CSL802

01

Distributed Computing

Lab

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Presented By:

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Computer Engineering, Sem-VIII

Experiment No. 03

AIM: Write a program to demonstrate the steps of Remote Method Invocation (RMI) application using java.

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Question?

**Q) What do you mean by RPC?**

Q) What do you mean by RMI?

- RMI is the object oriented equivalent to RPC (Remote procedure call).
- The **RMI** (Remote Method Invocation) is an API that provides a mechanism to create distributed application in java.
- The RMI allows an object to invoke methods on an object running in another JVM.
- The Java Remote Method Invocation (RMI) system allows an object running in one Java Virtual Machine (JVM) to invoke methods on an object running in another Java VM.
- RMI provides for remote communication between programs written in the Java programming language.
- The RMI provides remote communication between the applications using two objects *stub* and *skeleton*.

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- Terminology
- A **remote object** is an object whose method can be invoked from another JVM
- **stub**
  - The stub is an object, acts as a gateway for the client side.
  - All the outgoing requests are routed through it.
  - It resides at the client side and represents the remote object.
  - When the caller invokes method on the stub object, it does the following tasks:
    - It initiates a connection with remote Virtual Machine (JVM),
    - It writes and transmits (marshals) the parameters to the remote Virtual Machine (JVM),
    - It waits for the result
    - It reads (unmarshals) the return value or exception, and
    - It finally, returns the value to the caller.

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- **skeleton**
  - The skeleton is an object, acts as a gateway for the server side object.
  - All the incoming requests are routed through it.
  - When the skeleton receives the incoming request, it does the following tasks:
    - It reads the parameter for the remote method
    - It invokes the method on the actual remote object, and
   - It writes and transmits (marshals) the result to the caller.

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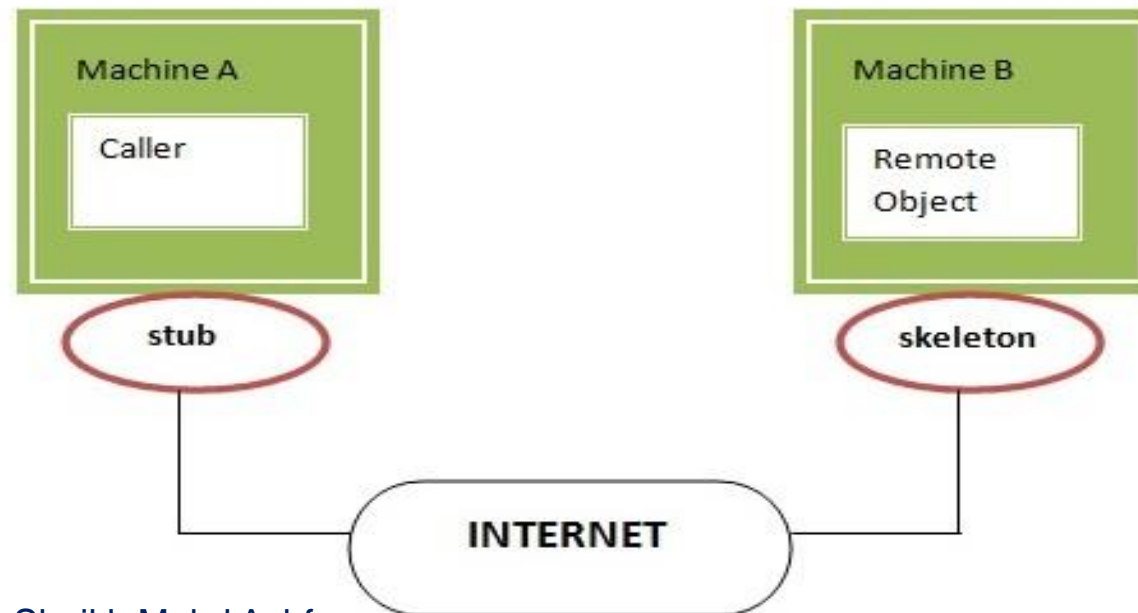
The is given the 6 steps to write the RMI program.

1. **Create the remote interface:**
   1. extend the Remote interface and declare the RemoteException with all the methods of the remote interface

2. **Provide the implementation of the remote interface**
   1. extend the UnicastRemoteObject

3. **Compile the implementation class and create the stub and skeleton objects using the rmic tool**

4. **Start the registry service by rmiregistry tool**
   1. If you don't specify the port number, it uses a default port number

5. **Create and start the remote application**
   1. rmi services need to be hosted in a server process.
   2. The Naming class provides methods to get and store the remote object.
   3. Bind method binds the remote object with the given name.
   4. binding the remote object by the name rcoe

6. **Create and start the client application**
   1. client we are getting the stub object by the lookup() method of the Naming class and invoking the method on this object
   2. Lookup method returns the reference of the remote object.

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- The client application need only two files, remote interface and client application.
- In the rmi application, both client and server interacts with the remote interface.
- The client application invokes methods on the proxy object, RMI sends the request to the remote JVM.
- The return value is sent back to the proxy object and then to the client application.

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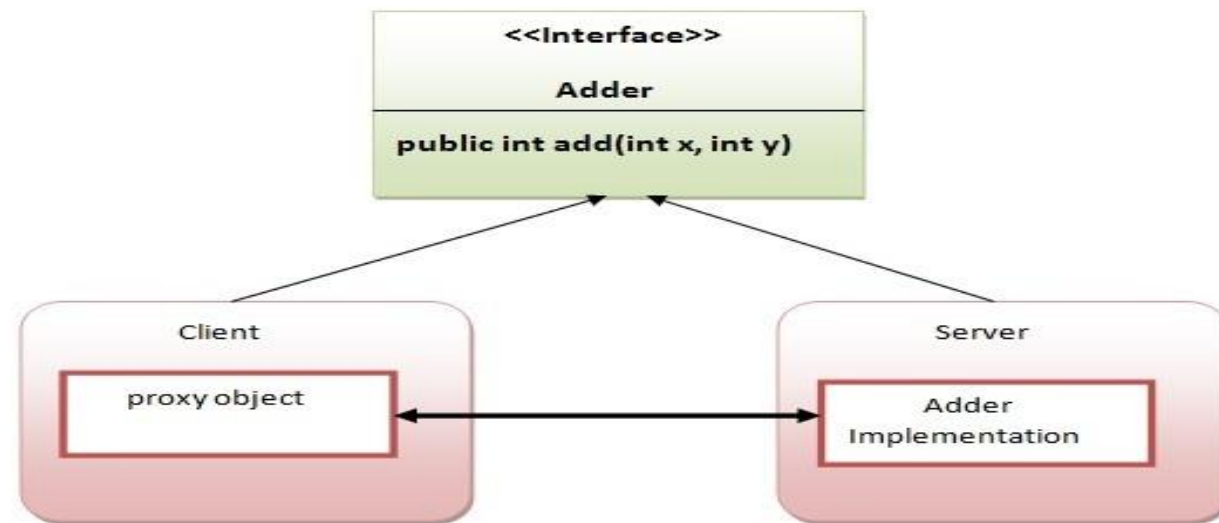
Summary

❖ **In this Practical, we have learnt to:**

How to write a Program for RMI.

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https://www.youtube.com/watch?v=GKIwu6XyqPI&list=PLGwb7xZHg-oMR0e6TSHKbc2SKOn_HJ-DR

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Thank You

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