

Lab Practice V [Distributed Systems]

Assignment No – 1

Title: Implement multi-threaded client/server Process communication using RMI.

Code: *Calculator Application using RMI*

- **Calculate.java**

```
import java.rmi.*;
public interface Calculate extends Remote
{
    public int calculate(int x, int y) throws RemoteException;
}
```

- **CalculateRemote.java**

```
import java.rmi.*;
import java.rmi.server.*;
import java.util.*;

public class CalculateRemote extends UnicastRemoteObject implements
Calculate
{
    CalculateRemote() throws RemoteException
    {
        super();
    }
    public int calculate(int a, int b)
    {
        Scanner sc = new Scanner(System.in);
        System.out.println("1. Add");
        System.out.println("2. Subtract");
        System.out.println("3. Multiply");
        System.out.println("4. Division");
        System.out.println("5. Exit");
        System.out.println("\nEnter your choice : ");
    }
}
```

```

int ch = sc.nextInt();

switch(ch){
    case 1:
    {
        return a+b;
    }
    case 2:
    {
        return a-b;
    }
    case 3:
    {
        return a*b;
    }
    case 4:
    {
        if(b!=0)
        {
            return a/b;
        }
        else
        {
            System.out.println("Division not possible...!");
        }
    }
    case 5: System.exit(0);

    default: System.out.println("\nInvalid choice");
        return 0;
    }
}
}

```

- **Server.java**

```

import java.rmi.*;

public class Server
{
    public static void main(String args[])
    {
        try
        {
            Calculate stub = new CalculateRemote();
            Naming.rebind("rmi://localhost:5000/sonoo",stub);
        }catch(Exception e)
        {

```

```

        System.out.println(e);
    }
}
}

```

- **Client.java**

```

import java.rmi.*;
import java.util.*;

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

        try
        {

            Calculate stub=(Calculate)Naming.lookup("rmi://localhost:5000/sonoo");

            int num1 = 0;
            int num2 = 0;
            Scanner sc = new Scanner(System.in);
            System.out.println("Enter num1 : ");
            num1 = sc.nextInt();
            System.out.println("Enter num2 : ");
            num2 = sc.nextInt();

            System.out.println("Result : " + stub.calculate(num1,num2));
        }
        catch(Exception e){}
    }
}

```

Steps to run the application

1. Compile all the java files

```
javac *.java
```

2. Start the rmiregistry on port 5000

```
start rmiregistry 5000
```

3. Start the server

```
java Server
```

4. Start the client

```
java Client
```

Output:

```
PS D:\Sem2\DS\rmi> javac *.java
PS D:\Sem2\DS\rmi> start rmiregistry 5000
PS D:\Sem2\DS\rmi> java Server
1. Add
2. Subtract
3. Multiply
4. Division
5. Exit

Enter your choice :
1
```

```
PS D:\Sem2\DS\rmi> java Client
Enter num1 :
9
Enter num2 :
2
Result : 11
```

```
1. Add
2. Subtract
3. Multiply
4. Division
5. Exit

Enter your choice :
2
```

```
PS D:\Sem2\DS\rmi> java Client
Enter num1 :
6
Enter num2 :
4
Result : 2
```

```
Enter your choice :
```

```
2
```

```
1. Add
```

```
2. Subtract
```

```
3. Multiply
```

```
4. Division
```

```
5. Exit
```

```
Enter your choice :
```

```
4
```

```
PS D:\Sem2\DS\rmi> java Client
```

```
Enter num1 :
```

```
14
```

```
Enter num2 :
```

```
7
```

```
Result : 2
```

```
Enter your choice :
```

```
4
```

```
1. Add
```

```
2. Subtract
```

```
3. Multiply
```

```
4. Division
```

```
5. Exit
```

```
Enter your choice :
```

```
8
```

```
Invalid choice
```