

CS 461

Lab Assignment 4

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Q. Implement Java RMI (Remote Method Invocation)

Basic To Do List:

ToDoListInterface.java

```
import java.rmi.Remote;
import java.rmi.RemoteException;
import java.util.List;

public interface ToDoListInterface extends Remote {
    void addTask(String task) throws RemoteException;

    void removeTask(String task) throws RemoteException;

    List<String> listTasks() throws RemoteException;
}
```

ToDoListImplementation.java

```
import java.rmi.RemoteException;
import java.rmi.server.UnicastRemoteObject;
import java.util.ArrayList;
import java.util.List;

public class ToDoListImplementation extends UnicastRemoteObject
implements ToDoListInterface {
    private List<String> tasks;

    protected ToDoListImplementation() throws RemoteException {
        super();
        tasks = new ArrayList<>();
    }

    @Override
```

```

    public void addTask(String task) throws RemoteException {
        tasks.add(task);
    }

    @Override
    public void removeTask(String task) throws RemoteException {
        tasks.remove(task);
    }

    @Override
    public List<String> listTasks() throws RemoteException {
        return tasks;
    }
}

```

ToDoListServer.java

```

import java.rmi.registry.LocateRegistry;
import java.rmi.registry.Registry;

public class ToDoListServer {
    public static void main(String[] args) {
        try {
            ToDoListImplementation obj = new
ToDoListImplementation();

            Registry registry = LocateRegistry.createRegistry(2000);
            registry.rebind("ToDoListService", obj);

            System.out.println("To-Do List Server is ready.");
        } catch (Exception e) {
            e.printStackTrace();
        }
    }
}

```

ToDoListClient.java

```
import java.rmi.registry.LocateRegistry;
import java.rmi.registry.Registry;
import java.util.List;
import java.util.Scanner;

public class ToDoListClient {
    public static void main(String[] args) {
        try {
            // Locate the registry
            Registry registry =
LocateRegistry.getRegistry("localhost", 2000);

            // Look up the remote object
            ToDoListInterface stub = (ToDoListInterface)
registry.lookup("ToDoListService");
            Scanner scanner = new Scanner(System.in);
            String command;

            System.out.println("Welcome to the To-Do List
application!");
            do {
                System.out.println("Enter a command (add, remove,
list, exit):");
                command = scanner.nextLine();

                switch (command.toLowerCase()) {
                    case "add":
                        System.out.println("Enter task to add:");
                        String taskToAdd = scanner.nextLine();
                        stub.addTask(taskToAdd);
                        System.out.println("Task added.");
                        break;
                    case "remove":
                        System.out.println("Enter task to remove:");
                        String taskToRemove = scanner.nextLine();
                        stub.removeTask(taskToRemove);
                        System.out.println("Task removed.");
                        break;
                    case "list":
                        List<String> tasks = stub.listTasks();
                        System.out.println("Current tasks:");
                        for (String task : tasks) {
                            System.out.println("- " + task);
                        }
                }
            } while (command != "exit");
        } catch (Exception e) {
            e.printStackTrace();
        }
    }
}
```

```

        break;
    case "exit":
        System.out.println("Exiting application.");
        break;
    default:
        System.out.println("Invalid command. Try
again.");
    }
} while (!command.equalsIgnoreCase("exit"));

scanner.close();
} catch (Exception e) {
    e.printStackTrace();
}
}
}

```

Code Explanation:

- A remote interface is declared that declares remote methods such as addTask, removeTask, listTasks.
- Then implemented remote interface in ToDoListImplementation.java
- The To do list server is hosted on localhost with port 2000.
- The client successfully connect to the server and can run the To do list application.

Testing Phase:

1) Adding three task(shopping, CS461 lab4 assignment, lab submission)

```
Welcome to the To-Do List application!
Enter a command (add, remove, list, exit):
add
Enter task to add:
shopping
Task added.
Enter a command (add, remove, list, exit):
add
Enter task to add:
CS461 lab4 assignment
Task added.
Enter a command (add, remove, list, exit):
add
Enter task to add:
lab submission
Task added.
```

2) View List

```
Enter a command (add, remove, list, exit):
list
Current tasks:
- shopping
- CS461 lab4 assignment
- lab submission
```

3) Remove 'shopping' from the list

```
Enter a command (add, remove, list, exit):
remove
Enter task to remove:
shopping
Task removed.
```

```
Enter a command (add, remove, list, exit):  
list  
Current tasks:  
- CS461 lab4 assignment  
- lab submission
```

Conclusion: Implemented Java RMI successfully with To Do List application.