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Ans to the Q. NO. 1(a)

The word "polymorphism" means having many forms. In simple words, we can define polymorphism as the ability of a message to be displayed in more than one form. A real life example of polymorphism is a person who at the same time can have different characteristics.

Ans to the Q. No. 1 (b)

An Entity that has state and behaviour is known as an object e.g. chair, bike, marker, pen, table, car etc. It can be physical or logical (tangible and intangible). The example of an intangible object is the banking system.

An object has three characteristics.

State: represent the data (value) of an object

Behavior: represent the behaviour of an object such as deposit, withdraw

Identity: An object identity is typically implemented via a unique ID. The value of the ID is not visible to the external user. However, it is used internally by the JVM to identify each object uniquely.

A class is a group of objects which have common properties. It is a template or blueprint from which objects are created. It is a logical entity. It can't be physical. A class in Java contains fields, methods, constructors, blocks, nested class and interface.

in this example we have created a student class which has two data members id and name. We are creating the object of the student class by new keyword and printing

The object value

Here we are creating a main() method inside the class

// java program to illustrate how to
define a class and field

// Defining a Student class.

```
class student {
```

// Defining Fields

```
int id; // Field or data member or instance  
variable
```

VI

```
String name;
```

// Creating main method inside the student
class

```
public static void main (String args[]) {
```

// Creating an object or instance

```
student s = new student (); // creating an object
```

// printing values of the object of student

```
System.out.println (s.id); // accessing member  
through refer
```

```
System.out.println (s.name);
```

System.out

Ans to the Q. NO. 1 (c)

Object-oriented programming is ultimately about taking a huge problem and breaking it down to solvable chunks. For each mini problem, you write a class that does what you require. And then - best of all - you can reuse those classes, which makes it even quicker to solve the next problem.

This is not to say that OOP is the only way to write software. But

There's a reason that languages like C++, C# and Java are the go-to options for serious software development.

The benefits of object-oriented programming lie in this kind of encapsulation. Here a look at some of object-oriented programming's benefits.

#Modularity for easier troubleshooting:

When working with object-oriented programming languages, you know exactly where to look when something goes wrong.

"Oh the car object broke down

The problems must be in the car class you don't have to go line by line through all your code that's the beauty of encapsulation objects are self-contained, and each bit of functionality does its own thing while leaving the other bits also, this modularity allows an IT team to work on multiple objects simultaneously while minimizing the chance that one person might duplicate someone else's functionality.

Flexibility through polymorphism:

Riffing on this example, you now need just a few drivers, or functions, like "drive car", "drive Race car" and "Drive Limousine".

Race Car Drivers share some traits with Limousine Drivers, but other things, like Race Helmets and Beverage Sponsorships, are unique.

This is where object-oriented programming polymorphism comes into play. Because a single function can shape-shift to adapt to whichever class it's in.

You could create one function in the parent car class called "drive" - not "drive car" or "drive Race car," but just "drive". This one function would work with the Race car Driver, Limousine Driver and so on. In fact, you could even have

"Race car. drive (my Race car driver)" or
"limo. drive (my chauffeur)!!"

Ans To The Q: NO. 2(a)

Java applets are used to provide interactive features to web application and can be executed by browsers from many platforms. They are small portable Java programs embedded in HTML pages and can run automatically when the pages are viewed. Malware authors have used Java applets as a vehicle for attack.

Ans To The Q. NO. 2(b)

Describe types of Application's That run on Java.

Java is one of the popular programming language having a number of applications. Through this blog, I will be listing down the some application of Java

- * Mobile Applications
- * Desktop GUI Applications
- * web-based Applications
- * Enterprise Applications

* Scientific Applications

* Gaming Applications

* Big Data technologies

* Business Applications

* Distributed Applications

* cloud-based Applications

Mobile Applications

Java is considered as the official programming language for mobile app development. It is compatible with software such as Android Studio and Kotlin. Now you must be wondering why only Java

The reason is that it can run on Java Virtual Machine (JVM), whereas Android uses DVM to execute class files. These files are further bundled as Android application package with Java and its OOPS principles. It provides better security and ease of simplicity with Android.

Big data technologies:

Java is the reason why the leading Big data technologies like Hadoop have become a reality and also the most powerful programming languages like Scala are existing. It is crystal clear that Java is the backbone when it comes to developing

Ans To The Q. NO. 2(c)

Multithreading: In java, Multithreading refers to a process of executing two or more threads simultaneously for maximum utilization of the CPU. A thread in java is a lightweight process requiring fewer resources to create and share the process resource.

Advantages of Multithreading:

▣ Enhanced performance by decreased development time.

▣ Simplified and streamlined program coding.

▣ Improved GUI responsiveness

▣ Decreased cost of maintenance

▣ Better use of CPU resource

disadvantages of Multithread

* complex debugging and testing processes

* Overhead Switching of context

* Increased difficulty level in writing a program

* Increased potential for deadlock occurrence

* Unpredictable results.

Ans to the Q. NO. 2(d)

RMI stands for Remote Method invocation.

It is a java technology in which an object running in java virtual Machine (JVM) could be invoked from another object running in a different JVM.

The technology provides a remote access of object in java programming language.

Difference between a Stub and Skeleton

Stub:

- # initiates a connection with the Remote JVM containing the Remote object.

- # marshals (writes and transmits) the parameters to the Remote JVM

- # waits for the result of the Method invocation.

- # unmarshals (reads) the return value or exception returned, and returns the value to the caller.

Skeleton:

unmarshals (reads) the parameters from the remote method.

invokes the method on the actual remote object implementation, and

marshals (write and transmits) the result (return value or exception) to the caller.

Ans to the Q NO. 3(a)

A Servlet is a Java programming language class that is used to extend the capabilities of servers that host applications accessed by means of a request-response programming model.

Advantage and Disadvantage of Servlets.

Advantage :

* Servlets provide a way to generate dynamic documents that is both easier to write and faster to run.

* provide all the powerful features of java, such as Exception handling and garbage collection.

* Servlet enables easy portability across web servers

* Servlet can communicate with different Servlet and Servers

Disadvantage:

* Designing in Servlet is difficult and slows down the application.

* Writing complex business logic makes the application difficult to understand.

* You need a Java runtime Environment on the server to run Servlets. CGI is completely language independent protocol. So you can write CGIs in whatever language you have available (including Java if you want to).

Ans to The Q. No. 3(b)

Java program to check Even or odd number

We can print odd and even numbers from an array in Java by getting remainder of each other element and checking if it is divided by 2 or not. If it is divided by 2, it is even number otherwise it is odd number.


```

public class OddEvenInArrayExample {
    public static void main (String args[]) {
        int a[] = {1, 2, 5, 6, 3, 2};
        System.out.println("Odd Numbers:");
        for (int i = 0; i < a.length; i++) {
            if (a[i] % 2 != 0) {
                System.out.println(a[i]);
            }
        }
        System.out.println("Even Numbers:");
        for (int i = 0; i < a.length; i++) {
            if (a[i] % 2 == 0) {
                System.out.println(a[i]);
            }
        }
    }
}

```

output

odd Numbers :

1

5

3

Even Numbers :

2

6

2