
ORDER BY C.Course_ID, S.Student_Name
;
```

The University management would like to know some information like how many total number of students were joined in all the branches, no.of male &no.of female students to check the majority in each branch.

A project team of CSE/IT Branch students was asked to write the SQLs by **providing required access** on "Students" & "Courses" tables to fetch the reports for management.

Assist the project team as a team member by writing SQLs.

Note: Sample results screenshots were provided for better understanding of the question, these are the results based on the data in "Students", "Courses" tables.

7. As an initial step, write an SQL to fetch the below output on "Students" table.

Sample result:

	Course_ID	Total_No_of_Students	No_of_Female_Students	No_of_Male_Students	Majority
1	CHE	1	0	1	Male
2	CSE	2	1	1	Equal
3	ECE	3	3	0	Female
4	EEE	1	0	1	Male
5	IT	2	1	1	Equal
6	MEC	1	0	1	Male

A faculty has reviewed the above results, he noticed that the report does not have detail for "Civil engineering", hence this turned out as an incomplete information to submit to University management. Also, he suggested to include course full name instead of course_ID.

8. Write an SQL to fetch the below result by fetching data from "Students", "Courses" tables.

Sample result:

	Course_Name	Total_No_of_Students	No_of_Female_Students	No_of_Male_Students	Majarity
1	Chemical Engineering	1	0	1	Male
2	Civil engineering	0	0	0	Equal
3	Computer Science Engineering	2	1	1	Equal
4	Electronics And Communication Engineering	3	3	0	Female
5	Electrical and Electronics Engineering	1	0	1	Male
6	Information Technology	2	1	1	Equal
7	Mechanical Engineering	1	0	1	Male

9. What is a JOIN in SQL, explain different types joins available in SQL with some examples?

10. Write an SQL to list how many students are reporting to each HOD in the descending order of total number of students reporting to.

Sample result:

	HOD_Name	No_of_Students_Reporting
1	Palli.Ravi Kumar	3
2	S.Sandeep	2
3	Sanjay sharma	2
4	Regala.Rambabu	1
5	S.Uma devi	1
6	Atla.Shiva prasad	1
7	Smitha sen K	0