

M T W T F S

OP Syllabus after midsem

- ✓ ① Exception Handling
- ✓ ② Event Handling (Try, Catch, Finally)
- ✓ ③ GUI
- ✓ ④ What is SQL?
- ✓ ⑤ What are the steps for database connection?
- ✓ ⑥ What is database?
- ✓ ⑦ What is relational database?
- ✓ ⑧ Why relational database is called relational?
- ✓ ⑨ What is table? And why we create/split it?
- ✓ ⑩ What is tuple?
- ✓ ⑪ What is normalization?
- ✓ ⑫ What is primary key? { difference between }
- ✓ ⑬ What is foreign key? { Their? }
- ✓ ⑭ What are database constraints?
- ✓ ⑮ How we create table? { insert data? view data? update data? and delete data? query? }
- ✓ ⑯ Difference between record & attribute
- ✓ ⑰ What is relational database management system?

SQL:

SQL (structured Query Language) is a domain specific language used for managing and manipulating relational database. It provides a standardized way to interact with databases, allowing users to create, view, update and delete data.

Steps for database connectivity:

Steps for connection of GUI with database are following:

- ① Driver Instance
- ② Connection Object
- ③ Statement Object
- ④ Execute Query
- ⑤

Database:

A database is a structured collection of organized data in a way that a computer program can quickly select and retrieve

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species of data. It is designed to efficiently manage, store and retrieve information. Databases are fundamental component of many software applications providing a systematic and organized approach to data storage.

Relational Database:

Relational database is a type of database which organizes data into tables i.e. which consists of rows and columns.

Why it is called relational??

The relational database is called relational because the term "relational" refers to the fact that the data in different tables can be related to each other through common fields or keys.

Table:

In relational database, a table is a fundamental component used to organize and store data in structured

manners. A table consists of rows and columns. Each row in table represents record or a complete set of data, while each column in table represents a specific attribute or field.

Tuple:

In relational database terminology, a tuple refers to a single row or record. It is an ordered set of values in which each value corresponds to a specific column or attribute in a table.

Normalization:

Normalization in database, refers to a process which reduce redundancy and improve data integrity. The goal of normalization is to eliminate or minimize data anomalies (normal) such as insertion, update and deletion anomalies that can arise when data is not organized properly. The process

involves breaking down large tables into smaller, related tables and establishing a relationship between them.

Benefits:

- ① Reduce Redundancy
- ② Improve data integrity
- ③ Simplified updates

Exception in Java:

In Java, Exception is an unwanted or unexpected event, which occurs during the execution of a program i.e. at run time, that disrupts the normal flow of the program's instructions. Exception can be caught and handled by the program

Why an exception occurs?

Invalid user input

Device failure

Loss of network connection

Code error

Opening an unavailable file

Exception Handling:

Date:

Exception handling in java is one of the effective means to handle runtime errors so that the regular flow of the application can be preserved.

Try: `try { };`

The "try" keyword is used to specify the exception block.

Catch: `catch (Exception) { };`

The "catch" keyword is used to specify the solution.

Finally: `finally { };`

The "finally" keyword has a mandatory executable code.

Throw:

The "Throw" keyword throws an exception.

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Event :

An event can be defined as changing the state of an object or behaviour by performing actions.

Actions can be a button click, cursor movement, keypress through keyboard or page scrolling etc.

The `java.awt.event` package can be used to provide various event classes.(Every action occurs called event)

Event Handling:

It is a mechanism to control the events and to decide what should happen after an event occur. To handle the events, java follows the Delegation Event model (The response of system in the event is called event handling).

Action Listener:-

It is a type of class in Java that receives a notification whenever any action is performed in the application. Java ActionListeners is alerted whenever the button or menu item is clicked. It is alerted against Action Event.

GUI:

GUI (Graphical user interface) ~~that~~ is a user interface that includes graphical elements such as windows, icons and buttons.

In Java two packages uses for GUI:

- (i) Java AWT
- (ii) Java Swing

AWT components are platform dependent.

These components are heavy weight.

Java swing components are not platform dependent.

These are light weight.

Primary Key

A primary key is a unique identifier for each record in a table. It insures the value in the specific column is unique.

Foreign Key

A foreign key establishes a relationship between tables by referencing the primary key of another table.

A table can have multiple foreign keys, each linking to the primary key of different table.

Database Constraints:-

Database constraints are rules applied to the data columns of a table to maintain the accuracy and reliability of the data within the database. These constraints ensure that the data adheres to certain conditions, preventing the entry of invalid data or actions that could compromise data integrity.

Record

A record in a database is a collection of information organized in a table that pertains to a specific topic or category. Another name for database record is a tuple.

A record also known as a row.

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Attributes
Attribute data is a type of data that can be used to describe an object or entity. Attributes also known as columns or fields.

Each attribute represents a particular piece of information about the entity represented by the record.

RDBMS (Relational Database Management System)

RDBMS is a software system that enables users to create, update and manage relational databases. These database use a structure that allows data to be represented as tables with rows and column. Where row is record and column is attribute.

Examples: MySQL, Oracle Database etc.

How can we create table?

To create table in database using Java, we typically use JDBC API along with SQL Statement.

- ① Setup JDBC Drivers
- ② Establish Connection
- ③ Create SQL statement
- ④ Execute SQL Statement

Example:

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```
import java.sql.Connection;
import java.sql.DriverManager;
import java.sql.Statement;
public class CreateTable {
    public static void main(String[] args) {
        String url = "jdbc:mysql://localhost:3306/mydatabase";
        String user = "username";
        String password = "password";
        try(Statement statement = connection.createStatement()) {
            try (Connection connection = DriverManager.getConnection(url, user, password)) {
                String sql = "CREATE TABLE users (id INT, name VARCHAR(50));";
                statement.executeUpdate(sql);
                System.out.println("Successfully created!");
            }
        } catch (Exception e) {
            e.printStackTrace();
        }
    }
}
```