

Name _____ Lastname _____ Student number

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Net Computing academic year 2009-10

Rules

- This is a closed books exam.
- The operation of any electronic device is prohibited (e.g. no calculator, phone or PDA).
- Answer the questions being *precise, complete, and formal*.
- Write as *clearly* as possible, both in terms of handwriting and wording.

Questions

1. Define the concept of middleware. Provide an example. Explain the relation between middleware of a distributed system and the operating system of an isolated computer.
2. Illustrate the components of the name `http://www.cs.rug.nl`. Additionally, explain how an iterative resolution of the name will perform (invent the server structure of the `.nl` domain).
3. Illustrate the phases of a process joining a Jini network and looking for a temperature service in the `leisure` domain.
4. Illustrate the general structure of a Remote Method Invocation architecture. Use Java RMI as an example for the explanation.
5. Explain the following code line by line. If there are errors, please indicate them and explain how to correct them. Modify the code so that the application connect to the main Web page of the University of Groningen and downloads the main HTML home page.

```
1 import java.io.IOException;
2 import java.net.*;
3 import java.io.*;
4 public class a
5 {
6     public static void main(String args[]) throws Exception
7     {
8         String ipAddress = "127.0.0.1";
9         InetAddress ipv4Address;
10        ipv4Address = (InetAddress) InetAddress.getByName(ipAddress);
11        int portNumber = 5555;
12        try {
13            Socket clientSideSocket = new
14                Socket(ipv4Address, portNumber);
15            DataOutputStream outputStream = new
16                DataOutputStream(clientSideSocket.getOutputStream());
17            DataInputStream inputStream = new
18                DataInputStream(clientSideSocket.getInputStream());
19            outputStream.writeUTF("Net Computing");
20            String data = inputStream.readUTF();
21            System.out.println(data);
22        }
23        catch (IOException e) e.printStackTrace();
24    }
25 }
```