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INT105 - Database Management System Lab Manual

SHANMUGHA ARTS, SCIENCE, TECHNOLOGY AND RESEARCH ACADEMY
(SASTRA Deemed to be University)

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1. SQL commands for table manipulation (Create, Alter, Drop Statements and Key Constraints)

Table Name: Product_Info

Column Name	Purpose
Maker	Name of the maker/manufacturer of computers/peripherals
Model_No	The unique identifier for each product manufactured
Type	Indicates the type of the product – PC for personal computers, LP for Laptop and PR for printers

Table Name: PC

Column Name	Purpose
Model_No	The unique identifier for each PC
Speed	Clock Speed of the PC
RAM	RAM in MB
HD	The hard-disk capacity of the PC in GB
CD	The speed of the CD Drive
Price	Price of the PC

Table Name: Laptop

Column Name	Purpose
Model_No	The unique identifier for each Laptop
Speed	Clock Speed of the PC
RAM	RAM in MB
HD	The hard-disk capacity of the PC in GB
Screensize	Screensize of the laptop
Price	Price of the PC

Table Name: Printer

Column Name	Purpose
Model_No	The unique identifier for each Laptop
Color	Flag indicating whether it is a color printer or a black and white printer
Type	Line, InkJet or Laser
Price	Price of the printer

The product_info table serves as a master table containing the list of all models of pc, laptop and printers manufactured by all makers. The PC, Laptop and the printer table give specific details about each product in that class.

1. Create the 4 tables mentioned above
    a. Check if the table is created successfully (tab table)

2. Alter the table product_info to make the type column NOT NULL.

3. Alter the table pc to have a default speed of 2.

4. Create suitable primary keys for all the tables of the above database schema
    a. Check if the primary keys are created successfully (User_Constraints table)

5. Create suitable foreign keys for all the tables of the above database schema
    a. Check if the foreign keys are created successfully (User_Constraints table)
    b. Demonstrate the usage of On delete cascade

6. Check Constraints:
    a. Apply a check constraint on the product_info table such that the only permitted values for the type column are ‘pc’, ‘lp’ and ‘pr’.
    b. Apply a check constraint such that the prices of pc, laptop and printer are all positive.
    c. Check if the check constraints are created successfully (User_Constraints table)

7. What are the different values for constraint_type in the user_constraints table and what is the meaning of each of those values?

8. Modify the table printer by adding a column printercode of type varchar2(10) to identify the printer uniquely in the world.

9. Add a Unique key constraint in the printercode column.
    a. Check if the unique key constraint is created successfully (User_Constraints table)

10. Increase the width of the column printercode by 2.

11. Without removing the table definition from the database remove all the rows from the table ‘Type_info’.

12. Drop the table ‘type_info’ from the database.

2. SQL commands for data manipulation (Select, Insert, Update and Delete statements)

1. Insert the following tuples in the table Product_Info

MAKER	MODEL_NO	TYPE
HCL	PC112	PC
HCL	LP113	LP
ZENITH	PR114	PR
WIPRO	PC122	PC
WIPRO	LP123	LP
WIPRO	PR124	PR
IBM	PC134	PC
HCL	LP114	LP
IBM	PC132	PC
IBM	LP133	LP
IBM	PR134	PR

2. Insert the following tuples in the table PC

MODEL_NO	SPEED	RAM	HD	CD	PRICE
PC112	2	256	60	52	40000
PC122	2	256	60	48	42000
PC132	1	128	100	68	50000
PC134	1	512	60	68	80000

3. Insert the following tuples in the table Laptop

MODEL_NO	SPEED	RAM	HD	SCREEN	PRICE
LP113	1	64	40	14	59000
LP123	2	128	60	16	72000
LP133	2	256	80	17	100000
LP114	2	128	40	17	45000

4. Insert the following tuples in the table Printer

MODEL_NO	COLOR	TYPE	PRICE
PR114	TRUE	INK	17000
PR124	FALSE	DOT	12000
PR134	TRUE	LASER	17000

5. Insert a tuple such that the model value is PC100, it is manufactured by HCL and has a speed of 3 GHz, RAM of 256 MB, HD of 40 GB and CD of speed 52x. The price is 50000.

6. Display all the records from the product_info table.

7. Delete all PC's with less than 50 cd speed.

8. Update all the rows of the printer table, such that the price is increased by 12% for Ink Jet Printers, 14% for Dot Matrix Printers, 10% for Laser Printers. (using separate Update as well as single update statements)

9. Update the Laptop table to increase the price by 12.33% for only those laptops with a speed of >= 2 and manufactured by HCL or IBM

10. Insert into Laptop table, all the rows from the PC table with the following considerations:
    a. If the model number for the PC row is PCxxx, the model number in the Laptop table should be LPxxx. (Hint : Omit the CD column)

    b. Keep the screen size as a constant value of 17.

    c. Price should be greater than 15,000.

3. SQL queries using Arithmetic, Logical, Set Operations, Sorting and grouping Operations

Create a table '**WORKERSKILL**' with the following details:

Name	Skill	City	Phone
DICK JONES	SMITHY	TRICHY	91-0437-77651
JOHN PEARSON	COMBINE DRIVER	CHENNAI	91-0426-98721
HELEN BRANDT	COMBINE DRIVER	MADURAI	91-0435-33333
JOHN PEARSON	COMBINE DRIVER	CHENNAI	91-0453-98765
JOHN PEARSON	SMITHY	MADURAI	91-0345-34565
VICTORIA LYNN	SMITHY	SYDNEY	91-0234-98723
ADAH TALBOT	WORK	THANJAVUR	91-0652-66544
ELBERT LOWELL	DISCUS	DELHI	91-0433-90875
WILFRED LOWELL	WORK	SALEM	91-0213-98723
ANAND KUMAR	PROGRAM	ERODE	91-0441-98123
JACKSON	PROGRAM	HOSUR	91-0543-90873

Create a table named '**WORKER**' with the following details

Name	Age
DICK JONES	33
WILLIAM SWING	30
BART SARJEANT	32
SUMA RANGANATH	21
RICHARD WILLIAMS	29
BHARTH KUMAR	36
JOHN PEARSON	28
JACKSON	34
MEENA KUMARI	29
ADAH TALBOT	27

1. List those rows of the table PC where RAM sizes are either '128' or '256' and the capacity of HD is greater than or equal to 50.

2. List all the rows from PRINTER except the printers 'pr112' or 'pr124'.

3. List all the rows from LAPTOP in ascending and descending order of the screen size.

4. List the makers of PC's. Use 'like' operator in the model field (don't use type).

5. List the laptop details where the screen size is not 17.

6. List the printers whose price is between 5000 and 10000. (Use between).

7. Display the PC details if we double the ram capacity. (Don't update).

8. Display the printer details with the following columnname as heading

PRINTER MODEL	COLORINFO	PRINTERTYPE	PRICE
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9. Apply the following operations on WORKER and WORKERSKILL tables
   UNION, UNION ALL , INTERSECTION & MINUS.

10. For each value of RAM, list the number of PCs (use group by function).

11. For each value of HD, list the number of PCs (use group by function).

12. List the HD values for which the number of PCs is more than 2. (Use group by and Having clause).

4. SQL commands using built-in functions and nested queries

1. Find the difference between the highest and lowest price from laptop.

2. Find the Standard deviation and Variance of price in PC table.

3. Use a specific command to get the data in the following manner:

Workername	*age*
JACK ADAMS	--21
MEENA KUMARI	--31

4. a. Update the PC table such that, the price for all PC models is increased by 12.33%.
   b. Display the PC model in lowercase and price rounded to the hundredths for all the PCs.

5. List the names in the ascending order of the length of names from WORKER table.

6. List the phone number (eliminate area code like 91-0437) of all employees from WORKERSKILL table.

7. Find the location of letter 'A' in the employee name of WORKERSKILL table.
   (Hint: use INSTR ( )).

8. Use SOUNDEX ( ) function on WORKERSKILL table to find a record of column city sound like ' Sidney '.

9. Display the current date/time in the following formats:
   a. Sep-2006
   b. September 12 2006
   c. 12-09-06 12:11:10

10. Give examples for replace, decode and translate functions.

11. Display the printer information whose price is equal to any one of the printer manufactured by 'IBM'.

12. List the laptop details whose screen size is equal to the screen size of 'lp114'.

5. SQL commands using Joins (Inner and Outer Joins)

1. Give an example for a Cartesian join.
2. Give an example for a Cartesian join involving 3 tables.
3. List the name, age, skill from the worker and worker skill tables for workers whose age is greater than 30 (use equi join).
4. Give an example for a non-equi join.
5. List the distinct combinations of PC models whose HD capacities are same (use self join).
6. Display the manufacturers of PC along with the details model, price (use inner join).
7. List the laptop and pc pairs whose price is same (list the model numbers, use inner join).
8. Give an example for left outer, right outer and full outer joins.
9. Give an example of how NVL function can be used effectively in outer joins.

6. SQL queries for creating Index, Views, Sequences & Synonyms

1. Create a view Price_info to include the columns model, maker and price for the PCs.
2. Create a view Price6000 on the table Printer to include only rows with price > 6000.
3. Modify one row in both the views and check whether it is reflected in the table and vice versa.
4. Delete one row from the views. Record the observations.
5. Create a unique index on the worker name column of the worker table.
6. Create a function based index on the city column of the worker table (Use upper, lower or initcap function and test)
7. Create a sequence object in ascending order start with 100.
8. Create a sequence object in descending order start with 100.
9. Use the system variables currval, nextval to pick values from these sequences and demonstrate their usage in insert, update, delete and select statements

10. Create a synonym object for worker skill with the name ‘G20K’.

7.Programs using simple PL/SQL construct

1. Write a PL/SQL program to display the area of a circle.

Steps:

- Declare the variables
- Accept the radius value as input from the user.
- Calculate area of circle
- Display the circle area.

8. Programs for function and procedure Creation using PL/SQL

1. Create a procedure to display the printer details by accepting the Model_No as an input

Steps:

- Create a procedure named printerdetails with Model_No as input parameter
- Place the SQL statement in the executable section.
- Compile the procedure
- Invoke the procedure

2. Create a function to return the price of a printer by accepting the Model_No as an input

Steps:

- Create a function named printerprice with Model_No as input parameter
- Place the SQL statement in the executable section.
- Use Return statement to return the price of the given printer
- Compile the function.
- Invoke the function from another PL/SQL block

9.Programs using PL/SQL for cursor creation

1. Write a PL/SQL block to increase the price of the printer by 10 percent if the screen size is greater than 15 inches.

Steps:

- Create a cursor in the declaration section
- Form a loop to fetch the data from the cursor and store the data in local variables.
- Increase the price by 10 percent.
- Display the old price and new price.

Additional Exercise:

Repeat the above problem with parameterized cursor.

10.Programs using PL/SQL to create triggers

1. Create the necessary triggers for the following scenario:

Sales_Transaction

Prod_Code	Date_Of_Sale	Qty	Price
P001	01-Jan-2007	10	1000
P002	01-Jan-2007	10	1000
P003	01-Jan-2007	10	1000
P004	02-Jan-2007	10	1000
P001	02-Jan-2007	10	1000

GST_Calculation

Date_Of_Sale	Prod_Code	GST
01-Jan-2007	P001	10% of the price sold on this date
01-Jan-2007	P002	10% of the price sold on this date

A. Whenever an insert happens to the Sales_Transaction table, the GST for the price should be calculated and inserted into the GST_Calculation table.

B. If the price is updated in the Sales_Transaction table, the GST in the GST_Calculation table should be updated accordingly.

C. If a row is deleted in the Sales_Transaction table, the corresponding row in the GST_Calculation table should be deleted as well.

11.Data handling application using C++

1. Write a CPP program to display the records from the product_info table.

Steps:

1.Oracle C++ Call Interface(OCCI) - API
2.Connecting to database
3.Executing a simple SQL command

12.Developing CRUD Application

Operations:

- Create
- Read
- Update
- Delete

Example:

CRUD in Human Resources

An enterprise organization maintains a human resources department that helps manage to staff and keep track of existing employees. The HR department manages a relational database application with various tables that track different types of employee information:

An **Employees Table** includes attributes such as first and last name, employee identification number, contact number, home address, work location, and any other relevant personal details.

An **HR Data Table** that includes the employee's payroll information, social security number, employee ID and salary.

A **Locations Table** that contains attribute data for each of the company's physical locations, including building ID, address, zip code, the name of the manager, etc.

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