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Third Year B. Tech., Sem VI 2021-22

Cloud Computing

Assignment submission

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Batch: T2

Assignment: 2

Title of assignment: Implementation of CORBA (Common Object Request Broker Architecture)

Implementation of CORBA

CORBA

The Common Object Request Broker Architecture (CORBA) is a standard developed by the Object Management Group (OMG) to provide interoperability among distributed objects.

CORBA- Middleware

CORBA is the world's leading middleware solution enabling the exchange of information, independent of hardware platforms, programming languages and operating systems. CORBA uses an object-oriented model although the systems that use the CORBA do not have to be object-oriented.

Types of Models

1. Inheritance Model
   IDL interface is implemented using an implementation class that also extends the compiler-generated skeleton.

2. Delegation Model
   The Delegation model is also known as the Tie model, or the Tie Delegation model. It inherits from either the POA or ImplBase compiler-generated skeleton, so the models will be described as POA/Tie or ImplBase/Tie models in this document.

Implementation of Server

- The server consists of two classes, the servant and the server.
- The servant, AdditionImpl, is the implementation of the Addition IDL interface; each Addition instance is implemented by a AdditionImpl instance.
- The servant is a subclass of AdditionPOA, which is generated by the idlj compiler from the example IDL.
- The servant contains one method for each IDL operation, in this example, the add() and shutdown() methods.
- Servant methods are just like ordinary Java methods; the extra code to deal with the ORB, with marshalling arguments and results, and so on, is provided by the skeleton.

Implementation of CORBA in Java

Creating Interface

```
//save file add Addition.idl
module AdditionApp
{
        interface Addition
        {
           long add(in long a,in long b);
           oneway void shutdown();
        };
};
```

Creating Server Side

```
import AdditionApp.*;
import org.omg.CosNaming.*;
import org.omg.CosNaming.NamingContextPackage.*;
import org.omg.CORBA.*;
import org.omg.PortableServer.*;
import org.omg.PortableServer.POA;
import java.util.Properties;

class AdditionImpl extends AdditionPOA
{
        private ORB orb;
        public void setORB(ORB orb_val)
        {
                orb = orb_val;
        }

        // implement add() method
        public int add(int a, int b)
        {
```

```
		int r=a+b;
		return r;
	}

	// implement shutdown() method
	public void shutdown()
	{
		orb.shutdown(false);
	}
}



/*--------------------------------*/

public class StartServer
{
	public static void main(String args[])
	{
		try{

			// create and initialize the ORB //// get reference to
rootpoa &amp; activate the POAManager
			ORB orb = ORB.init(args, null);
			POA rootpoa =
POAHelper.narrow(orb.resolve_initial_references("RootPOA"));
			rootpoa.the_POAManager().activate();

			// create servant and register it with the ORB
			AdditionImpl addobj = new AdditionImpl();
			addobj.setORB(orb);

			// get object reference from the servant
			org.omg.CORBA.Object ref =
rootpoa.servant_to_reference(addobj);
```

```
                        Addition href = AdditionHelper.narrow(ref);

                        org.omg.CORBA.Object objRef =
orb.resolve_initial_references("NameService");
                        NamingContextExt ncRef =
NamingContextExtHelper.narrow(objRef);

                        NameComponent path[] = ncRef.to_name( "ABC" );
                        ncRef.rebind(path, href);

                        System.out.println("Addition Server ready and
waiting ...");

                        // wait for invocations from clients
                        for (;;){
                                orb.run();
                        }
                }
                catch (Exception e)
                {
                        System.err.println("ERROR: " + e);
                        e.printStackTrace(System.out);
                }
                System.out.println("HelloServer Exiting ...");
        }
}
```

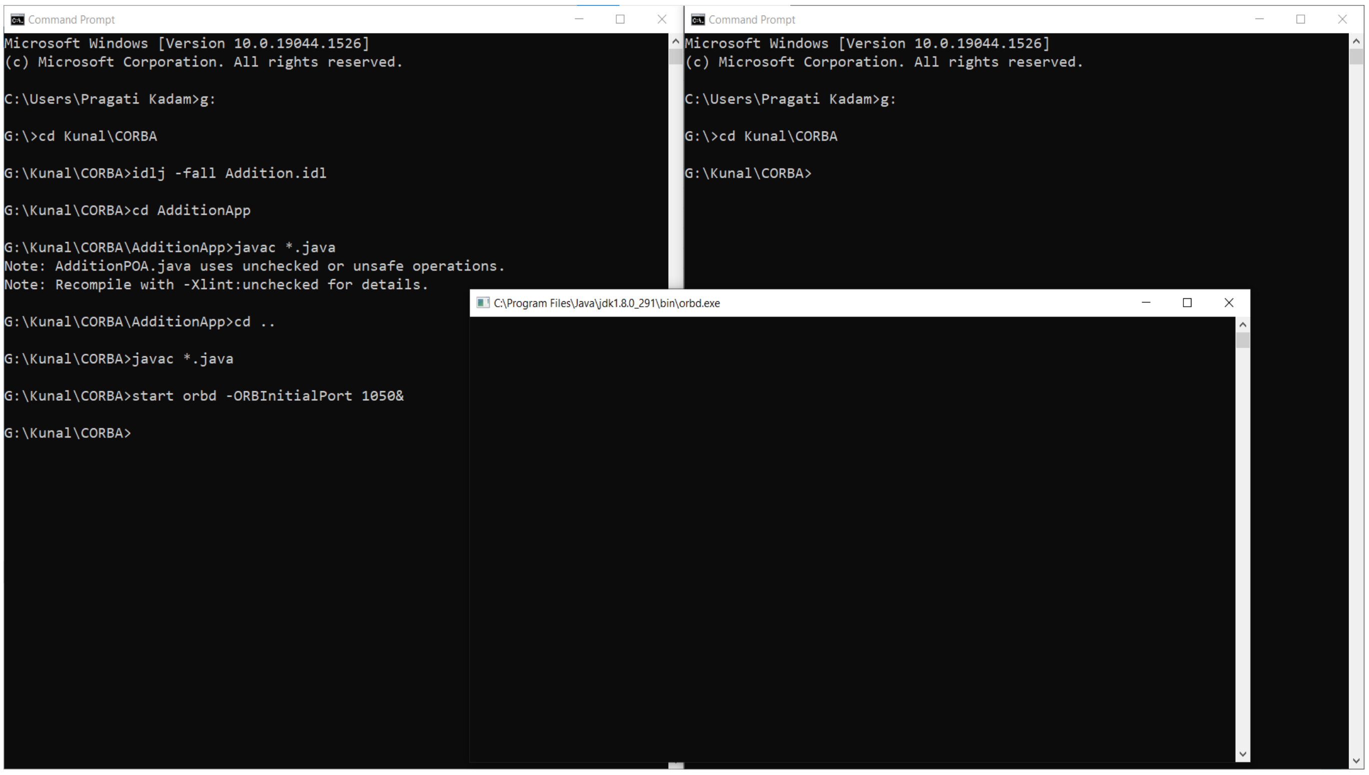
Creating Client Side

```
import AdditionApp.*;
import org.omg.CosNaming.*;
import org.omg.CosNaming.NamingContextPackage.*;
import org.omg.CORBA.*;
import java.io.*;
import java.util.*;

public class StartClient
{
	public static void main(String[] args)
	{
		try
		{
			ORB orb = ORB.init(args, null);
			org.omg.CORBA.Object objRef =
orb.resolve_initial_references("NameService");
			NamingContextExt ncRef =
NamingContextExtHelper.narrow(objRef);
			Addition addobj = (Addition)
AdditionHelper.narrow(ncRef.resolve_str("ABC"));

			Scanner c=new Scanner(System.in);
			System.out.println("Welcome to the addition
system:");
			for(;;)
			{
				System.out.println("Enter a:");
				String aa = c.nextLine();
				System.out.println("Enter b:");
				String bb = c.nextLine();
				int a=Integer.parseInt(aa);
				int b=Integer.parseInt(bb);
				int r=addobj.add(a,b);
```

```
                                        if(a==0)
                                                break;
                                        System.out.println("The result for addition is :
"+r);
                                        System.out.println("----------------------------------
");
                                }
                        }
                        catch (Exception e)
                        {
                                System.out.println("Hello Client exception: " + e);
                                e.printStackTrace();
                        }
                }
        }
```

Output:-

Starting orbd and executing all .java files

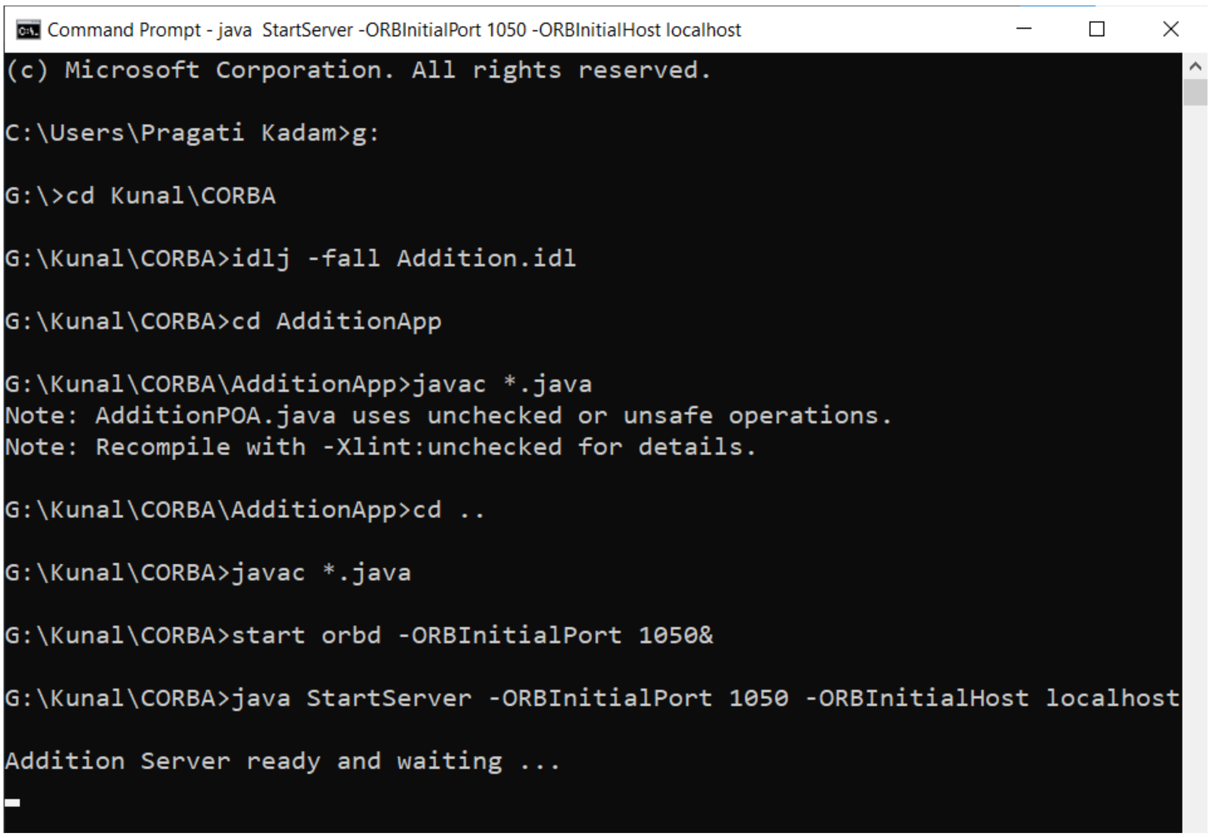


```
Microsoft Windows [Version 10.0.19044.1526]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Pragati Kadam>g:

G:\>cd Kunal\CORBA

G:\Kunal\CORBA>idlj -fall Addition.idl

G:\Kunal\CORBA>cd AdditionApp

G:\Kunal\CORBA\AdditionApp>javac *.java
Note: AdditionPOA.java uses unchecked or unsafe operations.
Note: Recompile with -Xlint:unchecked for details.

G:\Kunal\CORBA\AdditionApp>cd ..

G:\Kunal\CORBA>javac *.java

G:\Kunal\CORBA>start orbd -ORBInitialPort 1050&

G:\Kunal\CORBA>
```

```
Microsoft Windows [Version 10.0.19044.1526]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Pragati Kadam>g:

G:\>cd Kunal\CORBA

G:\Kunal\CORBA>
```

C:\Program Files\Java\jdk1.8.0_291\bin\orbd.exe

Running StartServer.java file


Command Prompt - java StartServer -ORBInitialPort 1050 -ORBInitialHost localhost

```
(c) Microsoft Corporation. All rights reserved.

C:\Users\Pragati Kadam>g:

G:\>cd Kunal\CORBA

G:\Kunal\CORBA>idlj -fall Addition.idl

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G:\Kunal\CORBA\AdditionApp>cd ..

G:\Kunal\CORBA>javac *.java

G:\Kunal\CORBA>start orbd -ORBInitialPort 1050&

G:\Kunal\CORBA>java StartServer -ORBInitialPort 1050 -ORBInitialHost localhost

Addition Server ready and waiting ...
```
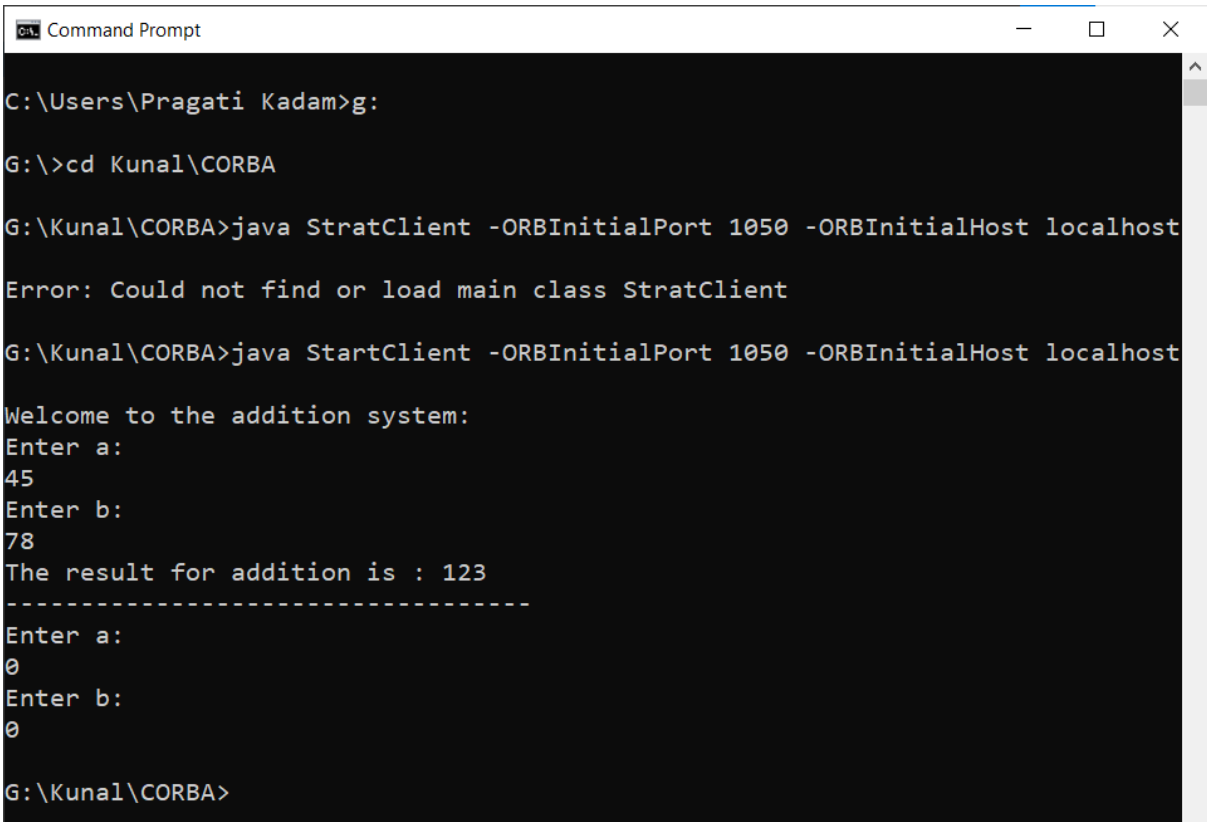

Running StartClient.java file



```

C:\Users\Pragati Kadam>g:

G:\>cd Kunal\CORBA

G:\Kunal\CORBA>java StratClient -ORBInitialPort 1050 -ORBInitialHost localhost

Error: Could not find or load main class StratClient

G:\Kunal\CORBA>java StartClient -ORBInitialPort 1050 -ORBInitialHost localhost

Welcome to the addition system:
Enter a:
45
Enter b:
78
The result for addition is : 123
-----------------------------------
Enter a:
0
Enter b:
0

G:\Kunal\CORBA>
```