

Java RMI-Based Student Result Calculator

1. Aim

To implement a Java Remote Method Invocation (RMI) based student result calculator where the server is deployed on a cloud platform and the client invokes methods remotely.

2. Objective

- To understand RMI architecture
- To implement remote interfaces and remote objects
- To deploy an RMI server on a cloud platform
- To verify remote method invocation

3. System Requirements

Hardware

- Computer with minimum 4 GB RAM
- Internet connection

Software

- Operating System: Ubuntu (Server), Windows (Client)
- Programming Language: Java
- Tools: OpenJDK
- Cloud Platform: AWS EC2

4. RMI Architecture

RMI follows an object-oriented client-server model. The client communicates with the server through a remote object registered in the RMI registry.

5. RMI Implementation Details

5.1 Remote Methods

- calculateTotal(m1, m2, m3)
- calculateAverage(total)

5.2 Working Principle

1. Remote interface defines student result methods
2. Server implements the remote interface
3. Server registers object in RMI registry

4. Client looks up remote object
5. Client invokes methods and receives results

6. Cloud Deployment

- RMI server hosted on AWS EC2
- Port 1099 enabled for registry
- Additional port opened for remote object

7. Error Handling

- Remote exceptions handled with try-catch
- Network failures managed gracefully

8. Output

```
Ubuntu 24.04.3 LTS (GNU/Linux 6.14.0-1018-aws x86_64)

Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.14.0-1018-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/pro

System information as of Fri Jan 30 18:33:54 UTC 2026

System load:  0.08          Temperature:      -273.1 C
Usage of /:   41.9% of 6.71GB Processes:           109
Memory usage: 27%          Users logged in:    0
Swap usage:   0%            IPv4 address for ens5: 172.31.33.81

Expanded Security Maintenance for Applications is not enabled.

31 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

Last login: Thu Jan 29 17:17:21 2026 from 122.164.85.143
```

```
ubuntu@ip-172-31-33-81:~$ sudo apt install default-jdk -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
default-jdk is already the newest version (2:1.21-75+exp1).
0 upgraded, 0 newly installed, 0 to remove and 44 not upgraded.
ubuntu@ip-172-31-33-81:~$ |
```

```
ubuntu@ip-172-31-33-81:~$ javac *.java
ubuntu@ip-172-31-33-81:~$ java RMIServer
RMI Student Server running...
```

```
PS D:\CEG\Study_Material\sem_6\DSC\5305_assignment\RMI> java RMIClient
Enter marks 1: 25
Enter marks 2: 23
Enter marks 3: 50
Total: 98
Average: 32.666666666666664
```

9. Result

The RMI-based student result calculator was successfully deployed and executed in a cloud environment.

10. Conclusion

This experiment demonstrated the use of Java RMI for building distributed applications using remote objects.