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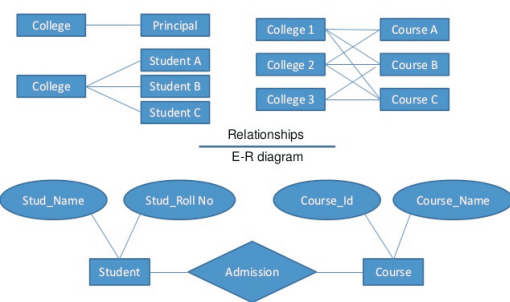
Roll No. _____ Year 20____ 20____

Exam Seat No. _____

COMPUTER GROUP | SEMESTER - III | DIPLOMA IN ENGINEERING AND TECHNOLOGY

A LABORATORY MANUAL FOR PRINCIPLES OF DATABASE (22321)

Entity-Relationship (E-R) Model



MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI
(Autonomous) (ISO 9001 : 2015) (ISO / IEC 27001 : 2013)

VISION

To ensure that the Diploma level Technical Education constantly matches the latest requirements of technology and industry and includes the all-round personal development of students including social concerns and to become globally competitive, technology led organization.

MISSION

To provide high quality technical and managerial manpower, information and consultancy services to the industry and community to enable the industry and community to face the changing technological and environmental challenges.

QUALITY POLICY

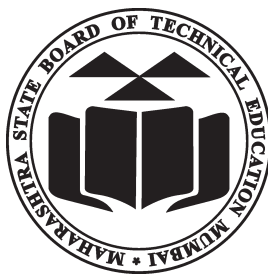
We, at MSBTE are committed to offer the best in class academic services to the students and institutes to enhance the delight of industry and society. This will be achieved through continual improvement in management practices adopted in the process of curriculum design, development, implementation, evaluation and monitoring system along with adequate faculty development programmes.

CORE VALUES

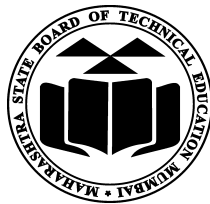
MSBTE believes in the followings:

- Education industry produces live products.
- Market requirements do not wait for curriculum changes.
- Question paper is the reflector of academic standards of educational organization.
- Well designed curriculum needs effective implementation too.
- Competency based curriculum is the backbone of need based program.
- Technical skills do need support of life skills.
- Best teachers are the national assets.
- Effective teaching learning process is impossible without learning resources.

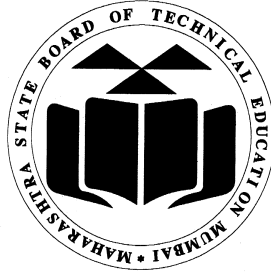
A Laboratory Manual
for
Principles of Database
(22321)
Semester-III
(IF)



Maharashtra State
Board of Technical Education, Mumbai
(Autonomous) (ISO:9001:2015) (ISO/IEC 27001:2013)



Maharashtra State Board of Technical Education,
(Autonomous) (ISO:9001 : 2015) (ISO/IEC 27001 : 2013)
4th Floor, Government Polytechnic Building, 49, Kherwadi,
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(Printed on June, 2018)



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Certificate

This is to certify that Mr. / Ms.
Roll No., of Third Semester of Diploma in
..... of Institute,
.....
(Code:) has completed the term work satisfactorily in course
Principles of Database (22321) for the academic year 20..... to 20..... as
prescribed in the curriculum.

Place:

Enrollment No:.....

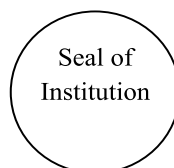
Date:

Exam. Seat No:

Subject Teacher

Head of the Department

Principal



Preface

The primary focus of any engineering laboratory/ field work in the technical education system is to develop the much needed industry relevant competencies and skills. With this in view, MSBTE embarked on this innovative 'I' Scheme curricula for engineering diploma programmes with outcome-based education as the focus and accordingly, relatively large amount of time is allotted for the practical work. This displays the great importance of laboratory work making each teacher; instructor and student to realize that every minute of the laboratory time need to be effectively utilized to develop these outcomes, rather than doing other mundane activities. Therefore, for the successful implementation of this outcome- based curriculum, every practical has been designed to serve as a '*vehicle*' to develop this industry identified competency in every student. The practical skills are difficult to develop through 'chalk and duster' activity in the classroom situation. Accordingly, the 'I' scheme laboratory manual development team designed the practicals to *focus* on the *outcomes*, rather than the traditional age old practice of conducting practicals to 'verify the theory' (which may become a byproduct along the way).

This laboratory manual is designed to help all stakeholders, especially the students, teachers and instructors to develop in the student the pre-determined outcomes. It is expected from each student that at least a day in advance, they have to thoroughly read through the concerned practical procedure that they will do the next day and understand the minimum theoretical background associated with the practical. Every practical in this manual begins by identifying the competency, industry relevant skills, course outcomes and practical outcomes which serve as a key focal point for doing the practical. The students will then become aware about the skills they will achieve through procedure shown there and necessary precautions to be taken, which will help them to apply in solving real-world problems in their professional life.

This manual also provides guidelines to teachers and instructors to effectively facilitate student-centered lab activities through each practical exercise by arranging and managing necessary resources in order that the students follow the procedures and precautions systematically ensuring the achievement of outcomes in the students comprehending concept of database, they can design relational database and perform basic operations on stored data.

Database management system stores, organizes and manages a large amount of data which can be used by different software application. Developing and managing efficient and effective database applications requires understanding the fundamentals of database management systems and techniques for the design of databases by following principles of database design. This course enables students comprehending concept of database, they can design relational database and perform basic operations on stored data.

Although best possible care has been taken to check for errors (if any) in this laboratory manual, perfection may elude us as this is the first edition of this manual. Any errors and suggestions for improvement are solicited and highly welcome

Programme Outcomes (POs) to be achieved through Practical of this Course

Following programme outcomes are expected to be achieved along with programme specific outcomes through the practical's of the course on Principles of Database.

- PO 1.**Basic knowledge:** Apply knowledge of basic mathematics, science and basic engineering to solve the problems related to application of computers and communication services in storing, manipulating and transmitting data, often in the context of a business or other enterprise.
- PO 2.**Discipline knowledge:** Apply Information Technology knowledge to solve broad- based Information Technology related problems.
- PO 3.**Experiments and practice:** Plan to perform experiments, practices and to use the results to solve Information Technology related problems.
- PO 4.**Engineering tools:** Apply appropriate Information Technology related techniques/ tools with an understanding of the limitations.
- PO 5.**The engineer and society:** Assess societal, health, safety and legal issues and the consequent responsibilities relevant to practice in the field of Information technology.
- PO 6.**Environment and sustainability:** Apply Information Technology related engineering solutions for sustainable development practices in environmental contexts.
- PO 7.**Ethics:** Apply ethical principles for commitment to professional ethics, responsibilities and norms of practice in the field of Information Technology.
- PO 8.**Individual and team work:** Function effectively as a leader and team member in diverse/ multidisciplinary teams.
- PO 9.**Communication:** Communicate effectively in oral and written form.
- PO 10.**Life-long learning:** Engage in independent and life-long learning along with the technological changes in the IT and allied industry.

Program Specific Outcomes (PSOs) :

- PSO 1.**Modern Information Technology:** Use latest technologies for operation and application of information.
- PSO 2.**Information Technology Process:** Maintain the information processes using modern information and communication technologies.

Practical- Course Outcome matrix

Course Outcomes (COs):-						
a. Use fundamental concepts of database in a Database System. b. Choose relevant data model to solve a problems. c. Develop relational databases using Entity Relationship modeling approach. d. Apply constraints for data integrity in Relational database. e. Apply data normalization and de-normalization techniques on database.						
S. No.	Practical Outcome	CO a.	CO b.	CO c.	CO d.	CO e.
1	Install database Product.	√	-	-	-	-
2	Use GUI (Graphical User Interface) environment of identified Database product.	√	-	-	-	-
3	Create a New Database and table structure with GUI (Graphical User Interface).	-	√	-	-	-
4	Insert, delete and rearrange records in table.	-	√	-	-	-
5	Identify an application, Draw Entity-Relation diagram and Design Database. Create table(s) and insert some records in it. Part I	-	-	√	-	-
6	Identify an application, Draw Entity-Relation diagram and Design Database. Create table(s) and insert some records in it. Part II	-	-	√	-	-
7	Create a relational database with constraints: Domain constraints, Key constraints, Not Null.	-	-	-	√	-
8	Create Forms, use various form controls, Apply data validation rules and perform view, add and save operations on it. Part-I	-	-	-	√	-
9	Create Forms, use various form controls, Apply data validation rules and perform view, add and save operations on it. Part- II	-	-	-	√	-

10	Create relations between the tables in database.	-	-	-	√	-
11	Create simple and composite indexes Using database GUI	-	-	-	√	-
12	Sort Records in the table Using given criteria.	-	-	-	√	-
13	Create queries by filtering the data based on criteria.	-	-	-	√	-
14	Create and Print reports using database GUI	-	-	-	√	-
15	Import and Export database to desired format.	-	-	-	-	√
16	Normalize the database you are working on to 3NF by decomposing existing tables.	-	-	-	-	√

List of Industry relevant Skills

The following industry relevant skills of the competency ‘Develop Relational Database by applying principles of database design’ are expected to be developed in you by undertaking the practicals of this laboratory manual.

1. Create and Manipulation on database.
2. Apply constraints on Database.
3. Create Form and Report using various controls.
4. Import and Export database to desired format.
5. Make the Database efficient using Normalization

Guidelines to Teachers

1. There will be two sheets of blank pages after every practical for the student to report other matters(if any), which is not mentioned in the printed practicals.
2. For difficult practicals if required, teacher could provide the demonstration of the practical emphasizing of the skills which the student should achieve.
3. Teachers should give opportunity to students for hands-on after the demonstration.
4. Assess the skill achievement of the students and COs of each unit.
5. One or two questions ought to be added in each practical for different batches.
For this teachers can maintain various practical related question bank for each course.
6. For effective implementation and attainment of practical outcomes, teacher ought to ensure that in the beginning itself of each practical, students must read through the complete write-up of that practical sheet.
7. During practical, ensure that each student gets chance and takes active part in taking observations/ readings and performing practical.
8. Teacher ought to assess the performance of students continuously according to the MSBTE guidelines.

Instructions for Students

1. For incidental writing on the day of each practical session every student should maintain a dated log book for the whole semester, apart from this laboratory manual which s/he has to submit for assessment to the teacher in the next practical session.
2. For effective implementation and attainment of practical outcomes, in the beginning itself of each practical, students need to read through the complete write- up including the practical related questions and assessment scheme of that practical sheet.
3. Student ought to refer the reference books, lab manuals, etc.
4. Student should not hesitate to ask any difficulties they face during the conduct of practicals.

Content Page
List of Practicals and Progressive
Assessment Sheet

S. No	Practical Outcome	Page No.	Date of performance	Date of submission	Assessment marks (25)	Dated sign. of teacher	Remarks (if any)
1.	Install database Product	1					
2.	Use GUI (Graphical User Interface) environment of identified Database	6					
3.	Create a New Database and table structure with GUI (Graphical User	11					
4.	Insert, delete and rearrange records in table	16					
5.	Identify an application, Draw Entity-Relation diagram and Design Database. Create table(s) and insert some records in it. Part I	21					
6.	Identify an application, Draw Entity-Relation diagram and Design Database. Create table(s) and insert some records in it. Part II	26					
7.	Create a relational database with constraints: Domain constraints, Key constraints. Not Null	31					
8.	Create Forms, use various form controls, Apply data validation rules and perform view, add and save operations on it. Part-I	36					
9.	Create Forms, use various form controls, Apply data validation rules and perform view, add and save operations on it. Part-II	41					
10.	Create relations between the tables in database	46					
11.	Create simple and composite indexes Using database GUI	52					
12.	Sort Records in the table Using given criteria	57					
13.	Create queries by filtering the data based on criteria	63					
14.	Create and Print reports using database GUI	68					
15.	Import and Export database to desired format	74					
16.	Normalize the database you are working on to 3NF by decomposing existing tables	79					
Total							

***To be transferred to Performa of CIAAN – 2017**

Practical No.1: Install database product

I. Practical Significance

It is essential to get familiar with fundamental concepts of database system. A properly designed database provides with access to up-to-date, accurate information. In order to work with any database product, it has to be installed first and this practical helps to develop this ability in students.

II. Relevant Program Outcomes (POs)

1. **Discipline knowledge:** Apply Information Technology knowledge to solve broad-based Information Technology related problems.
2. **Experiments and practice:** Plan to perform experiments and practices to use the results to solve broad-based Information Technology related problems.
3. **Engineering tools:** Apply appropriate Information Technology related techniques/tools with an understanding of the limitations.
4. **Individual and team work:** Function effectively as a leader and team member in diverse/ multidisciplinary teams.
5. **Life-long learning:** Engage in independent and life-long learning along with the technological changes in the IT and allied industry.

III. Competency and Practical skills

This practical is expected to develop the following skills for the industry oriented competency: ‘**Develop Relational Database by applying principles of database design.**’

1. Select related database product.
2. Install selected database product.

IV. Relevant Course Outcome(s)

Use fundamental concepts of database in a Database System.

V. Practical Outcome (Pros)

Install Database Product.

VI. Relevant Affective domain related Outcome(s)

1. Follow Ethical Practices.
2. Demonstrate working as a leader / a team member.

VII. Minimum Theoretical Background:

Database and its purpose:

Database is a collection of data of organization and main purpose of such database is to store the data more convenient and efficient.

Different types of Database Products:

Installation procedure of any of database products from the following:

- Open Office Base (Open Office)
- Star Base (Star Office)
- Libre Office
- MS-ACCESS
- MySQL
- MariaDB
- Or any other database software

Procedure:

1. Verify that system meets the basic requirements for installation of database.
2. Insert the database software CD into CD-ROM drive.
3. The installation process begins automatically and asks to wait while the system prepares the Installation Wizard.
4. The next step of the process prompts to enter product key and accept the terms of the license agreement.
5. When the installation completes, user may be prompted to restart computer. Go ahead and do so.
6. Create Shortcut of installed database product on Desktop /Identify installed database product on program Files.
7. Create user and set initial password for user.

VIII. Resources required

Sr. No.	Name of Resource	Specification	Quantity	Remarks
1	Computer System	Operating System: Windows 7 or higher Memory: 2 GB RAM or higher Processor Speed: Intel Core i3 or higher Hard Drive: 500 GB or larger DVD Drive: DVD +/- RW	As per batch size	For all Experiments
2	Software	Database Management System product with Graphical User Interface such as Open Office Base(Open Office), Star Base(Star Office), Libre Office, MS-ACCESS, MySQL, MariaDB	As per batch size	For all Experiments

IX. Precautions

1. Complete installation of database must be done.
2. Handle Computer System Carefully.
3. Start and Shutdown system with proper procedure.

X. Resources used

Sr. No.	Name of Resource	Specification
1	Computer System with broad specifications	
2	Software	
3	Any other resource used	

[illegible]

XV. References / Suggestions for further Reading:-

1. <https://www.thoughtco.com/install-microsoft-access-2010-1019928>
2. <https://dev.mysql.com/doc/refman/5.7/en/windows-installation.html>

XVI. Assessment Scheme:-

Performance indicators		Weightage
Process related(10 Marks)		40%
1.	Performing ability	15%
2.	Following ethical practices.	10%
3.	Handling/observing System Configuration	15%
Product related (15 Marks)		60%
4.	Follow procedure for handling databases	20%
5.	Installation of given database product	20%
6.	Timely Submission of practical	10 %
7.	Answer to sample questions	10%
Total (25 Marks)		100%

List of Students /Team Members

1.
2.
3.
4.

Marks Obtained			Dated signature of Teacher
Process Related(10)	Product Related(15)	Total(25)	

Practical No. 2: GUI Environment of Database

I. Practical Significance:

The database elements make it easy to work with and use computer software. A GUI uses windows, icons, and menus to activate the commands, such as to open, create, delete and to perform various operations on data stored in files. This practical is useful to identify various tools available with given product and use them effectively.

II. Relevant Program Outcomes (POs):

1. **Discipline knowledge:** Apply Information Technology knowledge to solve broad-based Information Technology related problems.
2. **Experiments and practice:** Plan to perform experiments and practices to use the results to solve broad-based Information Technology related problems.
3. **Engineering tools:** Apply appropriate Information Technology related techniques/ tools with an understanding of the limitations.
4. **Individual and team work:** Function effectively as a leader and team member in diverse/ multidisciplinary teams.
5. **Life-long learning:** Engage in independent and life-long learning along with the technological changes in the IT and allied industry.

III. Competency and Practical skills:

This practical is expected to develop the following skills for the industry oriented competency: **‘Develop Relational Database by applying principles of database design.’**

1. Observe the GUI for installed database product.
2. Identify different features of GUI Environment

IV. Relevant Course Outcome(s):

Use fundamental concepts of database in a Database System.

V. Practical Outcome (PrOs):

Use GUI (Graphical User Interface) environment of identified Database product.

VI. Relevant Affective domain related Outcome(s):

1. Follow Safety practices.
2. Follow ethical practices.
3. Participate in team problem solving activities.
4. Prioritizes time effectively to meet the needs of the team and yourself.

VII. Minimum Theoretical Background:

There exists different types of Database Products are categories in different ways. Most common categorization is structured database and unstructured database also relational database or non-relational database. Each database comes with various features like data storing mechanism, type of data store, retrieval process, controls redundancy, concurrent access to data and database. GUI base Database product provides User Interface to handle database. Unlike command base product where user needs to write and executes command to perform specific task.

Procedure:

1. Identify different tools of installed GUI such as open, create, save, browse and close.
2. Use different features of installed GUI database .e.g. for opening database use open sub menu in file menu likewise other menus also.

VIII. Resources required:

Sr. No.	Name of Resource	Specification	Quantity	Remarks
1	Computer System	Operating System: Windows 7 or higher Memory: 2 GB RAM or higher Processor Speed: Intel Core i3 or higher Hard Drive: 500 GB or larger DVD Drive: DVD +/- RW	As per batch size	For all Experiments
2	Software	Database Management System product with Graphical User Interface such as Open Office Base(Open Office), Star Base(Star Office) Libre Office, MS-ACCESS,	As per batch size	For all Experiments

IX Precautions:

1. Handle Computer system carefully.
2. Close the database GUI after its use.

X Resources used:

Sr. No.	Name of Resource	Specification
1	Computer System with broad	
2	Software	
3	Any other resource used	

XI Result (Output of the Program):

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XII Conclusion(s):

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(Note: Use Point XI and XIII to XIV for all relevant practical exercise use blank pages provided or attach more pages if needed.)

1. Write GUI features of any database product.
2. Write the functions of different tools of database product.

(Space for answers)

This image shows a full page of primary-ruled paper. It features multiple horizontal rows, each defined by two parallel dotted lines. The rows are evenly spaced across the entire page, providing a guide for handwriting practice. There are no margins, text, or other markings present.

Attempt the following Questions:

[illegible]

XV References / Suggestions for further Reading:

1. <https://www.databasejournal.com/features/mysql/slideshows/top-10-mysql-gui-tools.html>

XVI Assessment Scheme:

Performance indicators		Weightage
Process related(10 Marks)		40%
1.	Performing ability	15%
2.	Following ethical practices.	10%
3.	Handling/observing System Configuration	15%
Product related (15 Marks)		60%
4.	Observing GUI Environment	20%
5.	Writing different tools of database	20%
6.	Timely Submission of practical	10 %
7.	Answer to sample questions	10%
Total (25 Marks)		100%

List of Students /Team Members

1.
2.
3.
4.

Marks Obtained			Dated signature of Teacher
Process Related(10)	Product Related(15)	Total(25)	

Practical No. 3: Create a new database and table structure with GUI (Graphical User Interface)

I. Practical Significance:

Student will learn to create a simple structure of database which contains multiple tables. Each table has its own structure. This practical is useful to create the Database and table structure.

II. Relevant Program Outcomes (POs):

1. **Discipline knowledge:** Apply Information Technology knowledge to solve broad-based Information Technology related problems.
2. **Experiments and practice:** Plan to perform experiments and practices to use the results to solve broad-based Information Technology related problems.
3. **Engineering tools:** Apply appropriate Information Technology related techniques/tools with an understanding of the limitations.
4. **Individual and team work:** Function effectively as a leader and team member in diverse/ multidisciplinary teams.
5. **Life-long learning:** Engage in independent and life-long learning along with the technological changes in the IT and allied industry.

III. Competency and Practical skills:

This practical is expected to develop the following skills for the industry oriented competency: **‘Develop Relational Database by applying principles of database design.’**

1. Create database.
2. Create tables with appropriate table name and columns names.
3. Use suitable data types for representation of different types of data.
4. Table name in given database must be unique.
5. Attribute/fields name must be unique while creating table.

IV. Relevant Course Outcome(s):

Choose relevant data model to solve a problems.

V. Practical Outcome (PrOs):

Create a New Database with GUI (Graphical User Interface).

VI. Relevant Affective domain related Outcome(s):

1. Follow Safety practices.
2. Follow ethical practices.
3. Demonstrate working as a leader / a team member.
4. Participate in team problem solving activities.
5. Create multiple tables in same database
6. Close the opened database and tables for further use.

VII. Minimum Theoretical Background:

Database is a collection of tables. Usually the Database Administrator (DBA) creates a Database to store various table containing different but related data. The GUI Base database products allow DBA to create a Database using graphical interface and hence make DBAs' life easier. While specifying names to Database, Tables and Attribute one shall use normal naming conventions that are follows with variables in any other programming language. All database supports various data types like char/varchar, int/number, date. While specifying data types one needs to give size as well.

Procedure:

1. Start Database.
2. Click the "Blank desktop database" template.
3. Type a file name for the database.
4. Choose the folder where to store database.
5. Click the Create button.
6. Save the database.
7. Use different features on it and apply it on database
8. Create or Open Database.
9. Create table.
10. Suitable name for table.
11. Add fields on table.
12. Name of field should be as per proper convention.
13. Choose appropriate data types for representation of type of data.
14. Check the validity of data in each field.
15. Save the table.
16. Close the table.
17. Close the database

VIII. Resources required:

Sr. No.	Name of Resource	Specification	Quantity	Remarks
1	Computer System	Operating System: Windows 7 or higher Memory: 2 GB RAM or higher Processor Speed: Intel Core i3 or higher Hard Drive: 500 GB or larger DVD Drive: DVD +/- RW	As per batch size	For all Experiments
2	Software	Database Management System product with Graphical User Interface such as Open Office Base(Open Office), Star Base(Star Office), Libre Office, MS-ACCESS, MySQL, MariaDB	As per batch size	For all Experiments

IX. Precautions:

1. Handle Computer system carefully.
2. Save and Close the created database for further use.
3. Save and Close the created table for further use.
4. Avoid the use of reserved words for creating database and tables.

X. Resources used:

Sr. No.	Name of Resource	Specification
1	Computer System with broad specifications	
2	Software	
3	Any other resource used	

XI. Result (Output of the Program):

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XII. Conclusion(s) :

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XIII. Practical Related Questions:

Note: Below given are few sample questions for reference. Teacher must design more such questions so as to ensure the achievement of identified CO.

(Note: Use Point XI and XIII to XIV for all relevant practical exercise use blank pages provided or attach more pages if needed.)

1. Name the types of GUI databases available in your laboratory.
2. Write down the procedure for creating tables in a database.

(Space for answers)

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XIV. Exercise:

Attempt the following Questions:

(Note: Use Point XI and XIII to XIV for all relevant practical exercise use blank pages provided or attach more pages if needed.)

1. Create 'student' database and save the database.
2. Create 'Employee' database and save it.
3. Create multiple tables in database 'Employee' and rename it.
4. Create multiple tables in database for 'student' database.
5. View the multiple tables in 'student' database

(Space for answers)

XV References / Suggestions for further Reading:

1. <https://www.safaribooksonline.com/library/view/access-2013-the/>

XVI Assessment Scheme:

Performance indicators		Weightage
Process related (10 Marks)		40%
1.	Follow ethical practices.	20%
2.	Follow start and end procedure of system	20%
Product related (15 Marks)		60%
3.	Creation of database	15%
4.	Creation of table with appropriate data	15%
5.	Timely Submission of practical	15 %
6.	Answer to sample questions	15%
Total (25 Marks)		100%

List of Students /Team Members

1.
2.
3.
4.

Marks Obtained			Dated signature of Teacher
Process Related(10)	Product Related(15)	Total(25)	

Practical No. 4: Insert and delete records in Table

I. Practical Significance:

The main goal of database systems is to store data in the tables. The INSERT option is used to store data into a table. The INSERT option creates a new row in the table to store data. Similarly DELETE option used to delete a table, Using this practical, student's will be able to learn the insert and delete records in database using GUI interface and store large number of data in database. Also, he/she will check data are valid or not as per the fields.

II. Relevant Program Outcomes (POs):

1. **Discipline knowledge:** Apply Information Technology knowledge to solve broad-based Information Technology related problems.
2. **Experiments and practice:** Plan to perform experiments and practices to use the results to solve broad-based Information Technology related problems.
3. **Engineering tools:** Apply appropriate Information Technology related techniques/tools with an understanding of the limitations.
4. **Individual and team work:** Function effectively as a leader and team member in diverse/ multidisciplinary teams.
5. **Life-long learning:** Engage in independent and life-long learning along with the technological changes in the IT and allied industry.

III. Competency and Practical skills:

This practical is expected to develop the following skills for the industry oriented competency: '**Develop Relational Database by applying principles of database design.**'

1. Create rows in a table.
2. Insert data in table must be in assigned format.
3. After creating table can delete records using delete commands.

IV. Relevant Course Outcome(s):

Choose relevant data model to solve a problems.

V. Practical Outcome (PrOs):

Insert delete and rearrange records in table(s).

VI. Relevant Affective domain related Outcome(s):

1. Follow Safety practices.
2. Follow ethical practices.
3. Demonstrate working as a leader / a team member.
4. Participate in team problem solving activities.
5. Insert multiple rows in same table.
6. Delete the records from above table.
7. Close the table.

VII. Minimum Theoretical Background:

Structure of a table is known as Schema of a table. One can use DESC command/ option to verify structure of table. In table structure, Columns are known as *Attribute* and Rows are known as *tuple*. It shows name of table along with column structure and data type for all attribute. The attribute can store values as per the data type it holds. One can use GUI options to insert and delete from available menu.

Procedure:

1. Create or Open Database.
2. Create or open table.
3. Insert rows into created table
4. Insert data as per data types
5. Check the validity of data in each field.
6. After inserting delete require records
7. Save the table.
8. Close the table.
9. Close the database

VIII. Resources required:

Sr. No.	Name of Resource	Specification	Quantity	Remarks
1	Computer System	Operating System: Windows 7 or higher Memory: 2 GB RAM or higher Processor Speed: Intel Core i3 or higher Hard Drive: 500 GB or larger DVD Drive: DVD +/- RW	As per batch size	For all Experiments
2	Software	Database Management System product with Graphical User Interface such as Open Office Base(Open Office), Star Base(Star Office) Libre Office, MS-ACCESS, MySQL, MariaDB	As per batch size	For all Experiments

IX. Precautions:

1. Choose data depends on data type of respective attributes.
2. Write the proper steps to insert and delete records in a database.

This image shows a full page of white paper with horizontal dashed lines, typical of primary school handwriting practice paper. The lines are evenly spaced and run across the entire width of the page. There are no margins, text, or other markings present.

XV References / Suggestions for further Reading:

- 1 <https://msdn.microsoft.com/.../insert-update-and-delete-records-from-a-table-using-access>
- 2 <https://eeperry.wordpress.com/2014/.../libreoffice-base-sql-update-and-delete-records/>

XVI Assessment Scheme:

Performance indicators		Weightage
Process related(10 Marks)		40%
1.	Follow ethical practices.	10%
2.	Follow procedure	10%
3.	Creation of table with naming convention	20%
Product related (15 Marks)		60%
4.	Insertion of records with its data types	15%
5.	Display records	10%
6.	Deletion of records	15%
7.	Expected output achieved	10%
8.	Timely Submission of practical	5 %
9.	Answer to sample questions	5%
Total (25 Marks)		100%

List of Students /Team Members

1.
2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(10)	Product Related(15)	Total(25)	

Practical No. 5: Design Entity-Relation Diagram (Part I)

I. Practical Significance:

ER model is the best model which represents pictorial representation of entities and relation among them. Entities have got attributes and relationship between them. ER Diagrams are most often used to design or debug relational databases in the fields of software engineering, business information systems, education and research. This practical help students to visualize how data is connected in a general way, and are particularly useful for constructing a relational database.

II. Relevant Program Outcomes (POs):

1. **Discipline knowledge:** Apply Information Technology knowledge to solve broad-based Information Technology related problems.
2. **Experiments and practice:** Plan to perform experiments and practices to use the results to solve broad-based Information Technology related problems.
3. **Individual and team work:** Function effectively as a leader and team member in diverse/ multidisciplinary teams.
4. **Life-long learning:** Engage in independent and life-long learning along with the technological changes in the IT and allied industry.

III. Competency and Practical skills:

This practical is expected to develop the following skills for the industry oriented competency: **‘Develop Relational Database by applying principles of database design.’**

1. Identify all the entities in the system.
2. Identify relationships between entities.
3. Use different symbols of ER diagram
4. Design ER diagram on given problem.

IV. Relevant Course Outcome(s):

Develop relational databases using Entity Relationship modeling approach.

V. Practical Outcome (PrOs):

Identify an application, Draw Entity-Relation diagram and Design database. Create table(s) and insert some records in it-Part I.

VI. Relevant Affective domain related Outcome(s):

1. Follow ethical practices.
2. Handle Computer System Carefully.
3. Demonstrate working as a leader / a team member.
4. Participate in team problem solving activities.

VII. Minimum Theoretical Background:

In Relational model, each table stored in database has some relationship between them. This relation can be depicted with the help of E-R diagram. E-R Diagram can be drawn with the help of various symbols. One shall use the appropriate symbol and attribute type to showcase relations between two entities. Before one can create actual database, DBA must draw and verify the structure with the help of E-R diagram.

Procedure:

1. Understand all the symbols of Entity Relationship diagram.
2. Draw the symbols applicable to problem statement.
3. Show whether the relationship is 1-1, 1-many or many-to-many.
4. Model the relationships between each by drawing lines to connect related entities.
5. Label the relationships using verbs or a numeric notation.
6. Identify relevant attributes within each entity. For a conceptual model, focus on the most important attributes
7. Repeat until expected domain is well-represented by using E-R model.

VIII. Resources required:

Sr. No.	Name of Resource	Specification	Quantity	Remarks
1	Computer System	Operating System: Windows 7 or higher Memory: 2 GB RAM or higher Processor Speed: Intel Core i3 or higher Hard Drive: 500 GB or larger DVD Drive: DVD +/- RW	As per batch size	For all Experiments
2	Software	Database Management System product with Graphical User Interface such as Open Office Base(Open Office), Star Base(Star Office) Libre Office, MS-ACCESS, MySQL, MariaDB	As per batch size	For all Experiments

IX Precautions:

1. Follow the ethical practices.
2. Use appropriate symbols to design E-R diagram.
3. Use desired cardinality for each entity.

X Resources used:

Sr. No.	Name of Resource	Specification
1	Computer System with broad specifications	
2	Software	
3	Any other resource used	

XI Result (Output of the Program):

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XV References / Suggestions for further Reading:

1. <http://www.bridging-the-gap.com/erd-entity-relationship-diagram/>

XVI Assessment Scheme:

Performance indicators		Weightage
Process related (10 Marks)		40%
1.	Follow ethical practices.	10%
2.	Entity Relationship between data	15%
3.	Follow procedure	15%
Product related (15 Marks)		60%
4.	Use of correct symbols in E-R diagram	20 %
5.	E-R diagram for specific problem	20%
6.	Timely Submission of report	10%
7.	Answer to sample questions	10%
Total (25 Marks)		100%

List of Students /Team Members

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2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(10)	Product Related(15)	Total(25)	

Practical No. 6: Design of Enhanced ER Diagram (part-II)

I. Practical Significance:

The basic E-R modeling concepts were not sufficient to represent the requirements of complex applications. This practical is useful to identify shortcomings of ER modeling approach for the given system and resolve it through EER approach.

II. Relevant Program Outcomes (POs):

1. **Discipline knowledge:** Apply Information Technology knowledge to solve broad-based Information Technology related problems.
2. **Experiments and practice:** Plan to perform experiments and practices to use the results to solve broad-based Information Technology related problems.
3. **Individual and team work:** Function effectively as a leader and team member in diverse/ multidisciplinary teams.
4. **Life-long learning:** Engage in independent and life-long learning along with the technological changes in the IT and allied industry.

III. Competency and Practical skills:

This practical is expected to develop the following skills for the industry oriented competency: ‘**Develop Relational Database by applying principles of database design.**’

1. Identify all the entities in the system.
2. Identify relationships between entities.
3. Use different enhanced symbols of ER diagram
4. Design EER diagram on given problem.

IV. Relevant Course Outcome(s):

Develop relational databases using Entity Relationship modeling approach.

V. Practical Outcome (PrOs):

Identify an application, Draw Entity-Relation diagram and Design database. Create table(s) and insert some records in it. Part II

VI. Relevant Affective domain related Outcome(s):

1. Follow ethical practices.
2. Demonstrate working as a leader / a team member.
3. Participate in team problem solving activities.
4. Handle System Carefully.

VII. Minimum Theoretical Background:

Like E-R Model one can show high level relationship with the help EER diagram. Along with normal E-R model Database Designer can make use of advance functions like ISA, Generalization, Specialization and Aggregation to combine various entities. Enhanced E-R model also supports Super class and Sub class relationship where one entity becomes Super class and one or more entity becomes Sub class. This is known as Generalization – Specialization relationship.

Procedure:

1. Create each entity relevant to problem statement.
2. Model the relationships between each by drawing lines to connect related entities.
3. Label the relationships using verbs or a numeric notation.
4. Identify relevant attributes within each entity. For a conceptual model, focus on the most important attributes
5. Identify the sub class and super class of given problem and draw it.
6. Show the relationship using generalization and aggregation of given diagram.
7. Repeat until expected domain is well-represented by EER model.

VIII. Resources required:

Sr. No.	Name of Resources	Specification	Quantity	Remarks
1	Computer System	Operating System: Windows 7 or higher Memory: 2 GB RAM or higher Processor Speed: Intel Core i3 or higher Hard Drive: 500 GB or larger DVD Drive: DVD +/- RW	As per batch size	For all Experiments
2	Software	Database Management System product with Graphical User Interface such as Open Office Base(Open Office), Star Base (Star Office), Libre Office, MS-ACCESS, MySQL, MariaDB	As per batch size	For all Experiments

IX. Precautions:

Use appropriate symbols to design EE-R diagram.

X. Resources used:

Sr. No.	Name of Resource	Specification
1	Computer System with broad specifications	
2	Software	
3	Any other resource used	

XI. Result (Output of the Program):

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Note: Below given are few sample questions for reference. Teacher must design more such questions so as to ensure the achievement of identified CO.

(Note: Use Point XI and XIII to XIV for all relevant practical exercise use blank pages provided or attach more pages if needed.)

1. Describe all symbols of enhanced E R diagram.
2. Compare ER and EER model.

(Space for answers)

This image shows a full page of white paper with horizontal dotted lines. The lines are evenly spaced and run across the width of the page, providing a guide for handwriting practice. There are no margins, text, or other markings on the page.

Attempt the following Questions:

[illegible]

XV References / Suggestions for further Reading:

1. <https://www.lucidchart.com/pages/enhanced-entity-relationship-diagram>
2. <http://bit.do/PDB22321>

XVI Assessment Scheme:

Performance indicators		Weightage
Process related (10 Marks)		40%
1.	Follow ethical practices.	10%
2.	Relationship between data	20%
3.	Follow procedure	10%
Product related (15 Marks)		60%
4.	Pictorial representation of data	20%
5.	EE-R diagram for specific problem	20 %
6.	Timely Submission of report	10%
7.	Answer to sample questions	10%
Total (25 Marks)		100%

List of Students /Team Members

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2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(10)	Product Related(15)	Total(25)	

Practical No. 7: Create Relational Database with constraints

I. Practical Significance:

Once database is created, for validation, different types of constraints are used at the time of table creation so as to enforce correct type of data entry in the table. This practical inculcate in the students the ability to apply relevant key in database to comply the given constraints.

II. Relevant Program Outcomes (POs):

1. **Discipline knowledge:** Apply Information Technology knowledge to solve broad-based Information Technology related problems.
2. **Experiments and practice:** Plan to perform experiments and practices to use the results to solve broad-based Information Technology related problems.
3. **Engineering tools:** Apply appropriate Information Technology related techniques/tools with an understanding of the limitations.
4. **Individual and team work:** Function effectively as a leader and team member in diverse/ multidisciplinary teams.
5. **Life-long learning:** Engage in independent and life-long learning along with the technological changes in the IT and allied industry.

III. Competency and Practical skills:

This practical is expected to develop the following skills for the industry-identified competency: ‘Develop Relational Database by applying principles of database design.’

1. Create simple table.
2. Use suitable data types for representation of different types of data.
3. Apply the Constraints name to field in table.

IV. Relevant Course Outcome(s):

Apply constraints for data integrity in Relational database.

V. Practical Outcome (PrOs):

Create a relational database with constraints: Domain constraints, Key constraints, Not Null.

VI. Relevant Affective domain related Outcome(s):

1. Follow Safety practices.
2. Follow ethical practices.
3. Prioritizes time effectively to meet the needs of the team and self.
4. Create multiple constraints for given table.

VII. Minimum Theoretical Background:

Constraints are certain conditions that all values in a table and attribute needs to satisfy. This leads to having uniformity as far as values are concern. To convert DBMS into RDBMS all attribute needs to satisfy all 12 Codd’s rule specified by Edgar F. Codd. In RDBMS one can specify various constrains as follows.

- Entity Integrity Constraint: - Use to specify conditions on Entity / Attribute(s)
- Domain Integrity Constraint: - Use to specify conditions on Pool of legitimate/acceptable values

- **Referential Integrity Constraint:** - Use to specify Relationship between two attribute (columns) exist in different table.

Procedure:

1. Create tables with proper constraints.
2. Give unique name to the constraints while creation of table.
3. Check different constraints while inserting rows into the table.
4. Update the constraints as per needed.
5. Delete the constraint as per need.

VIII. Resources required:

Sr. No.	Name of Resource	Specification	Quantity	Remarks
1	Computer System	Operating System: Windows 7 or higher Memory: 2 GB RAM or higher Processor Speed: Intel Core i3 or higher Hard Drive: 500 GB or larger DVD Drive: DVD +/- RW	As per batch size	For all Experiments
2	Software	Database Management System product with Graphical User Interface such as Open Office Base(Open Office), Star Base(Star Office), Libre Office, MS-ACCESS, MySQL, MariaDB	As per batch size	For all Experiments

IX Precautions:

1. Save and Close the created table and database for further use.
2. Apply necessary constraints on specified attribute only.

X Resources used:

Sr. No.	Name of Resource	Specification
1	Computer System with broad specifications	
2	Software	
3	Any other resource used	

XI Result (Output of the Program):

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XII Conclusion(s):

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[illegible]

XV References / Suggestions for further Reading:

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XVI Assessment Scheme:

Performance indicators		Weightage
Process related (10 Marks)		40%
1.	Follow ethical practices.	10%
2.	Follow procedure	15%
3.	Use of constraints	15%
Product related (15 Marks)		60%
4.	Creation of records with constraints.	20%
5.	Record validation	20%
6.	Timely Submission of report	10 %
7.	Answer to sample questions	10%
Total (25 Marks)		100%

List of Students /Team Members

1.
2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(10)	Product Related(15)	Total(25)	

Practical No. 8: Create Forms and use various Form controls (Part-I)

I. Practical Significance:

Forms are a method of inputting data, editing data, and viewing data. Forms can be based on Tables or Queries. The input is stored in the table(s) that is based upon the form architecture. Forms are used to build menus and navigation screens. This practical help student to create form, and fill up, view data.

II. Relevant Program Outcomes (POs):

1. **Discipline knowledge:** Apply Information Technology knowledge to solve broad-based Information Technology related problems.
2. **Experiments and practice:** Plan to perform experiments and practices to use the results to solve broad-based Information Technology related problems.
3. **Engineering tools:** Apply appropriate Information Technology related techniques/ tools with an understanding of the limitations.
4. **Individual and team work:** Function effectively as a leader and team member in diverse/ multidisciplinary teams.
5. **Life-long learning:** Engage in independent and life-long learning along with the technological changes in the IT and allied industry.

III. Competency and Practical skills:

This practical is expected to develop the following skills for the industry-identified competency: **‘Develop Relational Database by applying principles of database design.’**

1. Create simple Form to present the data.
2. Apply different Controls to the Form.

IV. Relevant Course Outcome(s):

Apply constraints for data integrity in Relational database.

V. Practical Outcome (PrOs):

Apply data validation rules and perform view, add and save operations on it. Part-I.

VI. Relevant Affective domain related Outcome(s):

1. Follow Safety practices.
2. Follow ethical practices.
3. Prioritizes time effectively to meet the needs of the team and self.
4. Create multiple constraints for given table.

VII. Minimum Theoretical Background:

Inputting and editing information using Form and Form Wizard is easy way to input, edit, and view the stated information. For each table create a basic form that can be used to manage data for the table. Once forms have been created it provide more user-friendly way of entering and managing data in database (datasheet view is not considered user-friendly)

Procedure:

1. Creating a New Form Manually-
 - a. Open the database file to create the new form.
 - b. Click the Forms icon.
 - c. Click Create Form in Design View.

- 2 Creating a New Form With the Form Wizard-
 - a. Open the database file to create the new form.
 - b. Click the Forms icon.
 - c. Click Use Wizard to Create Form.
- 3 To add a control to a document-
 - a. On the Form Controls toolbar, click the icon of the control that user want to add.
 - b. In the document, drag to create the control.
 - c. To create a square control field, hold down the Shift key while drags.

When the Form is getting open, it displays each record according to the chosen layout. Using the navigation toolbar on the bottom we can navigate to each record of the table. The status bar on the bottom displays also the current record.

- 4 Creating and modifying a record-
To add a record click on the Add New Record button on the navigation toolbar and fill in the form fields. If user modify any field in a record then it is must click the Save Record button.

VIII. Resources required:

Sr. No.	Name of Resource	Specification	Quantity	Remarks
1	Computer System	Operating System: Windows 7 or higher Memory: 2 GB RAM or higher Processor Speed: Intel Core i3 or higher Hard Drive: 500 GB or larger DVD Drive: DVD +/- RW	As per batch size	For all Experiments
2	Software	Database Management System product with Graphical User Interface such as Open Office Base(Open Office), Star Base (Star Office), Libre Office, MS-ACCESS, MySQL, MariaDB	As per batch size	For all Experiments

IX. Precautions:

1. Save and Close the created table, forms and database for further use.

X. Resources used:

Sr. No.	Name of Resource	Specification
1	Computer System with broad specifications	
2	Software	
3	Any other resource used	

XIV. Exercise:

Attempt the following Questions:

(Note: Use Point XI and XIII to XIV for all relevant practical exercise use blank pages provided or attach more pages if needed.)

- 1 Consider the University database. Create a form to allow a user to view courses by department.
- 2 Consider the Library database. Create a form to list the loan records for a book.
Create another form to list the loan records for member.

(Space for answers)

XV. References / Suggestions for further Reading:

- 1 https://help.libreoffice.org/Common/Working_with_Forms

XVI. Assessment Scheme:

Performance indicators		Weightage
Process related (10 Marks)		40%
1.	Follow ethical practices.	05%
2.	Follow Safety Practices	05%
3.	Process followed to create Form	30%
Product related (15 Marks)		60%
4.	Expected Output Achieved	20%
5.	Use of Control to design Form	20%
6.	Timely Submission of report	10 %
7.	Answer to sample questions	10%
Total (25 Marks)		100%

List of Students /Team Members

1.
2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(10)	Product Related(15)	Total(25)	

Practical No. 9: apply data validation rules on form controls (Part-II)**I. Practical Significance:**

Validation rules to keep data entry consistent for each field. Some of the validation is done by default during the database table design, when fields are given their data type, size, etc. Any attempt by a user to enter the wrong type of data or exceed the field size will result in an error message. This practical is useful to for student to apply the different validation rules on Form.

II. Relevant Program Outcomes (POs):

1. **Discipline knowledge:** Apply Information Technology knowledge to solve broad-based Information Technology related problems.
2. **Experiments and practice:** Plan to perform experiments and practices to use the results to solve broad-based Information Technology related problems.
3. **Engineering tools:** Apply appropriate Information Technology related techniques/ tools with an understanding of the limitations.
4. **Individual and team work:** Function effectively as a leader and team member in diverse/ multidisciplinary teams.
5. **Life-long learning:** Engage in independent and life-long learning along with the technological changes in the IT and allied industry.

III. Competency and Practical skills:

This practical is expected to develop the following skills for the industry-identified competency: **‘Develop Relational Database by applying principles of database design.’**

1. Create Form with the data validation rule.
2. Modify the Form by applying validation rule.

IV. Relevant Course Outcome(s):

Apply constraints for data integrity in Relational database.

V. Practical Outcome (PrOs):

Apply data validation rules and perform view, add and save operations on it. Part-II.

VI. Relevant Affective domain related Outcome(s):

1. Follow Safety practices.
2. Follow ethical practices.
3. Prioritizes time effectively to meet the needs of the team and self.
4. Create multiple constraints for given table.

VII. Minimum Theoretical Background:

Inputting and editing information using Form and Form Wizard is easy way to input, edit, and view the stated information. For each table create a basic form that can be used to manage data for the table. Once forms have been created it provide more user-friendly way of entering and managing data in database (datasheet view is not considered user-friendly)

Procedure:

User can customize the way form controls look and behave in a number of ways. These are all accessed in design mode.

1. Select Control from the context menu and select the General tab in the Properties dialog box. Open the form in the design view.
2. Click on the field where the new validation rule will be applied.
3. Click on the Property Sheet Icon in the Tools Section.
4. Click on the Data Tab.
5. Enter the Validation Rule for row and column.
6. Enter the Validation Text (i.e., the error message that should be appear) in the next row.
7. Set a label for the control in the *Label* box . Some form controls, such as push buttons and option buttons, have visible labels that can be set. Others, such as text boxes, do not.
8. Set whether the form control will print out if the document is printed with the Print option.
9. Set the font, typeface, and size for a field's label or for text typed into a field. This setting does not affect the size of check boxes or option buttons.
10. For a text box, user can set the maximum text length. This is very useful when adding records into a database. Every database text field has a maximum length and, if the data entered is too long, it displays an error message. By setting the maximum text length of the form control to be the same as that of the database field, this error can be avoided.
11. User can set the default option for a form control. By default, a control is blank, or has every option unselected. User can set the control to start with a particular option or list item selected.
12. For controls where a password is being entered, setting the Password character (for example to *) displays only that character, but saves what the user really types.
13. User can add additional information and help text for a form control.
14. Other formatting controls such as background color, 3-D look, text formatting, scroll bars, and borders allow to further define how the control appears.

VIII. Resources required:

Sr. No.	Name of Resource	Specification	Quantity	Remarks
1	Computer System	Operating System: Windows 7 or higher Memory: 2 GB RAM or higher Processor Speed: Intel Core i3 or higher Hard Drive: 500 GB or larger DVD Drive: DVD +/- RW	As per batch size	For all Experiments
2	Software	Database Management System product with Graphical User Interface such as Open Office Base(Open Office), Star Base(Star Office), Libre Office, MS-ACCESS, MySQL, MariaDB	As per batch size	For all Experiments

IX. Precautions:

1. Save and Close the created table and database for further use.

X. Resources used:

Sr. No.	Name of Resource	Specification
1	Computer System with broad specifications	
2	Software	
3	Any other resource used	

XI. Result (Output of the Program):

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XII. Conclusion(s):

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XIII. Practical Related Questions:

Note: Below given are few sample questions for reference. Teacher must design more such questions so as to ensure the achievement of identified CO.

(Note: Use Point XI and XIII to XIV for all relevant practical exercise use blank pages provided or attach more pages if needed.)

1. Enlist any five properties for Image Control in Property sheet.
2. What is validation? Give its significance.

(Space for answers)

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XIV. Exercise:

Attempt the following Questions:

(Note: Use Point XI and XIII to XIV for all relevant practical exercise use blank pages provided or attach more pages if needed.)

1. Consider a student database. Create a form for accepting the data such as stud_ID, stud_Name, stud_Address, stud_Contact. Apply validation for control stud_ID and stud_Contact as number.
2. Consider a emp database. Create a form emp_details which include validation for control emp_mail_id as it should accept only @ in the user entered mail id and not the other symbols.
3. Consider the Orders database. Create appropriate forms to list
 - a) a customer and the customer's orders;
 - b) an order and its detail lines;
 - c) a product and the order detail lines where the product is referenced;
 - d) a category and the products belonging to the category.

(Space for answers)

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XV. References / Suggestions for further Reading:

- 1 https://help.libreoffice.org/Common/Working_with_Forms

XVI. Assessment Scheme:

Performance indicators		Weightage
Process related (10 Marks)		40%
1.	Follow ethical practices.	05%
2.	Follow Safety Practices	05%
3.	Process followed to create Form	30%
Product related (15 Marks)		60%
4.	Expected Output Achieved	20%
5.	Use of proper Validation to design Form	20%
6.	Timely Submission of report	10 %
7.	Answer to sample questions	10%
Total (25 Marks)		100%

List of Students /Team Members

1.
2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(10)	Product Related(15)	Total(25)	

Practical No. 10: Create relations between tables in database

I. Practical Significance:

A relationship helps to combine data from two different tables. A relationship works by matching data in key columns with the same name in both tables. In most cases, the relationship matches the primary key from one table, which provides a unique identifier for each row, with an entry in the foreign key in the other table. This practical is useful for creating relationships among different tables.

II. Relevant Program Outcomes (POs):

1. **Discipline knowledge:** Apply Information Technology knowledge to solve broad-based Information Technology related problems.
2. **Experiments and practice:** Plan to perform experiments and practices to use the results to solve broad-based Information Technology related problems.
3. **Engineering tools:** Apply appropriate Information Technology related techniques/tools with an understanding of the limitations.
4. **Individual and team work:** Function effectively as a leader and team member in diverse/ multidisciplinary teams.
5. **Life-long learning:** Engage in independent and life-long learning along with the technological changes in the IT and allied industry.

III. Competency and Practical skills:

This practical is expected to develop the following skills for the industry-identified competency: **‘Develop Relational Database by applying principles of database design.’**

1. Apply the relevant key in database to comply the given constraints.
2. Apply the given constraints to the tables in database application.
3. Design schema and subschema in database.

IV. Relevant Course Outcome(s):

Apply constraints for data integrity in Relational database.

V. Practical Outcome (PrOs):

Create relations between the tables in database.

VI. Relevant Affective domain related Outcome(s):

1. Follow Safety practices.
2. Participate in team problem solving activities.
3. Prioritizes time effectively to meet the needs of the team and self.
4. Create multiple tables in same database by using relation constraints.

VII. Minimum Theoretical Background:

Primary key is an attribute in a table which is used to identify any single row uniquely. Hence it does not allow user to have repetitive (redundant) values and also it cannot be blank i.e. null. Foreign key in a table is an attribute which can have only those values that are available in parent table. On deletion of these values from parent table all values associated in child table get automatically deleted.

VIII. Procedure:

1. Create or Open Database.
2. Create multiple tables with suitable key structure.
3. Apply constraints while creating table.
4. For creating relationships between tables on the '**Database Tools**' tab, click on the '**Relationships**' button. The '**Relationship Tools Design**' tab will appear.
5. Click on the '**Show Table**' button. The Show Table dialog box will appear.
6. In the Show Tables dialog box, ensure the Tables tab is selected.
7. Select the tables to be related and click on **Add** to add them to the relationships window.
8. Click on **Close** to close the Show Table dialog box.
9. The Relationship window displays the tables to be linked.
10. The Primary Keys are marked with a key symbol.
11. To create a relationship between two tables, click and drag between the two common fields in the table.
12. To define the type of relationship for each link click on 'Enforce Referential Integrity'.
13. Click on Create.
14. A line now joins the fields and the two tables are linked between the common fields.
15. Close the Relationships window to return to the Database Window.

IX. Resources required:

Sr. No.	Name Resource	Specification	Quantity	Remarks
1	Computer System	Operating System: Windows 7 or higher Memory: 2 GB RAM or higher Processor Speed: Intel Core i3 or higher Hard Drive: 500 GB or larger DVD Drive: DVD +/- RW	As per batch size	For all Experiments
2	Software	Database Management System product with Graphical User Interface such as Open Office Base(Open Office), Star Base(Star Office), Libre Office, MS-ACCESS, MySQL, MariaDB	As per batch size	For all Experiments

X. Precautions:

1. Apply proper constraints on tables for creating relationships.

XI. Resources used:

Sr. No.	Name of Resource	Specification
1	Computer System with broad specifications	
2	Software	
3	Any other resource used	

XII. Result (Output of the Program):

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XIII. Conclusion(s):

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XIV. Practical Related Questions:

Note: Below given are few sample questions for reference. Teacher must design more such questions so as to ensure the achievement of identified CO.

(Note: Use Point XI and XIII to XIV for all relevant practical exercise use blank pages provided or attach more pages if needed.)

1. Write steps to apply one to many relationships for emp and dept table.
2. Write steps to apply many to many relationships for book and student table.

(Space for answers)

This image shows a full page of white paper with horizontal dashed lines, typical of primary school handwriting practice paper. The lines are evenly spaced and run across the entire width of the page. There are no margins, text, or other markings present.

XV. Exercise:**Attempt the following Questions:**

(Note: Use Point XI and XIII to XIV for all relevant practical exercise use blank pages provided or attach more pages if needed.)

For Company database which does not have any relationships defined. The first few rows of Employee and Department are:

Employee				
empId	firstName	lastName	supervisor	dept
1	Tanya	Dickson		
2	Heidi	Herring	1	1
3	Hiroko	Hawkins	1	2
4	Emmanuel	Watkins	1	3
5	Oliver	Holt	2	1
6	Raphael	Delaney	3	2
7	Basia	Franks	2	1
8	Bruno	Pena	2	1

Department			
deptId	department	manager	phone
1	Marketing	2	(204) 999-4444
2	Human Resources	3	(204) 999-3333
3	Sales	4	(204) 999-2222

- Consider the Employee and Department tables in Employee database. Note the Employee table has a field 'dept' which indicates the department where the employee works. The relationship can be stated:
 - Each department has zero or more employees, and,
 - Each employee works in at most one department.
 Create a one-to-many "works in" relationship between Employee and Department.
- Consider the empId and the supervisor fields of Employee. Most employees report to someone – someone who is their supervisor. Only employee 1 does not report to anyone else. The *supervises* relationship can be stated:
 - an employee may supervise many other employees, and,
 - an employee reports to at most one other employee. Create the "supervises" relationship.

- 3 The Department table has a field *manager* which indicates the employee who is the head of the department. The relationship is stated:
- each department has one employee who manages that department, and,
 - an employee may manage at most one department.
- There is a unique index defined for the manager field and create a one-to-one relationship “has manager” between Department and Employee.

(Space for answers)

This image shows a full page of white paper with horizontal dotted lines. The lines are evenly spaced and run across the width of the page, providing a guide for handwriting practice. There are no margins, text, or other markings on the page.

XVI. References / Suggestions for further Reading:

- 1 <http://www.informit.com/articles/article.aspx?p=26115&seqNum=4>
- 2 <https://support.office.com/en-us/article/create-a-relationship-40c998dd-4875-4da4-98c8-8ac8f109b85b>
- 3 <https://www.techrepublic.com/article/relational-databases-defining-relationships-between-database-tables/>

XVII. Assessment Scheme:

Performance indicators		Weightage
Process related(10 Marks)		40%
1.	Performing ability	10%
2.	Following ethical practices	10%
3.	Correct process followed to apply relationship	20%
Product related (15 Marks)		60%
4.	Apply constraints on the tables	20%
5.	Proper output after creating relationships	20%
6.	Timely Submission of practical	10 %
7.	Answer to sample questions	10%
Total (25 Marks)		100%

List of Students /Team Members

1.
2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(10)	Product Related(15)	Total(25)	

Practical No. 11: Create Simple and Composite Indexes Using Database GUI

I. Practical Significance:

Using this practical, student will learn to create a simple and composite indexing which will improve the speed of data retrieval while search or sort its records by a particular field. Students also speed up these operations by creating an index for the field.

II. Relevant Program Outcomes (POs):

1. **Discipline knowledge:** Apply Information Technology knowledge to solve broad-based Information Technology related problems.
2. **Experiments and practice:** Plan to perform experiments and practices to use the results to solve broad-based Electronics related problems.
3. **Engineering tools:** Apply appropriate Information Technology related techniques/ tools with an understanding of the limitations.
4. **Individual and team work:** Function effectively as a leader and team member in diverse/ multidisciplinary teams.
5. **Life-long learning:** Engage in independent and life-long learning along with the technological changes in the IT and allied industry.

III. Competency and Practical skills:

This practical is expected to develop the following skills for the industry oriented competency: ‘**Develop Relational Database by applying principles of database design.**’

1. Create simple tables.
2. Insert the values into the tables using insert operation.
3. Create the index to particular fields.
4. Create secondary indexes into tables.
5. Delete the created indexes by the user.

IV. Relevant Course Outcome(s):

Apply constraints for data integrity in Relational database.

V. Practical Outcome (PrOs):

Create simple and composite indexes Using database GUI

VI. Relevant Affective domain related Outcome(s):

1. Follow ethical practices.
2. Demonstrate working as a leader / a team member.
3. Participate in team problem solving activities.
4. Prioritizes time effectively to meet the needs of the team and self.
5. Create multiple tables in same database with data validation rule.
6. Close the table.

VII. Minimum Theoretical Background:

Indexes are used for faster retrieval of data from table. There are two types of index. Simple index is one which is created on one column and Composite index is one which is created on more than one attribute. Unique index is one which gets automatically created when a table is created with primary key.

Procedure:

1. Create or Open Database.
2. Create table.
3. Suitable name for table.
4. Add fields into table with proper convention.
5. Go to the menu and select appropriate options for auto index.
6. If user wants to make any field indexed then go to the field tab.
7. Check the indexed checkbox in field validation section.
8. This indexed property user can change by clicking on the drop down menu and choosing other two options –YES Duplicate Ok and YES Noduplicate.
9. Apply two indexes to a specified table, first index was created automatically based on primary key fields and another we will apply using above said concepts.
10. Close the table.
11. Close the database.

VIII. Resources required:

Sr. No	Name of Resource	Specification	Quantity	Remarks
1	Computer System	Operating System: Windows 7 or higher Memory: 2 GB RAM or higher Processor Speed: Intel Core i3 or higher Hard Drive: 500 GB or larger DVD Drive: DVD +/- RW	As per batch size	For all Experiments
2	Software	Database Management System product with Graphical User Interface such as Open Office Base(Open Office), Star Base(Star Office), Libre Office, MS-ACCESS, MySQL, MariaDB	As per batch size	For all Experiments

IX Precautions:

1. Save and Close the created table and database for further use.

X Resources used:

Sr. No.	Name of Resource	Specification
1	Computer System with broad specifications	
2	Software	
3	Any other resource used	

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(Note: Use Point XI and XIII to XIV for all relevant practical exercise use blank pages provided or attach more pages if needed.)

1. State the difference between constraint and index.
2. Create table and apply the various constraints and index on given table.

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XV References / Suggestions for further Reading"

1. <http://www.tutorialspoint.com/cgi-bin/printpage.cgi>
2. <http://support.office.com/en-us/article/create-and-use-an-index-to-improve-performance>

XVI Assessment Scheme:

Performance indicators		Weightage
Process related (10 Marks)		40%
1.	Follow ethical practices.	10%
2.	Creation of Table	10%
3.	Apply different constraints	15%
4.	Follow procedure	5%
Product related (15 Marks)		60%
5.	Creation of Index	20%
6.	Apply Index on given table	20%
7.	Timely Submission of practical	10 %
8.	Answer to sample questions	10%
Total (25 Marks)		100%

List of Students /Team Members

1.
2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(10)	Product Related(15)	Total (25)	

Practical No. 12: Sort Records in the Tables

I. Practical Significance:

Sorting data can play a big role in making a report or form effective and easy to use. When records are getting sort records, they are placed into a logical order, with similar data grouped together. As a result, sorted data is often simpler to read and understand than unsorted data. This practical is useful to sort the records in a table or form on one or more fields.

II. Relevant Program Outcomes (POs):

1. **Discipline knowledge:** Apply Information Technology knowledge to solve broad-based Information Technology related problems.
2. **Experiments and practice:** Plan to perform experiments and practices to use the results to solve broad-based Electronics related problems.
3. **Engineering tools:** Apply appropriate Information Technology related techniques/ tools with an understanding of the limitations.
4. **Individual and team work:** Function effectively as a leader and team member in diverse/ multidisciplinary teams.
5. **Life-long learning:** Engage in independent and life-long learning along with the technological changes in the IT and allied industry.

III. Competency and Practical skills:

This practical is expected to develop the following skills for the industry-identified competency: **‘Develop Relational Database by applying principles of database design.’**

1. Sort the records in a table, query or form.
2. Remove a sort.

IV. Relevant Course Outcome(s):

Apply constraints for data integrity in Relational database.

V. Practical Outcome (PrOs):

Sort Records in the table using given criteria.

VI. Relevant Affective domain related Outcome(s):

1. Follow ethical practices.
2. Participate in team problem solving activities.
3. Prioritizes time effectively to meet the needs of the team and self.

VII. Minimum Theoretical Background:

Attributes are columns in a table which holds similar type of values for all entities. For example Roll_number attribute will hold roll number of all students. Based on the data types one can store specific value with condition (if any). While specifying name of table and attribute one shall ensure that they cannot use space, and only alpha numerical values are allowed. Name needs to start with character only.

Procedure:**1. Sort a table, query or form-**

- a. Identify the fields to sort. To sort on two or more fields, identify the fields that will act as the innermost and outermost sort fields.
- b. Do one of the following:
 - i. **Use the Ascending or Descending Sort button:**
 - Click in any field and select the **Ascending** or **Descending Sort** button.
 - Repeat the previous step for each sort field, ending with the outermost sort field.
 - ii. **Use the mouse:**
 - Right-click anywhere in the column or control corresponding to the innermost field, and click one of the sort commands.

Note: The commands vary with the type of data that is in the selected field. If a text field contains null and zero-length strings, when sorted in ascending order, the records with null values are listed first, then the records with zero-length strings, and then the records with nonblank values.

- c. To remove a sort order:
 - i. **Home** tab / **Sort & Filter** group / **Clear All Sorts** button.

2. Sort in the query design view-

- a. Open query in Design view.
- b. Add the fields want to sort by, if necessary.
- c. Choose **Ascending** or **Descending** from the **Sort**

Note: To sort by a field, add the field to the grid, choose **Ascending** or **Descending** from the **Sort** row, but then uncheck the “**Show**” checkbox

- d. To remove the sort criteria from the grid:
 - i. In Design view, choose (**not sorted**) from the **Sort** drop down list for each field.

VIII. Resources required:

Sr. No.	Name of Resource	Specification	Quantity	Remarks
1	Computer System	Operating System: Windows 7 or higher Memory: 2 GB RAM or higher Processor Speed: Intel Core i3 or higher Hard Drive: 500 GB or larger DVD Drive: DVD +/- RW	As per batch size	For all Experiments
2	Software	Database Management System product with Graphical User Interface such as Open Office Base(Open Office), Star Base(Star Office), Libre Office, MS-ACCESS, MySQL, MariaDB	As per batch size	For all Experiments

IX. Precautions:

1. Save and Close the created table and database for further use.

X. Resources used:

Sr. No.	Name of Resource	Specification
1	Computer System with broad specifications	
2	Software	
3	Any other resource used	

XI. Result (Output of the Program):

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XII. Conclusion(s):

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XV. References / Suggestions for further Reading:

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XVI. Assessment Scheme:

Performance indicators		Weightage
Process related (10 Marks)		40%
1.	Performing ability	10%
2.	Following ethical practices	10%
3.	Follow the correct steps to perform	20%
Product related (15 Marks)		60%
4.	Sort the records of tables	20%
5.	Achieved expected output	20%
6.	Timely Submission of practical	10 %
7.	Answer to sample questions	10%
Total (25 Marks)		100%

List of Students /Team Members

1.
2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(10)	Product Related(15)	Total(25)	

Practical No. 13: Filter Data into the Table

I. Practical Significance:

Filters allow user to view only the data that user want to see. When user creates a filter, it set criteria for the data to display. The filter then searches all of the records in the table, finds the ones that meet search criteria, and temporarily hides the ones that don't. Filters are useful because they allow focusing on specific records without being distracted by the data which is user uninterested in. This practical is useful for viewing the data with a filter which is convenient than searching for it in a large table.

II. Relevant Program Outcomes (POs):

1. **Discipline knowledge:** Apply Information Technology knowledge to solve broad-based Information Technology related problems.
2. **Experiments and practice:** Plan to perform experiments and practices to use the results to solve broad-based Electronics related problems.
3. **Engineering tools:** Apply appropriate Information Technology related techniques/ tools with an understanding of the limitations.
4. **Individual and team work:** Function effectively as a leader and team member in diverse/ multidisciplinary teams.
5. **Life-long learning:** Engage in independent and life-long learning along with the technological changes in the IT and allied industry.

III. Competency and Practical skills:

This practical is expected to develop the following skills for the industry-identified competency: **‘Develop Relational Database by applying principles of database design.’**

1. Apply Filters to tables.
2. View the specific records that meet some specific criteria.
3. Save and Print only the desired and required information from huge database.

IV. Relevant Course Outcome(s):

Apply constraints for data integrity in Relational database.

V. Practical Outcome (PrOs):

Create queries by filtering the data based on criteria.

VI. Relevant Affective domain related Outcome(s):

1. Follow ethical practices.
2. Demonstrate working as a leader / a team member.
3. Participate in team problem solving activities.
4. Prioritizes time effectively to meet the needs of the team and self.

VII. Minimum Theoretical Background:

Filters are very important option while working with big tables. At times user needs to work on specific data that satisfies certain conditions. In such case developer can apply filters on the table and then specific values will be displayed. This allows reflecting changes in some portion of table and not all. When we specify the condition filter option invokes where clause on selected attribute and displays the result.

Procedure:**To create a filter:**

1. Click the drop-down arrow next to the field to filter by. User can filter by city because they want to see a list of customers who live in a certain city.
2. A drop-down menu with a checklist will appear. Only checked items will be included in the filtered results. Use the following options to determine which items will be included in filter:
3. Select and deselect items one at a time by clicking their checkboxes.
4. Click Select All to include every item in the filter. If all items are already selected, this option will deselect all items.
5. Click Blanks to set the filter to find only the records with no data in the selected field.
6. Click OK. The filter will be applied. In customers table now displays only customers who live in Cary.

VIII. Resources required:

Sr. No.	Name of Resource	Specification	Quantity	Remarks
1	Computer System	Operating System: Windows 7 or higher Memory: 2 GB RAM or higher Processor Speed: Intel Core i3 or higher Hard Drive: 500 GB or larger DVD Drive: DVD +/- RW	As per batch size	For all Experiments
2	Software	Database Management System product with Graphical User Interface such as Open Office Base(Open Office), Star Base(Star Office), Libre Office, MS-ACCESS, MySQL,	As per batch size	For all Experiments

IX. Precautions:

1. Save and Close the created table and database for further use.

X. Resources used:

Sr. No.	Name of Resource	Specification
1	Computer System with broad specifications	
2	Software	
3	Any other resource used	

XV. References / Suggestions for further Reading:

1. <https://www.gcfllearnfree.org/access2013/sorting-and-filtering-records/1/>
2. <https://www.fontstuff.com/access/acctut06.htm>
3. <http://www.databaslessons.com/filtering.php>

XVI. Assessment Scheme:

Performance indicators		Weightage
Process related(10 Marks)		40%
1.	Performing ability	10%
2.	Following ethical practices	10%
3.	Follow the correct steps to perform filter	20%
Product related (15 Marks)		60%
4.	Apply filter on table	20%
5.	Expected Output Achieved	20%
6.	Timely Submission of practical	10 %
7.	Answer to sample questions	10%
Total (25 Marks)		100%

List of Students /Team Members

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2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(10)	Product Related(15)	Total(25)	

Practical No. 14: Create and Print reports using database GUI

I. Practical Significance:

Reports offer a way to view, format, and summarize the information. A report is used to present data in print format. With a report, user has greater flexibility to present summary information. In this practical, student will learn how to create reports that groups data.

II. Relevant Program Outcomes (POs):

1. **Discipline knowledge:** Apply Information Technology knowledge to solve broad-based Information Technology related problems.
2. **Experiments and practice:** Plan to perform experiments and practices to use the results to solve broad-based Information Technology related problems.
3. **Engineering tools:** Apply appropriate Information Technology related techniques/tools with an understanding of the limitations.
4. **Individual and team work:** Function effectively as a leader and team member in diverse/ multidisciplinary teams.
5. **Life-long learning:** Engage in independent and life-long learning along with the technological changes in the IT and allied industry.

III. Competency and Practical skills:

This practical is expected to develop the following skills for the industry-identified competency: ‘**Develop Relational Database by applying principles of database design.**’

1. Create report using database GUI.
2. Save and print the report.

IV. Relevant Course Outcome(s):

Choose relevant data model to solve a problems.

V. Practical Outcome (PrOs):

Create and Print reports using database GUI.

VI. Relevant Affective domain related Outcome(s):

1. Follow Safety practices.
2. Follow ethical practices.
3. Demonstrate working as a leader / a team member.
4. Participate in team problem solving activities.
5. Prioritizes time effectively to meet the needs of the team and self.

VII. Minimum Theoretical Background:

Reports are documented values of database represented in specific format. By creating a report one can reuse the data stored in table. By generating report one can save the data in specific format and same can be use or print as per the requirement.

Procedure:

1 To create a report-

- a. In the Database window, click the **Reports** button.
- b. Choose the **New** button. Database GUI displays the New Report dialog box.
- c. Select the required table or query from the list for the report.

- d. Select the **Report Wizard** button and click **OK**. Database GUI displays the first Report Wizard dialog box.
- e. Complete the instructions for the final Report Wizard dialog boxes that set the style of the report.

2 **Preview, Print, and Save a Report-**

- a. In Print Preview, Database GUI displays report as it would appear in print.

3 **To see a whole page of the report-**

- a. In **Print Preview**, position the pointer over the report. The pointer changes to a magnifying glass.
- b. Click the report. Database GUI displays a view of the whole page.
- c. To zoom back in and view the data, click the report again. The **Zoom** button on the toolbar to zoom in or out of report.

4 **To close the Print Preview window**

- a. Click the **Close** button on the toolbar.

5 **To print a report**

- a. From the **File** menu, choose **Print** or click the **Print** button on the toolbar.
- b. Change the print settings and then choose **OK**. Database GUI prints report.

6 **To save a report**

- a. From the **File** menu, choose **Save** or click the **Save** button on the toolbar.
- b. Database GUI displays the **Save As** dialog box. Give the report a name and choose **OK**.

VIII. Resources required:

Sr. No	Name of Resource	Specification	Quantity	Remarks
1	Computer System	Operating System: Windows 7 or higher Memory: 2 GB RAM or higher Processor Speed: Intel Core i3 or higher Hard Drive: 500 GB or larger DVD Drive: DVD +/- RW	As per batch size	For all Experiments
2	Software	Database Management System product with Graphical User Interface such as Open Office Base(Open Office), Star Base(Star Office), Libre Office, MS-ACCESS,	As per batch size	For all Experiments

IX. Precautions:

Open and close the database and table.

X. Resources used:

Sr. No.	Name of Resource	Specification
1	Computer System with broad specifications	
2	Software	
3	Any other resource used	

XI. Result (Output of the Program):

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XII. Conclusion(s):

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XIII. Practical Related Questions:

Note: Below given are few sample questions for reference. Teacher must design more such questions so as to ensure the achievement of identified CO.

(Note: Use Point XI and XIII to XIV for all relevant practical exercise use blank pages provided or attach more pages if needed.)

1. What is the use of report? Give its applications.
2. Enlist the options available in View tab.

(Space for answers)

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XIV. Exercise:

Attempt the following Questions:

(Note: Use Point XI and XIII to XIV for all relevant practical exercise use blank pages provided or attach more pages if needed.)

1. Create and print the report of hospital room allotment database.
2. Create a report for staff table in student management system.
3. Write steps to create report of Hotel billing system.

(Space for answers)

XV. References / Suggestions for further Reading:

- 1 <https://www.databasejournal.com/features/mysql/generating-reports-on-mysql-data.html>
- 2 <https://support.office.com/en-us/article/create-a-simple-report-408e92a8-11a4-418d-a378-7f1d99c25304>

XVI. Assessment Scheme:

Performance indicators		Weightage
Process related (10 Marks)		40%
1.	Performing ability	10%
2.	Following ethical practices	10%
3.	Follow the correct steps to create report	20%
Product related (15 Marks)		60%
4.	Create report	20%
5.	Expected Output Achieved	20%
6.	Timely Submission of practical	10 %
7.	Answer to sample questions	10%
Total (25 Marks)		100%

List of Students /Team Members

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Marks Obtained			Dated signature of Teacher
Process Related(10)	Product Related(15)	Total(25)	

Practical No. 15: Import and Export Database to Desired Format

I. Practical Significance:

Export and Import data is simple and supported process in a wide variety of computer applications and online services. If users have existing data in an acceptable form, these data can be import and export into multiple valid file types such as Text file, XML file, Excel file, PDF or XPS, dBase file, Word file using the Import wizard. This practical is useful for importing and exporting the data into the desired format.

II. Relevant Program Outcomes (POs):

1. **Discipline knowledge:** Apply Information Technology knowledge to solve broad-based Information Technology related problems.
2. **Experiments and practice:** Plan to perform experiments and practices to use the results to solve broad-based Electronics related problems.
3. **Engineering tools:** Apply appropriate Information Technology related techniques/ tools with an understanding of the limitations.
4. **Individual and team work:** Function effectively as a leader and team member in diverse/ multidisciplinary teams.
5. **Life-long learning:** Engage in independent and life-long learning along with the technological changes in the IT and allied industry.

III. Competency and Practical skills:

This practical is expected to develop the following skills for the industry-identified competency: **‘Develop Relational Database by applying principles of database design.’**

1. Able to store the data into different file format.
2. Import the database to multiple file system.
3. Export the data to known user file type.

IV. Relevant Course Outcome(s):

Apply constraints for data integrity in Relational database.

V. Practical Outcome (PrOs):

Import and Export database to desired format.

VI. Relevant Affective domain related Outcome(s):

1. Follow Safety practices.
2. Follow ethical practices.
3. Demonstrate working as a leader / a team member.
4. Prioritizes time effectively to meet the needs of the team and self.

VII. Minimum Theoretical Background:

Since Database is a collection of tables which contains data in structured form, there is a necessity to retrieve data from these tables. Once data is fetched from table it can be printed on any documents. Reports are used to display this fetched data in specific format and it can be either printed on any file or stored on specific media. The data can be stored on any type of file.

Procedure:

1. Create a new database by selecting the option as New Blank Database.
2. Enter a filename for the database in the File Name field and click Create.
3. Under the External Data tab, click appropriate file type in the Export section.
4. Enter a destination for file or use the Browse tool, then click OK.
5. Click Next, then click Finish.

VIII. Resources required:

Sr. No.	Name of Resource	Specification	Quantity	Remarks
1	Computer System	Operating System: Windows 7 or higher Memory: 2 GB RAM or higher Processor Speed: Intel Core i3 or higher Hard Drive: 500 GB or larger DVD Drive: DVD +/- RW	As per batch size	For all Experiments
2	Software	Database Management System product with Graphical User Interface such as Open Office Base(Open Office), Star Base(Star Office), Libre Office, MS-ACCESS, MySQL, MariaDB	As per batch size	For all Experiments

IX. Precautions:

1. Save and Close the created table and database for further use.

X. Resources used:

Sr. No.	Name of Resource	Specification
1	Computer System with broad specifications	
2	Software	
3	Any other resource used	

XI. Result (Output of the Program):

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Note: Below given are few sample questions for reference. Teacher must design more such questions so as to ensure the achievement of identified CO.

1. Write the steps to Import the student database to XML file format.
2. Enlist the option available under Import and Export tab.

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Attempt the following Questions:

(Note: Use Point XI and XIII to XIV for all relevant practical exercise use blank pages provided or attach more pages if needed.)

- (Space for answers)

[illegible]

XV. References / Suggestions for further Reading:

1. <https://inpics.net/tutorials/base2/basics48.html>
2. <https://classroom.synonym.com/create-report-dbms-8772386.html>

XVI. Assessment Scheme:

Performance indicators		Weightage
Process related(10 Marks)		40%
1.	Performing ability	10%
2.	Following ethical practices	10%
3.	Follow the correct steps	20%
Product related (15 Marks)		60%
4.	Import and Export data	20%
5.	Expected Output Achieved	20%
6.	Timely Submission of practical	10 %
7.	Answer to sample questions	10%
Total (25 Marks)		100%

List of Students /Team Members

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2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(10)	Product Related(15)	Total(25)	

Practical No. 16: Normalize the Database

I. Practical Significance:

Database normalization, or simply normalization, is the process of organizing columns (attributes) and tables (relations) of a relational database to minimize data redundancy. It is the process of splitting data across multiple tables to improve overall performance, integrity and longevity. This practical describes the process of design a database (or modify an existing database design) and organize data using normalization.

II. Relevant Program Outcomes (POs):

1. **Discipline knowledge:** Apply Information Technology knowledge to solve broad-based Information Technology related problems.
2. **Experiments and practice:** Plan to perform experiments and practices to use the results to solve broad-based Electronics related problems.
3. **Engineering tools:** Apply appropriate Information Technology related techniques/tools with an understanding of the limitations.
4. **Individual and team work:** Function effectively as a leader and team member in diverse/ multidisciplinary teams.
5. **Life-long learning:** Engage in independent and life-long learning along with the technological changes in the IT and allied industry.

III. Competency and Practical skills:

This practical is expected to develop the following skills for the industry-identified competency: ‘**Develop Relational Database by applying principles of database design.**’

1. Apply normalization to group columns into tables to minimize data in relational database design.
2. Able to reduce file storage space required by base tables by normalizing data.
3. Able to ensure that data is logically stored.

IV. Relevant Course Outcome(s):

Apply data normalization and denormalization techniques on database.

V. Practical Outcome (PrOs):

Normalize the database while working on to 3NF by decomposing existing tables.

VI. Relevant Affective domain related Outcome(s):

1. Follow Safety practices.
2. Follow ethical practices.
3. Demonstrate working as a leader / a team member.
4. Prioritizes time effectively to meet the needs of the team and self.

VII. Minimum Theoretical Background:

Primary key is an attribute which allows unique identification of tuple where as foreign key is a primary key of another table which is referred in some other table. The table which holds the value is known as Parent table and Referring table is known as child table. Normalization is the process of reducing the redundancy in table. There are various normalization forms as follows.

1NF: It ensures that all rows contain only atomic values i.e. single value in a row.

2NF: It defines that all non-prime attribute is directly dependent on prime attribute and also table should be in 1NF. Example if Enrollment number of student is deleted entire row is deleted, and Enrollment number should able to give all

values related to students.

3NF: It defines that table should be in 2NF and transitive functional dependency is removed, i.e. if Enrollment Numbers gives Roll Number and Roll Number gives Name; then such relation needs to be removed by dividing table in 2 parts.

Procedure:

The steps to normalize the tables are as follows:

1. Select a table; observe cell(s) with multiple values.
2. Resolve such cells so that each cell contains only one value i.e. atomic value
3. Now table is in 1NF.
4. Once table is in 1NF, identify the attribute which are dependent on other.
5. Divide a table in 2 so that it can uniquely identify
6. Observe for Transitive functional dependency (if any). If it exists remove transitive dependency and divide table.

VIII. Resources required:

Sr. No.	Name of Resource	Specification	Quantity	Remarks
1	Computer System	Operating System: Windows 7 or higher Memory: 2 GB RAM or higher Processor Speed: Intel Core i3 or higher Hard Drive: 500 GB or larger DVD Drive: DVD +/- RW	As per batch size	For all Experiments
2	Software	Database Management System product with Graphical User Interface such as Open Office Base(Open Office), Star Base(Star Office), Libre Office, MS-ACCESS, MySQL, MariaDB	As per batch size	For all Experiments

IX. Precautions:

1. Save and Close the created table and database for further use.

X. Resources used:

Sr. No.	Name of Resource	Specification
1	Computer System with broad specifications	
2	Software	
3	Any other resource used	

XI. Result (Output of the Program):

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XII. Conclusion(s):

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XIII. Practical Related Questions:

Note: Below given are few sample questions for reference. Teacher must design more such questions so as to ensure the achievement of identified CO.

(Note: Use Point XI and XIII to XIV for all relevant practical exercise use blank pages provided or attach more pages if needed.)

1. Write steps to converting a first normal form (1NF) table to second normal form (2NF) table(s).
2. Examine the table shown below.

B001	8 Jefferson Way, Portland, OR 97201	503-555-3618, 503- 555-2727, 503-555- 6534
B002	City Center Plaza, Seattle, WA 98122	206-555-6756, 206- 555-8836
B003	14 – 8th Avenue, New York, NY 10012	212-371-3000
B004	16 – 14th Avenue, Seattle, WA 98128	206-555-3131, 206- 555-4112

- (a) Why is this table not in 1NF?
- (b) Describe and illustrate the process of normalizing the data shown in this table to third normal form (3NF).
- (c) Identify the primary, alternate and foreign keys in 3NF relations.

(Space for answers)

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[illegible]

XV. References / Suggestions for further Reading

1. <https://www.youtube.com/watch?v=tZIsqzCutHI>
2. <https://www.computerweekly.com/tutorial/Database-normalization-in-MySQL-Four-quick-and-easy-steps>

XVI. Assessment Scheme:

Performance indicators		Weightage
Process related (10 Marks)		40%
1.	Performing ability	15%
2.	Following ethical practices	10%
3.	Observing System Configuration	15%
Product related (15 Marks)		60%
4.	Sort the records of tables	20%
5.	Follow the correct steps to perform sorting	20%
6.	Timely Submission of practical	10 %
7.	Answer to sample questions	10%
Total (25 Marks)		100%

List of Students /Team Members

1.
2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(10)	Product Related(15)	Total(25)	

List Of Laboratory Manuals Developed by MSBTE

First Semester:

1	Fundamentals of ICT	22001
2	English	22101
3	English Work Book	22101
4	Basic Science (Chemistry)	22102
5	Basic Science (Physics)	22102

Second Semester:

1	Business Communication Using Computers	22009
2	Computer Peripherals & Hardware Maintenance	22013
3	Web Page Design with HTML	22014
4	Applied Science (Chemistry)	22202
5	Applied Science (Physics)	22202
6	Applied Machines	22203
7	Basic Surveying	22205
8	Applied Science (Chemistry)	22211
9	Applied Science (Physics)	22211
10	Fundamental of Electrical Engineering	22212
11	Elements of Electronics	22213
12	Elements of Electrical Engineering	22215
13	Basic Electronics	22216
14	'C' programming Language	22218
15	Basic Electronics	22225
16	Programming in "C"	22226
17	Fundamentals of Chemical Engineering	22231

Third Semester:

1	Applied Multimedia Techniques	22024
2	Advanced Surveying	22301
3	Highway Engineering	22302
4	Mechanics of Structures	22303
5	Building Construction	22304
6	Concrete Technology	22305
7	Strength Of Materials	22306
8	Automobile Engines	22308
9	Automobile Transmission System	22309
10	Mechanical Operations	22313
11	Technology Of Inorganic Chemicals	22314
12	Object Oriented Programming Using C++	22316
13	Data Structure Using 'C'	22317
14	Computer Graphics	22318
15	Database Management System	22319
16	Digital Techniques	22320
17	Principles Of Database	22321
18	Digital Techniques & Microprocessor	22323
19	Electrical Circuits	22324
20	Electrical & Electronic Measurement	22325
21	Fundamental Of Power Electronics	22326
22	Electrical Materials & Wiring Practice	22328
23	Applied Electronics	22329
24	Electrical Circuits & Networks	22330
25	Electronic Measurements & Instrumentation	22333
26	Principles Of Electronics Communication	22334
27	Thermal Engineering	22337
28	Engineering Metrology	22342
29	Mechanical Engineering Materials	22343
30	Theory Of Machines	22344

Fourth Semester:

1	Hydraulics	22401
2	Geo Technical Engineering	22404
3	Chemical Process Instrumentation & Control	22407
4	Fluid Flow Operation	22409
5	Technology Of Organic Chemicals	22410
6	Java Programming	22412
7	GUI Application Development Using VB.net	22034
8	Microprocessor	22415
9	Database Management	22416
10	Electric Motors And Transformers	22418
11	Industrial Measurements	22420
12	Digital Electronics And Microcontroller Applications	22421
13	Linear Integrated Circuits	22423
14	Microcontroller & Applications	22426
15	Basic Power Electronics	22427

16	Digital Communication Systems	22428
17	Mechanical Engineering Measurements	22443
18	Fluid Mechanics and Machinery	22445
19	Fundamentals Of Mechatronics	22048

Fifth Semester:

1	Design of Steel and RCC Structures	22502
2	Public Health Engineering	22504
3	Heat Transfer Operation	22510
4	Environmental Technology	22511
5	Operating Systems	22516
6	Advanced Java Programming	22517
7	Software Testing	22518
8	Control Systems and PLC's	22531
9	Embedded Systems	22532
10	Mobile and Wireless Communication	22533
11	Industrial Machines	22523
12	Switchgear and Protection	22524
13	Energy Conservation and Audit	22525
14	Power Engineering and Refrigeration	22562
15	Solid Modeling and Additive Manufacturing	22053
16	Guidelines & Assessment Manual for Micro Projects & Industrial Training	22057

Sixth Semester:

1	Solid Modeling	17063
2	Highway Engineering	17602
3	Contracts & Accounts	17603
4	Design of R.C.C. Structures	17604
5	Industrial Fluid Power	17608
6	Design of Machine Elements	17610
7	Automotive Electrical and Electronic Systems	17617
8	Vehicle Systems Maintenance	17618
9	Software Testing	17624
10	Advanced Java Programming	17625
11	Mobile Computing	17632
12	System Programming	17634
13	Testing & Maintenance of Electrical Equipments	17637
14	Power Electronics	17638
15	Illumination Engineering	17639
16	Power System Operation & Control	17643
17	Environmental Technology	17646
18	Mass Transfer Operation	17648
19	Advanced Communication System	17656
20	Mobile Communication	17657
21	Embedded System	17658
22	Process Control System	17663
23	Industrial Automation	17664
24	Industrial Drives	17667
25	Video Engineering	17668
26	Optical Fiber & Mobile Communication	17669
27	Therapeutic Equipment	17671
28	Intensive Care Equipment	17672
29	Medical Imaging Equipment	17673

Pharmacy Lab Manual

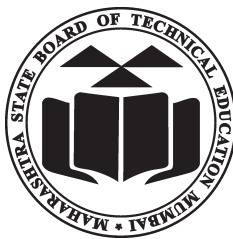
First Year:

1	Pharmaceutics - I	0805
2	Pharmaceutical Chemistry - I	0806
3	Pharmacognosy	0807
4	Biochemistry and Clinical Pathology	0808
5	Human Anatomy and Physiology	0809

Second Year:

1	Pharmaceutics - II	0811
2	Pharmaceutical Chemistry - II	0812
3	Pharmacology & Toxicology	0813
4	Hospital and Clinical Pharmacy	0816

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