2013 - 2014 Thema 2.1 ITSD

Practicum Week 1 Exercises

The number between parenthesis at the end of each question is a reference for the lecturer.

Exercises

Chapter 1

1.1 Explain the difference between protection and security. (1.7)

Chapter 2

2.1 What is the main function of the command interpreter? (2.3)

2.2 Describe three general methods for passing parameters to the operating system (2.13) system calls. (2.8)

Chapter 3

3.1 What is the difference between a process and a program? (3.1)

3.2 What are the five process states that defines the current activity of a process. (3.2)

3.3 What is the difference between a process and a thread? (3.3)

3.4 What are the two models of interprocess communication? What are the strengths and weaknesses of the two approaches ? (3.10)

3.5 Describe the actions taken by a kernel to context-switch between processes. (3.17)

Programming Exercise

see book Silberschatz ed. 8, Project 1: Naming Service Project, page 187.

A naming service such as DNS(domain name system) can be used to resolve IP names to IP addresses. For example, when someone accesses the host www.westminstercollege.edu , a naming service is used to determine the IP address that is mapped to the IP name www.westminstercollege.edu .
This assignment consists of writing a multithreaded naming service in Java using sockets (see Section 3.6.1). The java.net API provides the following mechanism for resolving IP names:

```
InetAddress hostAddress = InetAddress.getByName("www.westminstercollege.edu");
String IPaddress = hostAddress.getHostAddress();
```

where getByName() throws an UnknownHostExceptionif it is unable to resolve the host name.

The Server

The server will listen to port 6052 waiting for client connections. When a client connection is made, the server will service the connection in a separate thread and will resume listening for additional client connections. Once a client makes a connection to the server, the client will write the IP name it wishes the server to resolve — such aswww.westminstercollege.edu — to the socket. The server thread will read this IP name from the socket and either resolve its IP address or, if it cannot locate the host address, catch an UnknownHostException. The server will write the IP address back to the client or, in the case of an UnknownHostException, will write the message “Unable to resolve host <host name>. ” Once the server has written
to the client, it will close its socket connection.

The Client

Initially, write just the server application and connect to it via telnet. For example, assuming the server is running on the local host, a telnet session will appear as follows. (Client responses appear in blue .)

```
telnet localhost 6052
Connected to localhost.
Escape character is ’^]’.
www.westminstercollege.edu
146.86.1.17
Connection closed by foreign host.
```

By initially having telnet act as a client, you can more easily debug any problems you may have with your server. Once you are convinced your server is working properly, you can write a client application. The client will be passed the IP name that is to be resolved as a parameter. The client will open a socket connection to the server and then write the IP name that is to be resolved. It will then read the response sent back by the server. As an example, if the client is named NSClient , it is invoked as follows:

```
java NSClient www.westminstercollege.edu
```

The server will respond with the corresponding IP address or “unknown host” message. Once the client has output the IP address, it will close its socket connection.