



Marwadi University

Bachelor of Computer Application

Semester II (w.e.f. July, 2016)

Subject Code: 05BC0205

Subject Name: **Database Management System - I**

Learning Objectives:

This course is intended to give students basic fundamental knowledge about RDBMS. This will give conceptual insight about how database design and implementation takes place. Also, gives insight about relational operations and use of databases.

Prerequisites:

Basic knowledge of working with computers

Unit	Course Content	Hours
1	Overview to Database Management System Introduction to Database Management systems, Database-applications, purpose, instance and schema, Data Models, Database System Architecture	05
2	Database Design The Entity Relationship Model: The Basic ER concepts, Entities and Attributes, Relationships, constraints, E-R Diagram symbols, Examples of ERD.	08
3	Normalization Process: Introduction, first Normal Form, Second Normal Form, Third Normal Form.	04
4	Interactive SQL : SQL commands , Data Definition Language Commands, Data Manipulation Language Commands, insertion of data into the tables, Viewing of data into the tables, Deletion operations, updating the contents of the table, modifying the structure of the table, renaming table, destroying tables, Data Constraints, Type of Data Constraint, Column Level Constraint, Table Level Constraint.	10
5	Viewing The Data : Computations on Table Data, Arithmetic Operators, Logical Operators, Comparison Operators, Range Searching, Pattern Searching, ORACLE FUNCTIONS, Number Functions, Group Functions, Scalar Functions, Data Conversion Functions, Manipulating Dates in SQL , Character Functions, Sub queries and Joins : Joins, Equi Joins, Non Equi Joins, Self Joins, Outer Joins, Sub Queries, Correlated Queries, Using Set Operators:- Union , Intersect, Minus.	07
6	Views and Indexes : Definition and Advantages Views, Creating and Altering Views, Using Views, Indexed Views, Partitioned views, Definition and Advantages of Indexes, Composite Index and Unique Indexes, Accessing Data With and without Indexes, Creating Indexes and Statistics.	07



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7	Introduction to PL/SQL : Advantage of PL/SQL, The Generic PL/SQL Block, The Declaration Section, The Begin Section, The End Section, The Character set, Literals, PL/SQL Data types, Variables, Constants, Logical Comparison, Conditional Control in PL/SQL, Iterative Control, sequential control.	08
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Text Book(s):

1. Silberschatz, Korth, Sudarshan, "Database System Concepts" 5th Edition, McGraw Hill
2. S. K. Singh, "Database Systems: Concepts, Design and Applications", Pearson Education
3. SQL, PL/SQL: The Programming Language of Oracle by Ivan Bayross.3rd revised edition

Reference Book(s):

1. Alexis Leon, Mathews Leon, "Essentials of Database Management Systems" (Second reprint 2009), Tata McGraw Hill Publication
2. SQL: The Complete Reference, 3rd Edition.by James R. Groff (Author), Paul N. Weinberg (Author), Andrew J. Opper (Author)



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Lab Practical Tutorial

1. CREATE, ALTER, INSERT, UPDATE, RENAME, DROP COMMANDS

Create the table student with following structure with name student.

Column name	Data type	Size
Rollno	Number	4
Name	Varchar2	10
Course	Varchar2	8
Sem	Varchar2	8
Sub1	Number	4
Sub2	Number	4
Sub3	Number	4
Total	Number	5
Per	Number	5,3
Result	Varchar2	5
Class	Varchar2	8

1. Insert five records into the table
2. Calculate total, per, result and class.(using update)
3. Insert one new column named "city".
4. Insert data into the new column.
5. Change the size of "class" field.
6. Change the datatype of "rollno" field from number to varchar2(5).
7. Rename the table to student_data.
8. Insert one new column "address".
9. Drop the column "address".

2. SELECT statement WHERE clause

Perform the following queries on student_data table.

1. Find all the students heaving „a" as the first letter in their name.
2. Find all the students heaving „a" as the second letter in their name.
3. Find all the students heaving „i" as the starting letter and ending letter „a" with four character length in name.
4. Find all the students of city "rajkot".



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5. Find all the students who are not of "rajkot".
6. Display the rollno, name and city of the students with first class.
7. Find out the list of all students who stay in "delhi" or "rajkot".
8. Find all the students whose total mark is greater than 200.
9. Display the information of student whose roll no is 2.
10. Perform the above query by asking the rollno from user.
11. Find the students whose percentage is between 50 and 60.
12. List the name, city and class of the students who are not in the "rajkot".
13. List all students of MCA or BCA department and with first class.
14. List all the students with second class and living in the "rajkot".
15. Delete all students whose total is below 100.
16. Delete all students of city "delhi" and department PGDCA.

3. SELECT statement with ORDER BY, DISTINCT clause

Perform the following queries on student table.

1. Display the student list having first or second class.
2. Display the student list having first or second class and living in city "rajkot".
3. Display student name, total and city whose total is greater than 200 and living in city "rajkot" or "Bombay".
4. Display all students of "rajkot" or "Bombay" and of MCA or PGDCA department.
5. If the marks 20 of discipline is added to the total then display the new total with the column heading "newtotal" along with rollno, name, total.
6. In above query display the percentage with "%" sign.
7. Display name, city and total in descending order of total.
8. Display the list of student alphabetically.
9. Display the list of student in ascending order of name and descending order of city.
10. Display list of student in ascending order of total and percentage.
11. Display list of all students with unique city.
12. Display name and city of all student with unique name.

4. INBUILT FUNCTIONS

Perform the following queries on student table.

1. Find maximum total.
2. Find minimum total.
3. Find average of total.



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4. Find sum of total of all students.
 5. Find total number of students.
 6. Display rollno, name and city from student with name in uppercase and city in lower case.
 7. Display name and city with initial letter in capital.
 8. Insert new column jdate with datatype data in student table.
 9. Insert data in jdate column.
 10. Display name, city and jdate with dd/mm/yy format.
 11. Display name, city and jdate with dd/mon/yyyy format.
 12. Arrange the student in ascending order of their joining year
 13. Find absolute value of (-15).
 14. Find 32.
 15. Round the number 25.29 to one digit.
 16. Find square root of 36.
 17. Find exponent of 6.
 18. Extract month from the system date.
 19. Extract year from the date "02-05-2004".
 20. Find greatest number from the (3,5,34).
 21. Find greatest string from („x", "s", "za").
 22. Find least number from (3,5,34) and string from („x", "s", "za").
 23. Find modulo of (15,2).
 24. Find nearest largest and smallest integer of 25.8.
 25. Truncate 2 and -2 digits from the number 123.234.
 26. Convert the string "COLLEGE" to lower case.
 27. Convert the string "college" to uppercase.
 28. Display "college" with first letter in capital.
 29. Display "lle" from the word "college".
 30. Display ascii value of letter „g".
 31. Display the position of character „o" in word "college".
 32. Replace the word "lle" with "123" in word "college".
 33. Find the length of the word "college".
 34. Remove the letter "c" from the world "college".
 35. Remove the letter "e" from the world "college".
 36. Remove the spaces from left side of world " college".
 37. Remove the spaces from right side of world " college".
 38. Remove the spaces from both side of world " college".
 39. Display the today's date in month day, year format.
 40. Add five months in the system date.
 41. Display the number of months between system date and "02-05-2009".
5. GROUP BY and HAVING clause



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1. Display the student data city wise.
2. Display course wise total number of students.
3. Display course wise average total of all students
4. Display course wise sum of total.
5. Display course wise sum of percentage.
6. Display semester wise total number of students.
7. Display course wise total number of students whose result is pass.
8. Display result wise total number of students.
9. Display result wise sum of total of all students.
10. Display class wise total number of students who are of rajkot and delhi.
11. Display class wise total of percentage of all students of pgdca.
12. Display class wise average of total.
13. Display city wise name of students.
14. Display city wise name and class of students whose result is pass.
15. Display semester wise name of students.
16. Display semester wise total number of students of rajkot and with percentage greater than 70.
17. Display course wise joining date of all students.
18. Display result wise name and city of all students who are in sem1 or sem5
19. Display result wise name and city of all students of rajkot and morbid and get first class.
20. Display semester wise course and city of all students of bca and mca.
21. Display result wise sum of total and sum of percentage of all students.
22. Display the students of BCA class wise.
23. Display the students of first class city wise.
24. Display resultwise minimum and maximum total of all students of city rajkot and Bombay.
25. Display classwise maximum and minimum total of all the students whose result is fail.
26. Display course wise and semester wise average marks of students.
27. Display semester wise total number of students whose result is pass.
28. Display semester wise total number of students of MCA whose result is fail.
29. Display semester wise count of students whose result is pass.
30. Display result wise average percentage.
31. Display course wise average total of students of sem1 and sem2 students.
32. Display class wise count of all students of MCA who got first class or distinction.

6. Data Constraints

1. Create table named smaster with following fields. sno varchar2(8) sname varchar2(10) city varchar2(10) phone varchar2(15)
2. City name must not be null.
3. Student name must be unique and can not be empty.



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4. Student name must be in upper case.
5. Define primary key on sno field of smaster table.
6. Make 'rajkot' as default city.
7. Try to insert the record that violate the given constraints.
8. Create the following table with name sdetail. dno varchar2(8) sub1 varchar2(10) sub2 varchar2(10) mark1 number(10) mark2 number(10) total number (10)
9. Define foreign key on dno field of sdetail table that references the primary key of smaster table.
10. sub1,sub2,mark1,mark2 field can not be empty.
11. sub1 and sub2 must be with initial letter in capital.
12. Give name to foreign key.
13. Give name to any check constraint.
14. Drop that constraint using its name.

7. Subquery

1. Create table named "dept" with following structure. dno varchar2(5), dname varchar2(15)
2. Insert the following records into dept table. 1 sales 2 excise 3 incometax 4 marketing 5 admin 6 payment
3. Create table named "emp" with following structure. eno varchar2(5), dno varchar2(5), ename varchar2(15), desig varchar2(10), salary number(8), jdate date
4. Insert following records into emp table. s1 1 raj clerk 2000 20-jun-05 s2 1 rima manager 10000 15-mar-07 e1 2 jay clerk 2000 03-mar-08 e2 2 roma clerk 4000 02-sep-07 e3 2 komal clerk 4500 08-feb-09 i1 3 rahul manager 11000 24-jan-07 m1 4 nisha clerk 6000 23-aug-06 m2 4 isha manager 12000 18-dec-06
5. Display department number and name for employee whose name is „raj“;
6. Display all departments whose name starts with „m“ or „i“.
7. Display the department number and name for employee whose department name is given by user.
8. Display department number, department name, employee number and employee name of all employees of excise department.
9. Display department number and name, employee number, name, designation and salary of all clerks of excise department.
10. Display department name, employee name, designation and joining date of all employees of excise and marketing department.
11. Display department name, employee name, designation and joining date of all employees whose joining month is „march“.
12. Display information of all employees whose salary is greater than average salary of all employees.



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13. Display department name, employee name and designation of all clerks.
14. Display information of all employees whose salary is greater than salary of „roma“.
15. Display information of all employees whose working days in the company is less than 300.
16. Display department name, employee name, designation and joining date of all employees whose number of working months are more than 24.
17. Display all employee whose salary is more than all employees of marketing department
18. Display all employee whose salary is more than any employees of marketing department
19. Display all departments which have one or more employees.
20. Display all departments which have no employees.
21. Display all departments in which there are no managers.
22. Display all departments in which there are only clerks.
23. Display all departments in which employees joining month is not „march“.
24. Display all departments in which there are clerks and managers.
25. Display department name, employee name, designation and salary of all employees whose salary is less than salary of manager of sales department.
26. Display department and employee information of all employees whose salary is less than average salary of sales department.
27. Display department and personal information of employee whose salary is maximum of all departments.
28. Display all employees whose salary is more than maximum salary of marketing department.
29. Display all employees whose joining month is march or designation is clerk.
30. Display department and employee information of all clerks who have worked in company for more than 200 days.
31. Display all departments in which there are no clerks who has joined the company in the month of june.
32. Display all departments in which maximum salary is less than 8000.

8. Join, Union, Intersection, Minus

Equi – join

Tables : dept , emp, edetail

1. Create table edetail with following fields: eno varchar2(10) mobile varchar2(15) pan_no varchar2(15)
2. Insert data into edetail table.
3. Display employee name, salary, design and department name.
4. Display employee name, salary, design and department name of all managers.
5. Display department no, department name, employee name of all employees whose joining date is in march and salary more than 5000.
6. Display information of employee along with department name who are clerk or manager and salary between 8000 and 10000.



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7. Display all employees with their working days completed in company.
8. Display all employees who worked in company more than 30 months.
9. List all employees with their pan card and mobile information
10. List all employees who don't have mobile number.

Tables: Book , magazine , student , issue

1. Create table book with following fields. bno varchar2(5) bname varchar2(10) qty number(10) price number(8)
2. Create table magazine with following fields. mno varchar2(5) mname varchar2(10) qty number(10) price number(8)
3. Create table student with following fields. sno varchar2(5) sname varchar2(15) jdate date fees number(8)
4. Create table issue with following fields. bno varchar2(5) mno varchar2(5) sno varchar2(5) idate date rdate date days number(8) fine number(8)
5. Insert records in the above tables.
6. Display all students with their name, book name, magazine name that those have issued the books but not returned.
7. Display student name, book name with date of issuing and returning of book that has paid fine.
8. Display student and book information who keep book for more than 10 days.
9. Display all students who never pay fine.
10. Display all students with their book and magazine name with price between 200 and 500 and issue date is in september
11. Display Student name and fine amount whose fine amount is more than their fees.
12. Display student names and books they issued who had joined the library from more than 10 months.
13. Display magazine name and book names with available quantity more than 100 pieces.

Outer-join

Tables: dept , emp, edetail

- (1) Display department number and department name , employee name and designation of all employees if any.
- (2) Display department number and department name , employee name and mobile number of all employees if any.



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Self-join

- (1) Create table "emp1" with eno,ename,mno,salary as fields where mno is the manager number in which you insert employee number who is manager for that employee.
- (2) Insert the data in emp1 table.
- (3) Display employee with their respective managers.

Union, Intersection, Minus

- (1) Display union of department name and employee names from dept and emp tables.
- (2) Display intersection of all employees of excise department and all employees whose salary between 8000 and 10000.
- (3) Display all departments which have no employees.

9. PL/Block

1. All programs are written in PL block.
2. Write pl block where you declare two number variables and get data runtime and display the sum of that variables.
3. Enter three values runtime (eno,ename,esal)and display those values on the screen with some string.
4. Enter two numeric value runtime and check the which one is higher using IF condition..and display the higher and lower value.
5. Display 1 to 10 number using while loop.
6. Display 1 to 10 number using for loop.
7. Display 10 to 1 number using for loop.
8. Find factorial of given number(runtime) using while loop.
9. Display Fibonacci series of your choice min 10 numbers.
10. Display reverse of 65432 using While loop and FOR.
11. Enter a number and check if it is prime or not,and give proper output
12. Enter three numbers and perform addition,multiplication and division.
13. Enter three values and check the higher value among the three and display the result.
14. Enter 1 to any number and print odd and even numbers between those numbers.
15. Enter 1 to any number and find out its prime number between those numbers.
16. Create a table employee with empno,ename,sal.
17. Get above attributes values in to plblock using %type.Get one value empno from user and display the records from the table as per user empno.if no data is found display the message like there is not such data exists in the table.
18. Create a plblock where use %Rowtype and make total of given columns like(sal+commission+DA) and store this value in another variable.Then update the finalsal



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column in the table with this value.(if this column is not there in your table then create it with arbitrary value)

10. Cursor

All programs are to be written in Cursor.

1. Create any table with four attributes(use sql).
2. Create a cursor of table,fetch all the records from the table and display on screen with proper message.
3. Create a table emp with ename,deptno,sal(use sql).
4. Create a cursor on above table with arranged data in descending order. Display first 10 rows with ename and sal (when 10 record come cursor should exit).
5. Create a cursor fetch the data and display on the screen,if data is not available display proper message not "data not found:",If cursor is not found or open display the message like "unable to open cursor".
6. Create a cursor and fetch the data from table and until data is not found.Display proper message and exit the cursor.
7. Create a parameterized cursor on table emp,where get runtime city name and display all the records(empname,empid,salary,pincode) related to that particular city.
8. Create a cursor and insert the values in two table boy and girl.Get runtime option to user,if user enters 'm' insert into boy table.if user enters 'f' enter into girl table.b_id in boy table and g_id in girl table should automaically get the value using sequence.
9. Create a cursor updating any record in your table.

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11. Procedure and Function

1. Create a procedure which takes values and updates the table as per the requirement. Also provide proper exception handling like if data is not found the "table is empty".
2. Create any procedure which takes 4 attributes where one is used for input and remaining used for return the value.
3. create a function for prime numbers,then call this function in any of the pl program and return the proper value and display on the screen.
4. Create a function of finding of max value in the salary column of the table. Return the max value and print it.
5. Create a function which will return the total number of year between the joining date and the system date.For this enter any column of joining data and give any data but before 2 - 6 years(1-mar-2000).
example: 1-mar-2000 to 3-april-2012 it should return 12