The Java/COBRA development process for the Calculator example application is broken down in to ten manageable steps:

1. Download and install a Java ORB
2. Create IDL file
3. Compile IDL file
4. Create the client
5. Create the server
6. Create the interface implementation
7. Compile the client
8. Compile the server
9. Compile the interface implementation
10. Start the naming service (OS Agent)
11. Start the server
12. Start the client.

Program for Calculator Application

1. Calc.idl:

```
module WssCalculator
{
interface Calc
{
//Performs the Calculations:ADD/SUB/MUL/DIV
long calculate(in long operator,in long num1,in long num2);
//The Server EXITS when the Client prompts it to do so
oneway void shutdown();
};
};
```

2. CalcServer.java:

```
//Importing all the packages and classes
//Import the package which contains the Server Skeleton
import WssCalculator.*;
```

```
//Import the below two packages to use the Naming Service
import org.omg.CosNaming.*;
import org.omg.CosNaming.NamingContextPackage.*;
//Import this package to run the CORBA Application
import org.omg.CORBA.*;//
//Import the below to Classes for inheriting Portable Server
import org.omg.PortableServer.*;
import org.omg.PortableServer.POA;
//Initiate the ORB using the class Properties
import java.util.Properties;
//Perform the Input-Output functionalities
import java.io.*;
import java.util.*;

//Write the Servant class
//It inherits the general CORBA utilities generated by the Compiler
class Calcserverimpl extends CalcPOA
{
//orb variable is used to invoke the shutdown()
private ORB orb;
public void setORB(ORB orb_val)

{
orb = orb_val;
}

//Declaring and Implementing the required method
public int calculate(int a,int b,int c)
{
//ADDITION
if(a==43)
```

```
{
return (b+c);
}
//SUBTRACTION
else if(a==45)
{
return (b-c);
}
//MULTIPLICATION
else if(a==42)
{
return (b*c);
}
//DIVISION
else if(a==47)
{
return (b/c);
}
//DEFAULT
else
{
return 0;
}
}
//Closing the server
public void shutdown()
{
orb.shutdown(false);
}
}//end of the servant class
```

```
public class CalcServer
{
public static void main(String args[])
{
try
{
//Create and Initialize the ORB object
//init() allows to set the properties at run time
ORB orb=ORB.init(args,null);
//Obtain the initial Naming Context
//Obtain an initial object reference to the name server
//orb retrieves the reference to the Root POA
//Activate the POA Manager
//activate() causes the POAs to process the client requests
POA rootpoa=POAHelper.narrow(orb.resolve_initial_references("RootPOA"));
rootpoa.the_POAManager().activate();
//The server instantiates the servant objects
//The servant performs the operations defined in the idlj interface
Calcserverimpl simpl=new Calcserverimpl();
simpl.setORB(orb);
//Get the object reference associated with the servant
//narrow() is used to cast CORBA obj ref to its proper type
org.omg.CORBA.Object ref = rootpoa.servant_to_reference(simpl);
Calc href=CalcHelper.narrow(ref);
//Obtain the initial Naming Context
//Obtain an object reference to the Name Server
org.omg.CORBA.Object objRef=orb.resolve_initial_references("NameService");
//Narrow the objref to its proper type
NamingContextExt ncRef=NamingContextExtHelper.narrow(objRef);
//Register the Servant with the Name Server
String name = "Calc";
```

```
//NameComponent array contains the path to Calc
NameComponent path[]=ncRef.to_name(name);
//Pass the path and the servant object to the Naming Service
//Bind the servant object to Calc
ncRef.rebind(path,href);
System.out.println("The SERVER is READY");
System.out.println("The SERVER is WAITING to receive the CLIENT requests");
//run() is called by the main thread
//run() enables the ORB to perform work using the main thread
//the server waits until an invocation comes from the ORB
orb.run();
}
catch (Exception e)
{
System.err.println("ERROR: " + e);
e.printStackTrace(System.out);
}
//This statement is executed when the Client wishes to discontinue
System.out.println("The Server Exits");
}//end of main()
}//end of CalcServer()
```

3. CalcClient.java:

```
//Import all the important packages
//Import the package which contains the Client Stub
import WssCalculator.*;
//Import the below two packages to use the Naming Service
import org.omg.CosNaming.*;
import org.omg.CosNaming.NamingContextPackage.*;
//Import this package to run the CORBA Applicaion
import org.omg.CORBA.*;
//Import to perform Input-Output functionalities
```

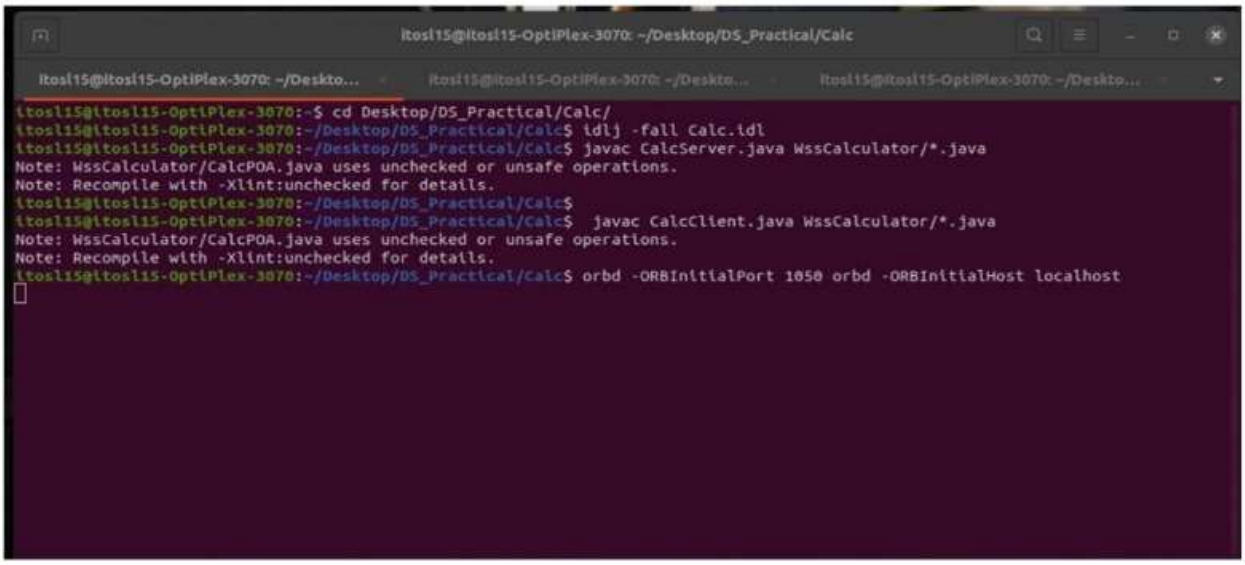
```
import java.io.*;
import java.util.*;
public class CalcClient
{
static Calc cimpl;
public static void main(String args[])
{
try
{
//Declaring and initializing the variables
int dec=1;
int i=0;
int j=0;
int k=0;
int result=0;
int x=1;
char c='x';
char d='y';
char f='z';
String abc="vas";
//Create and Initialize the ORB object
//init() allows to set properties at run time
ORB orb=ORB.init(args,null);
//ORB helps the Client to locate the actualservices which it needs
//COS Naming Service helps the client to do so
//Obtain the initial Naming Context
//Obtain an object reference to the name server
org.omg.CORBA.Object objRef=orb.resolve_initial_references("NameService");
//Narrow the objref to its proper type
NamingContextExt ncRef=NamingContextExtHelper.narrow(objRef);
//Identify a String to refer the Naming Service to Calc object
```

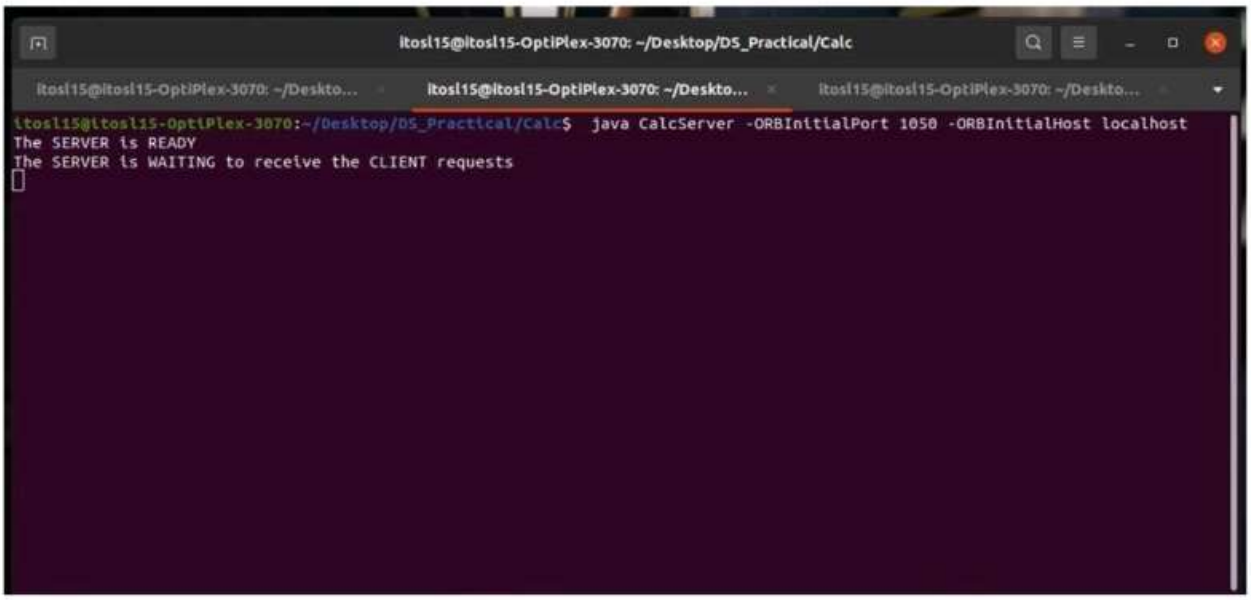
```
String name="Calc";
//Get a reference to the CalcServer and Narrow it to Calc object
cimpl=CalcHelper.narrow(ncRef.resolve_str(name));
System.out.println("Obtained a handle on the server object");
BufferedReader br=new BufferedReader(new InputStreamReader(System.in));
while(x==1)
{
System.out.println("Enter the string:");
abc=br.readLine();
//Separate the input string into separate characters
c=abc.charAt(0);
d=abc.charAt(1);
f=abc.charAt(2);
//Get the ASCII value of the Operator
i=(int)c;
//Get the Integer values of the other two characters
j=Character.getNumericValue(d);
k=Character.getNumericValue(f);
result=cimpl.calculate(i,j,k);
System.out.println("The result of the operation is "+result);
System.out.println("Enter 1 to continue and 0 to exit ");
x=Integer.parseInt(br.readLine());
}
//If the Client wants to discontinue
cimpl.shutdown();
}
catch(Exception e)
{
System.out.println("ERROR : " + e) ;
e.printStackTrace(System.out);
}
```

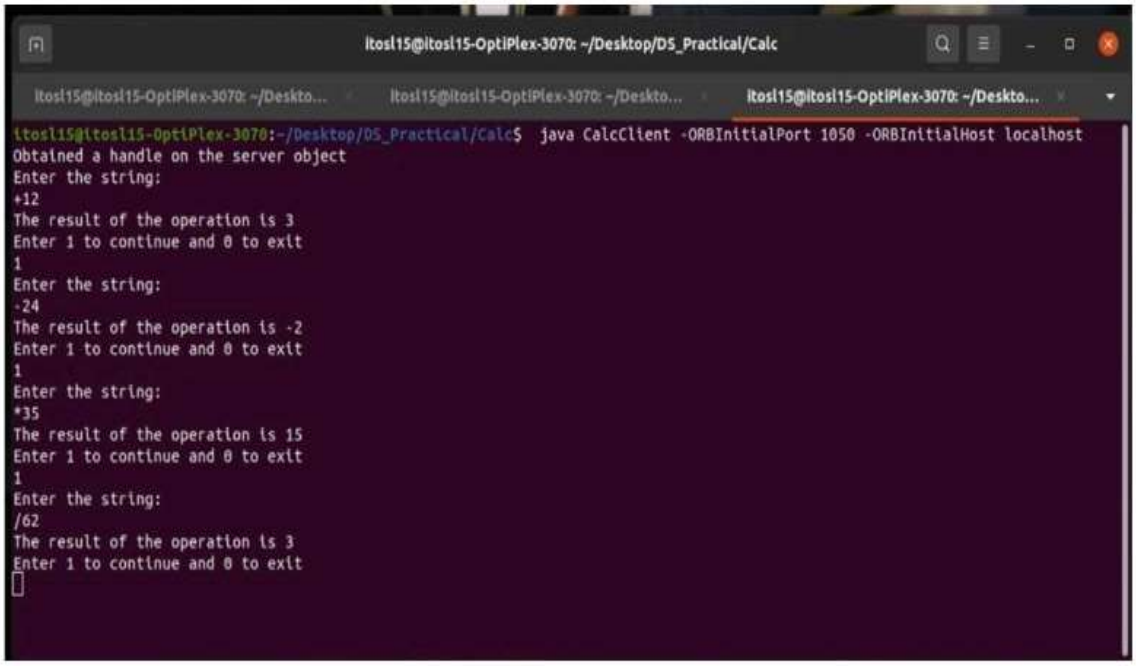
}//end of main()

}//end of class

OUTPUT:






itosl15@itosl15-OptiPlex-3070: ~/Desktop/DS_Practical/Calc
itosl15@itosl15-OptiPlex-3070: ~/Deskto...
itosl15@itosl15-OptiPlex-3070: ~/Deskto...
itosl15@itosl15-OptiPlex-3070: ~/Deskto...
itosl15@itosl15-OptiPlex-3070:~/Desktop/DS_Practical/Calc$ java CalcClient -ORBInitialPort 1050 -ORBInitialHost localhost
Obtained a handle on the server object
Enter the string:
+12
The result of the operation is 3
Enter 1 to continue and 0 to exit
1
Enter the string:
-24
The result of the operation is -2
Enter 1 to continue and 0 to exit
1
Enter the string:
*35
The result of the operation is 15
Enter 1 to continue and 0 to exit
1
Enter the string:
/62
The result of the operation is 3
Enter 1 to continue and 0 to exit