Code

Client.java

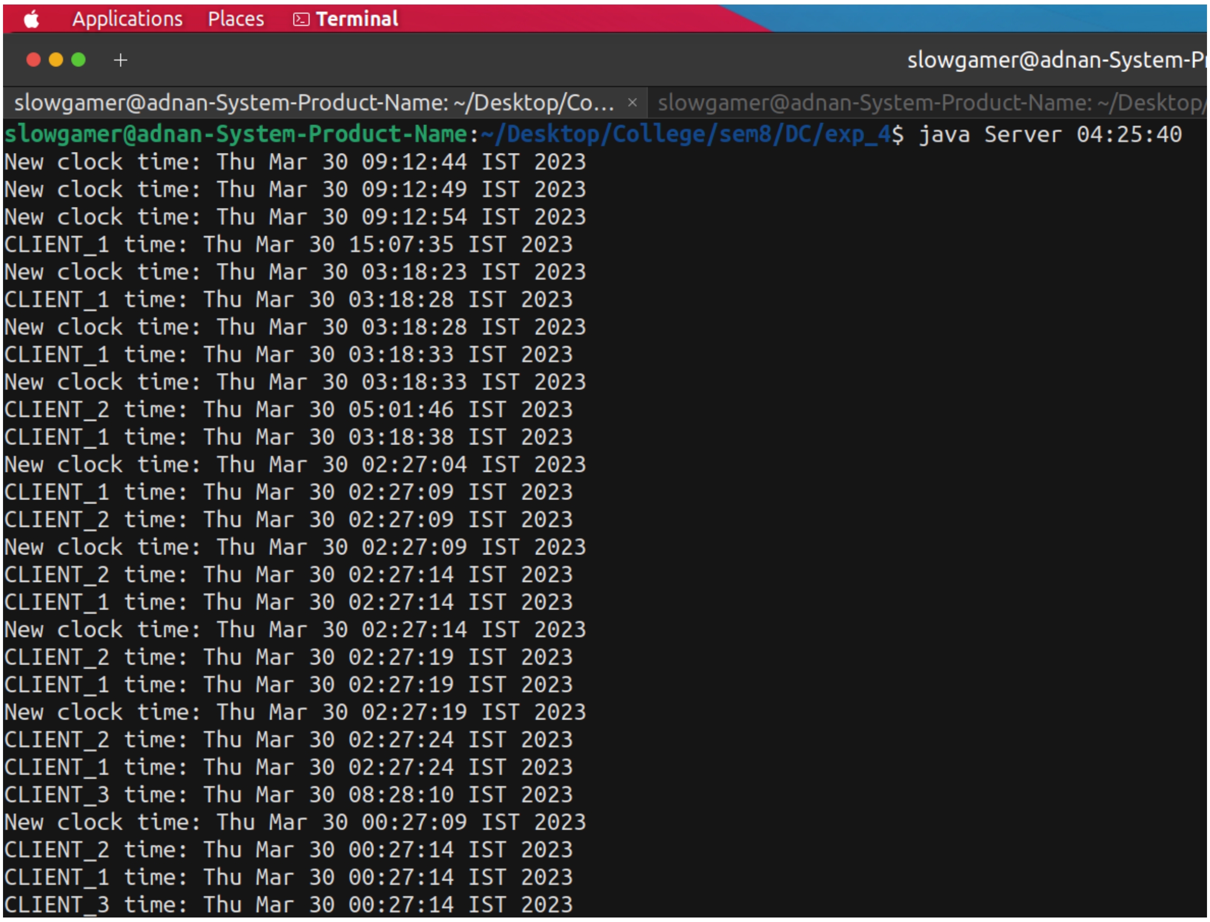
```
import java.io.BufferedReader;
import java.io.IOException;
import java.io.InputStreamReader;
import java.io.PrintWriter;
import java.net.Socket;
import java.text.DateFormat;
import java.text.ParseException;
import java.text.SimpleDateFormat;
import java.util.Date;
import java.util.Timer;
import java.util.TimerTask;


public class Client {
    static long givenTime;
    public static void main(String[] args) throws IOException,ParseException{
        DateFormat sdf = new SimpleDateFormat("hh:mm:ss");
        givenTime = sdf.parse(args[0]).getTime() + (new Date()).getTime();

        System.out.println("Current Time: "+new Date(givenTime));
        Timer timer = new Timer();
        timer.scheduleAtFixedRate(new TimerTask() {
            @Override
            public void run(){
                givenTime += 100;
            }
        }, 0, 100);
        try(
            Socket sock = new Socket("localhost",6969);
            BufferedReader in = new BufferedReader(
                new InputStreamReader(
                    sock.getInputStream()
                )
            );
            PrintWriter out = new PrintWriter(sock.getOutputStream(),true);
        ){
            String fromServer;

            while((fromServer = in.readLine()) != null){

                if (fromServer.equals("send time")){
                    out.println(givenTime);
                    System.out.println("Send Time:"+new Date(givenTime));
                }else if(fromServer.chars().allMatch( Character::isDigit)||
(fromServer.startsWith("-") && fromServer.substring(1).chars().allMatch(
Character::isDigit))){
```

```
                    givenTime = Long.parseLong(fromServer);

                    System.out.println("New Date From Server: "+new Date(givenTime));
                }else if(fromServer.equals("exit")){
                    System.out.println("Server shutdown exiting: ");
                    break;
                }else{
                    System.out.println("From Server: "+fromServer);
                }

            }
        }
    }
}
```

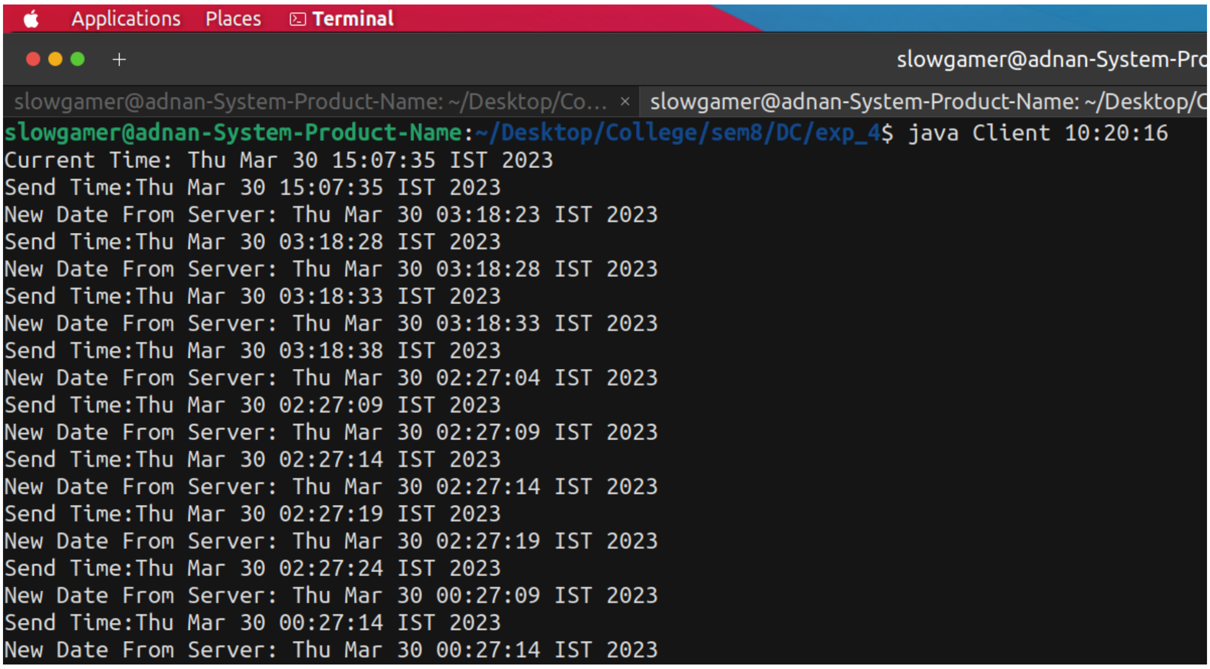
Server.java

```
import java.io.BufferedReader;
import java.io.IOException;
import java.io.InputStreamReader;
import java.io.PrintWriter;
import java.net.ServerSocket;
import java.net.Socket;
import java.util.Date;
import java.util.Timer;
import java.util.TimerTask;
import java.text.SimpleDateFormat;
import java.text.DateFormat;
import java.text.ParseException;
import java.util.ArrayList;


class Server{
    static DateFormat sdf = new SimpleDateFormat("hh:mm:ss");
    static long givenTime;
    static Date startTime = null;
    public static void main(String[] args) throws IOException,ParseException{
        givenTime = sdf.parse(args[0]).getTime() + (new Date()).getTime();

        Timer timer = new Timer();
        timer.scheduleAtFixedRate(new TimerTask() {
            @Override
            public void run(){
                ArrayList<Long> timeList = ClientSockets.GetTime();
                long res = 0;

                for(Long clientTime:timeList){
                    res += givenTime -clientTime;
                }
                res  = res/Math.max(1,timeList.size());
                givenTime= givenTime+res;
                System.out.println("New clock time: "+new Date(givenTime));
                ClientSockets.sendTime(givenTime);
            }
        }, 0,5000);
        timer.scheduleAtFixedRate(new TimerTask() {
            @Override
            public void run(){
                givenTime += 1;
            }
        }, 0, 1);

        final ServerSocket serverSock = new ServerSocket(6969);
        try{
            while(true) new ClientSockets(serverSock.accept());
        }catch(Exception e){
            e.printStackTrace();
        }
        finally{
            for(ClientSockets cs: ClientSockets.clientList){
                cs.sockDos.println("exit");
            }
            serverSock.close();
        }
    }

}

class ClientSockets{
    public static ArrayList<ClientSockets> clientList = new ArrayList<>();
    private static  int count = 0;
    private static final String CLIENT="CLIENT_";
    Socket socket;
    String nameString;
    PrintWriter sockDos;
    BufferedReader sockDis;



    ClientSockets(Socket socket) throws IOException{
        count++;
        this.socket = socket;
        this.nameString = CLIENT+count;
        this.sockDos = new PrintWriter(this.socket.getOutputStream(),true);
        this.sockDis = new BufferedReader(
            new InputStreamReader(this.socket.getInputStream())
        );

        clientList.add(this);
    }
    public static ArrayList<Long> GetTime(){
        ArrayList<Long> times = new ArrayList<>();

            clientList.parallelStream().forEach((client)->{
                try{
                    client.sockDos.println("send time");
                    String temp = null;
                    while((temp=client.sockDis.readLine()) ==null);
                    long time=Long.parseLong(temp);
                    System.out.println(client.nameString+" time: "+new Date(time));
                    times.add(time);
                }catch(Exception e){
                    e.printStackTrace();
                }
            });

        return times;
    }

    public static void sendTime(long refTime){
        clientList.parallelStream().forEach((client)->{
            try{
                client.sockDos.println(refTime);
            }catch(Exception e){
                e.printStackTrace();
            }
        });
    }

}
```

Output


Applications
Places
Terminal
slowgamer@adnan-System-P
slowgamer@adnan-System-Product-Name: ~/Desktop/Co…
slowgamer@adnan-System-Product-Name: ~/Desktop/

```
slowgamer@adnan-System-Product-Name:~/Desktop/College/sem8/DC/exp_4$ java Server 04:25:40
New clock time: Thu Mar 30 09:12:44 IST 2023
New clock time: Thu Mar 30 09:12:49 IST 2023
New clock time: Thu Mar 30 09:12:54 IST 2023
CLIENT_1 time: Thu Mar 30 15:07:35 IST 2023
New clock time: Thu Mar 30 03:18:23 IST 2023
CLIENT_1 time: Thu Mar 30 03:18:28 IST 2023
New clock time: Thu Mar 30 03:18:28 IST 2023
CLIENT_1 time: Thu Mar 30 03:18:33 IST 2023
New clock time: Thu Mar 30 03:18:33 IST 2023
CLIENT_2 time: Thu Mar 30 05:01:46 IST 2023
CLIENT_1 time: Thu Mar 30 03:18:38 IST 2023
New clock time: Thu Mar 30 02:27:04 IST 2023
CLIENT_1 time: Thu Mar 30 02:27:09 IST 2023
CLIENT_2 time: Thu Mar 30 02:27:09 IST 2023
New clock time: Thu Mar 30 02:27:09 IST 2023
CLIENT_2 time: Thu Mar 30 02:27:14 IST 2023
CLIENT_1 time: Thu Mar 30 02:27:14 IST 2023
New clock time: Thu Mar 30 02:27:14 IST 2023
CLIENT_2 time: Thu Mar 30 02:27:19 IST 2023
CLIENT_1 time: Thu Mar 30 02:27:19 IST 2023
New clock time: Thu Mar 30 02:27:19 IST 2023
CLIENT_2 time: Thu Mar 30 02:27:24 IST 2023
CLIENT_1 time: Thu Mar 30 02:27:24 IST 2023
CLIENT_3 time: Thu Mar 30 08:28:10 IST 2023
New clock time: Thu Mar 30 00:27:09 IST 2023
CLIENT_2 time: Thu Mar 30 00:27:14 IST 2023
CLIENT_1 time: Thu Mar 30 00:27:14 IST 2023
CLIENT_3 time: Thu Mar 30 00:27:14 IST 2023
```


Applications
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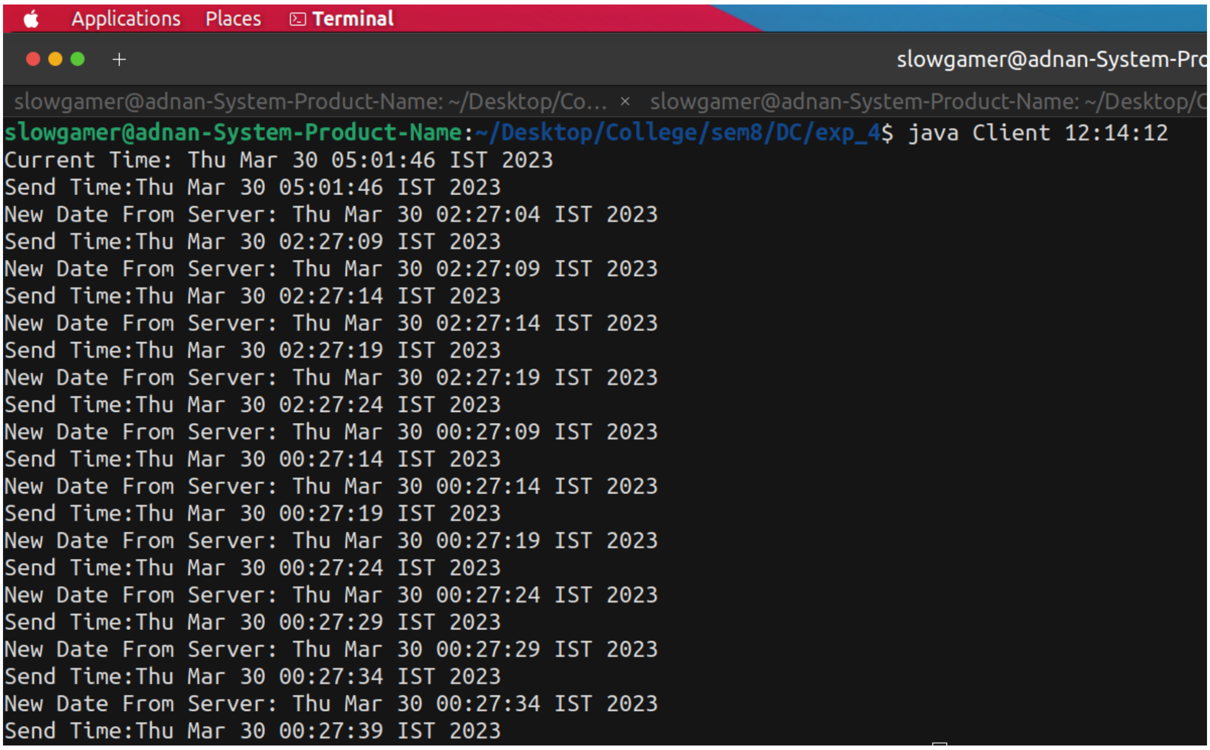
Terminal
slowgamer@adnan-System-Pro
slowgamer@adnan-System-Product-Name: ~/Desktop/Co…
slowgamer@adnan-System-Product-Name: ~/Desktop/C

```
slowgamer@adnan-System-Product-Name:~/Desktop/College/sem8/DC/exp_4$ java Client 10:20:16
Current Time: Thu Mar 30 15:07:35 IST 2023
Send Time:Thu Mar 30 15:07:35 IST 2023
New Date From Server: Thu Mar 30 03:18:23 IST 2023
Send Time:Thu Mar 30 03:18:28 IST 2023
New Date From Server: Thu Mar 30 03:18:28 IST 2023
Send Time:Thu Mar 30 03:18:33 IST 2023
New Date From Server: Thu Mar 30 03:18:33 IST 2023
Send Time:Thu Mar 30 03:18:38 IST 2023
New Date From Server: Thu Mar 30 02:27:04 IST 2023
Send Time:Thu Mar 30 02:27:09 IST 2023
New Date From Server: Thu Mar 30 02:27:09 IST 2023
Send Time:Thu Mar 30 02:27:14 IST 2023
New Date From Server: Thu Mar 30 02:27:14 IST 2023
Send Time:Thu Mar 30 02:27:19 IST 2023
New Date From Server: Thu Mar 30 02:27:19 IST 2023
Send Time:Thu Mar 30 02:27:24 IST 2023
New Date From Server: Thu Mar 30 00:27:09 IST 2023
Send Time:Thu Mar 30 00:27:14 IST 2023
New Date From Server: Thu Mar 30 00:27:14 IST 2023
```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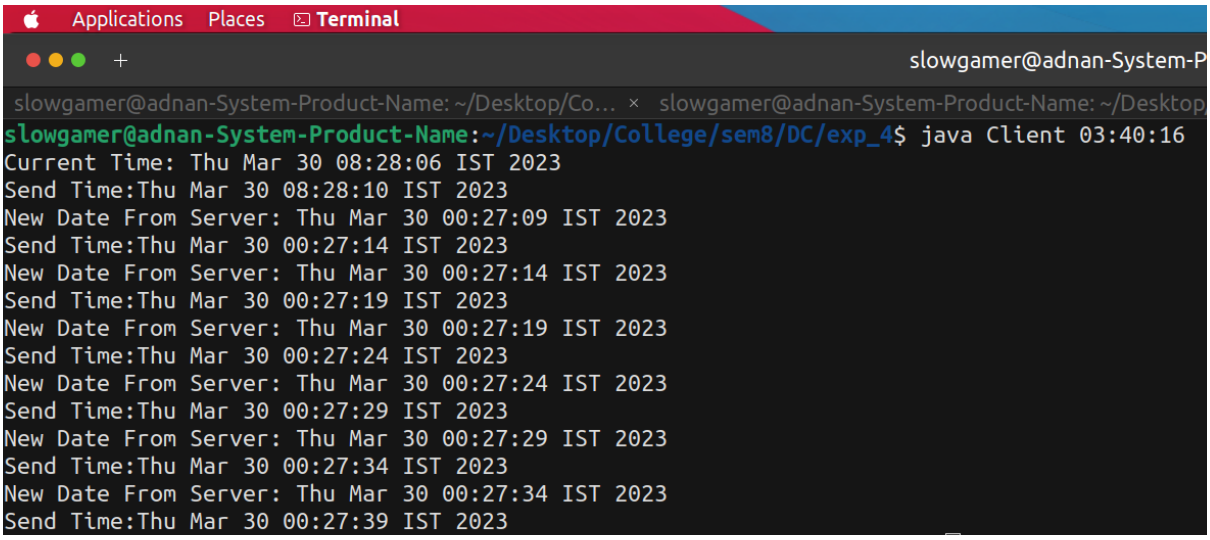
slowgamer@adnan-System-Product-Name: ~/Desktop/Co… ×
slowgamer@adnan-System-Product-Name: ~/Desktop/C

```
slowgamer@adnan-System-Product-Name:~/Desktop/College/sem8/DC/exp_4$ java Client 12:14:12
Current Time: Thu Mar 30 05:01:46 IST 2023
Send Time:Thu Mar 30 05:01:46 IST 2023
New Date From Server: Thu Mar 30 02:27:04 IST 2023
Send Time:Thu Mar 30 02:27:09 IST 2023
New Date From Server: Thu Mar 30 02:27:09 IST 2023
Send Time:Thu Mar 30 02:27:14 IST 2023
New Date From Server: Thu Mar 30 02:27:14 IST 2023
Send Time:Thu Mar 30 02:27:19 IST 2023
New Date From Server: Thu Mar 30 02:27:19 IST 2023
Send Time:Thu Mar 30 02:27:24 IST 2023
New Date From Server: Thu Mar 30 00:27:09 IST 2023
Send Time:Thu Mar 30 00:27:14 IST 2023
New Date From Server: Thu Mar 30 00:27:14 IST 2023
Send Time:Thu Mar 30 00:27:19 IST 2023
New Date From Server: Thu Mar 30 00:27:19 IST 2023
Send Time:Thu Mar 30 00:27:24 IST 2023
New Date From Server: Thu Mar 30 00:27:24 IST 2023
Send Time:Thu Mar 30 00:27:29 IST 2023
New Date From Server: Thu Mar 30 00:27:29 IST 2023
Send Time:Thu Mar 30 00:27:34 IST 2023
New Date From Server: Thu Mar 30 00:27:34 IST 2023
Send Time:Thu Mar 30 00:27:39 IST 2023
```


Applications
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Terminal
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slowgamer@adnan-System-Product-Name: ~/Desktop/Co… ×
slowgamer@adnan-System-Product-Name: ~/Desktop

```
slowgamer@adnan-System-Product-Name:~/Desktop/College/sem8/DC/exp_4$ java Client 03:40:16
Current Time: Thu Mar 30 08:28:06 IST 2023
Send Time:Thu Mar 30 08:28:10 IST 2023
New Date From Server: Thu Mar 30 00:27:09 IST 2023
Send Time:Thu Mar 30 00:27:14 IST 2023
New Date From Server: Thu Mar 30 00:27:14 IST 2023
Send Time:Thu Mar 30 00:27:19 IST 2023
New Date From Server: Thu Mar 30 00:27:19 IST 2023
Send Time:Thu Mar 30 00:27:24 IST 2023
New Date From Server: Thu Mar 30 00:27:24 IST 2023
Send Time:Thu Mar 30 00:27:29 IST 2023
New Date From Server: Thu Mar 30 00:27:29 IST 2023
Send Time:Thu Mar 30 00:27:34 IST 2023
New Date From Server: Thu Mar 30 00:27:34 IST 2023
Send Time:Thu Mar 30 00:27:39 IST 2023
```