

Assignment 01:

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

ServerInterface:

```
package A;
import java.rmi.*;
public interface ServerInterface extends Remote {
    boolean isLeapYear(int year) throws RemoteException;
}
```

ServerImplementation:

```
package A;
import java.rmi.*;
import java.rmi.server.*;

public class ServerImplementation extends UnicastRemoteObject implements ServerInterface {
    public ServerImplementation() throws RemoteException {
        super();
    }
    // Leap year logic
    public boolean isLeapYear(int year) throws RemoteException {
        return (year % 4 == 0 && year % 100 != 0) || (year % 400 == 0);
    }
}
```

Server:

```
package A;
import java.rmi.*;

public class Server {
    public static void main(String[] args) {
        try {
            ServerImplementation serverImpl = new ServerImplementation();
            Naming.rebind("LeapYearServer", serverImpl);
            System.out.println("Server is Ready...");
        } catch (Exception e) {
            System.out.println("Exception occurred at Server! " + e.getMessage());
        }
    }
}
```

Client:

```
package A;
import java.rmi.*;
import java.util.Scanner;
```

```

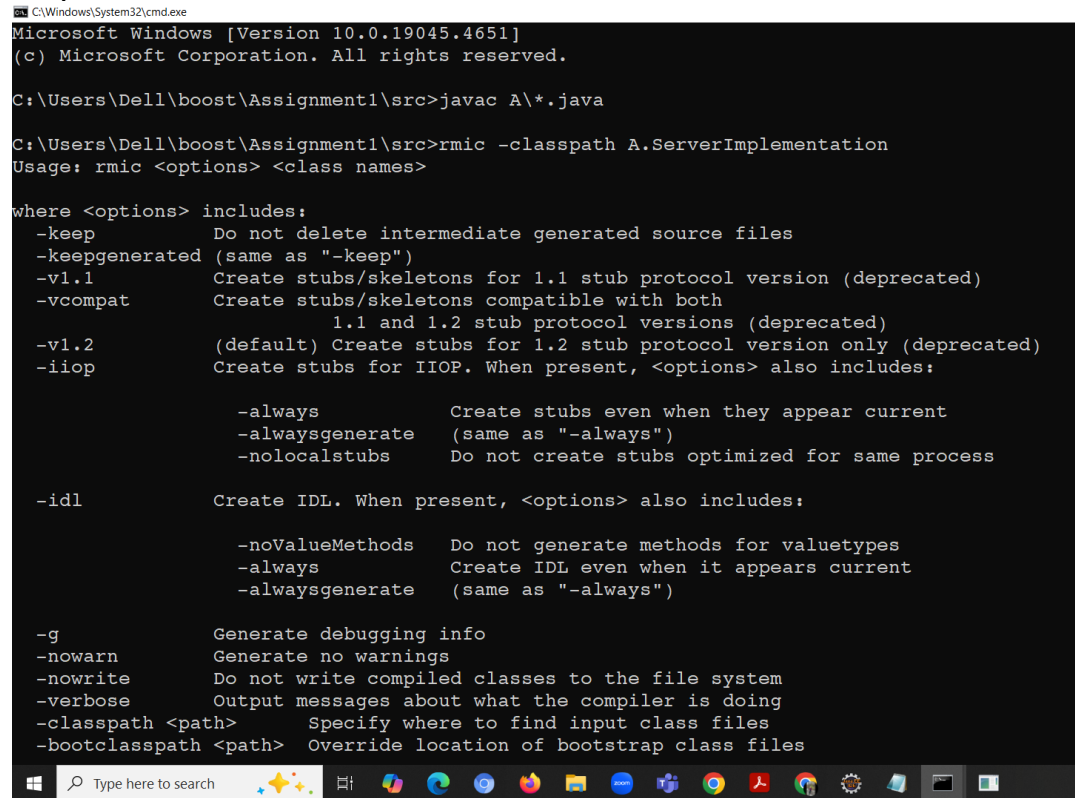
public class Client {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        try {
            // Connect to the remote server
            String serverUrl = "rmi://localhost/LeapYearServer";
            ServerInterface serverIntf = (ServerInterface) Naming.lookup(serverUrl);

            System.out.print("Enter a year: ");
            int year = sc.nextInt();

            if (serverIntf.isLeapYear(year)) {
                System.out.println(year + " is a Leap Year.");
            } else {
                System.out.println(year + " is NOT a Leap Year.");
            }
        } catch (Exception e) {
            System.out.println("Exception occurred at Client! " + e.getMessage());
        }
    }
}

```

Output:



```

C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.19045.4651]
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C:\Users\Dell\boost\Assignment1\src>javac A\*.java

C:\Users\Dell\boost\Assignment1\src>rmic -classpath A.ServerImplementation
Usage: rmic <options> <class names>

where <options> includes:
    -keep          Do not delete intermediate generated source files
    -keepgenerated (same as "-keep")
    -v1.1          Create stubs/skeletons for 1.1 stub protocol version (deprecated)
    -vcompat       Create stubs/skeletons compatible with both
                   1.1 and 1.2 stub protocol versions (deprecated)
    -v1.2          (default) Create stubs for 1.2 stub protocol version only (deprecated)
    -iiop          Create stubs for IIOP. When present, <options> also includes:
                   -always          Create stubs even when they appear current
                   -alwaysgenerate (same as "-always")
                   -nolocalstubs   Do not create stubs optimized for same process

    -idl           Create IDL. When present, <options> also includes:
                   -noValueMethods Do not generate methods for valuetypes
                   -always          Create IDL even when it appears current
                   -alwaysgenerate (same as "-always")

    -g             Generate debugging info
    -nowarn        Generate no warnings
    -nowrite       Do not write compiled classes to the file system
    -verbose       Output messages about what the compiler is doing
    -classpath <path> Specify where to find input class files
    -bootclasspath <path> Override location of bootstrap class files

```

C:\Windows\System32\cmd.exe

```
-noValueMethods  Do not generate methods for valuetypes
-always          Create IDL even when it appears current
-alwaysgenerate  (same as "-always")

-g              Generate debugging info
-nowarn        Generate no warnings
-nowrite       Do not write compiled classes to the file system
-verbose       Output messages about what the compiler is doing
-classpath <path> Specify where to find input class files
-bootclasspath <path> Override location of bootstrap class files
-extdirs <path>  Override location of installed extensions
-d <directory>  Specify where to place generated class files
-J<runtime flag> Pass argument to the java interpreter
```

C:\Users\Dell\boost\Assignment1\src>start rmiregistry

C:\Users\Dell\boost\Assignment1\src>_

C:\Windows\System32\cmd.exe - java A.Server

Microsoft Windows [Version 10.0.19045.4651]
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C:\Users\Dell\boost\Assignment1\src>java A.Server
Server is Ready...

C:\Windows\System32\cmd.exe

Microsoft Windows [Version 10.0.19045.4651]
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C:\Users\Dell\boost\Assignment1\src>java A.Client
Enter a year: 2024
2024 is a Leap Year.

C:\Users\Dell\boost\Assignment1\src>java A.Client
Enter a year: 2011
2011 is NOT a Leap Year.

C:\Users\Dell\boost\Assignment1\src>