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Assignment - 02

Q) Write Short Note On:

A] Thread Synchronization:-

As Java is a multi_threaded language, thread synchronization has a lot of importance in Java as multiple threads execute in parallel in an application.

We use keywords **“synchronized”** and **“volatile”** to achieve Synchronization in Java We need synchronization when the shared object or resource is mutable. If the resource is immutable, then the threads will only read the resource either concurrently or individually.

In this case, we do not need to synchronize the resource. In this case, JVM ensures that **Java synchronized code is executed by one thread at a time**.
Most of the time, concurrent access to shared resources in Java may introduce errors like “Memory inconsistency” and “thread interference”. To avoid these errors we need to go for synchronization of shared resources so that the access to these resources is mutually exclusive.

We use a concept called **Monitors to implement synchronization.** A monitor can be accessed by only one thread at a time. When a thread gets the lock, then, we can say the thread has entered the monitor.
When a monitor is being accessed by a particular thread, the monitor is locked and all the other threads trying to enter the monitor are suspended until the accessing thread finishes and releases the lock.

Going forward, we will discuss synchronization in Java in detail in this tutorial. Now, let us discuss some basic concepts related to synchronization in Java.

B] Abstract Class:-

1. A class which is declared with the abstract keyword is know as an abstract class in java.
2. Abstraction is a process of hiding the implantation details and showing only functionality to the user.

3. There are two ways to achieve abstraction:- • Abstract class
    - Interface.
4. It can have final methods which will force the subclass not to change the body of the method.
5. A method which is declared as abstract and does not have implementation is known as an abstract method.
6. Rule of java Abstract class:-
    - An abstract class must be declared with an abstract keyword.
    - It can have abstract and non-abstract methods.
    - It cannot be instantiated.
    - It can have final methods.
    - It can have constructors and static methods also.
7. In this example, Bike is an abstract class that contains only one abstract method run. Its implementation is provided by the Honda class.

C] JDBC drives and architectures in java:-

1. JDBC Driver is a software component that enables java application to interact with the database. There are 4 types of JDBC drivers:

    ○ JDBC-ODBC bridge driver

    ○ Native-API driver (partially java

    driver) ○ Network Protocol driver (fully java

    driver) ○ Thin driver (fully java driver)

2. The JDBC-ODBC bridge driver uses ODBC driver to connect to the database. The JDBC-ODBC bridge driver converts JDBC method calls into the ODBC function calls. This is now discouraged because of thin driver.
3. JDBC-OBC drives:-

Oracle does not support the JDBC-ODBC Bridge from Java 8. Oracle recommends that you use JDBC drivers provided by the vendor of your database instead of the JDBC-ODBC Bridge.

1. Advantages of JDBC-ODBC drives are:- ○ JDBC dive is easy to use.
    - JDBC can be easily connected to any datatype.
2. Disadvantages of JDBC drives are:- ○ JDBC drive degrade the performance because JDBC method call is converted into the ODBC function calls.
    - ODBC driver needs to be install on the client machine.

4. Native API drivers:-

   Oracle does not support the JDBC-ODBC Bridge from Java 8. Oracle recommends that you use JDBC drivers provided by the vendor of your database instead of the JDBC-ODBC Bridge.

    1. Advantages of API drives are:- ○ performance upgraded than JDBC-ODBC bridge driver.
    2. Disadvantages of API drives are:- ○ The Native driver needs to be installed on the each client machine.
        - The Native Vendor client library needs to be installed on client machine.

5. Network Protocol Driver:-

   The Network Protocol driver uses middleware (application server) that converts JDBC calls directly or indirectly into the vendor-specific database protocol. It is fully written in java.

    1. Advantages of Network protocol drives are:- ○ No client side library is required because of application server that can perform many tasks like auditing, load balancing, logging etc.

    2. Disadvantages of Network protocol drives are:- ○ Network support is required on client machine. ○ Requires database-specific coding to be done in the middle tier.

- Maintenance of Network Protocol driver becomes costly because it requires database-specific coding to be done in the middle tier.

6. Thin Driver:-

   The thin driver converts JDBC calls directly into the vendor-specific database protocol. That is why it is known as thin driver. It is fully written in Java language.

   1. Advantages of Thin drives are:- ○ Thin driver give better

      performance than all other drivers.

      - In Thin Drivers no software is required at client side or server side.

   2. Disadvantages of Thin drives are:- ○ Thin drivers depend on

      the Database.

D] Life Cycle of Applet :-

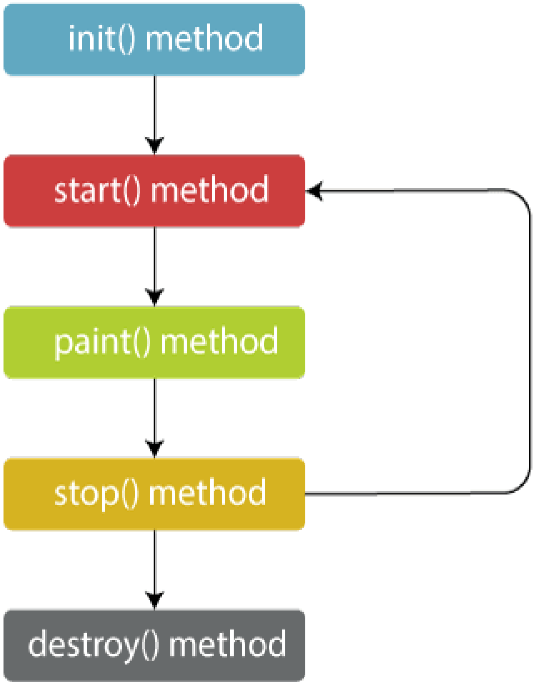
1. In Java, an applet is a special type of program embedded in the web page to generate dynamic content. Applet is a class in Java.
2. The applet life cycle can be defined as the process of how the object is created, started, stopped, and destroyed during the entire execution of its application. It basically has five core methods namely init(), start(), stop(), paint() and destroy().These methods are invoked by the browser to execute.
   - **int():** The init() method is the first method to run that initializes the applet. It can be invoked only once at the time of initialization.
   - **Start():**The start() method contains the actual code of the applet and starts the applet. It is invoked immediately after the init() method is invoked.
   - **stop():** The stop() method stops the execution of the applet. The stop () method is invoked whenever the applet is stopped, minimized, or moving from one tab to another in the browser, the stop() method is invoked.

   - **destroy():** The destroy() method destroys the applet after its work is done. It is invoked when the applet window is closed or when the tab containing the webpage is closed.

- **paint():** The paint() method belongs to the Graphics class in Java. It is used to draw shapes like circle, square, trapezium, etc., in the applet.

3. The applet also works on the client side, thus having less processing time.
4. Working of applet cycle :- ○ The Java plug-in software is responsible for managing the life cycle of an applet.
   - An applet is a Java application executed in any web browser and works on the client-side. It doesn't have the main() method because it runs in the browser.
   - The int(), start(), stop() and destroy() methods belongs to the applet. Applet class.
   - The paint() method belongs to the awt.Component class.
   - In Java, if we want to make a class an Applet class, we need to extend the Applet ○ Whenever we create an applet, we are creating the instance of the existing Applet class. And thus, we can use all the methods of that class.

5. Flow of Applet Life Cycle:-


init() method
start() method
paint() method
stop() method
destroy() method