

Session 04

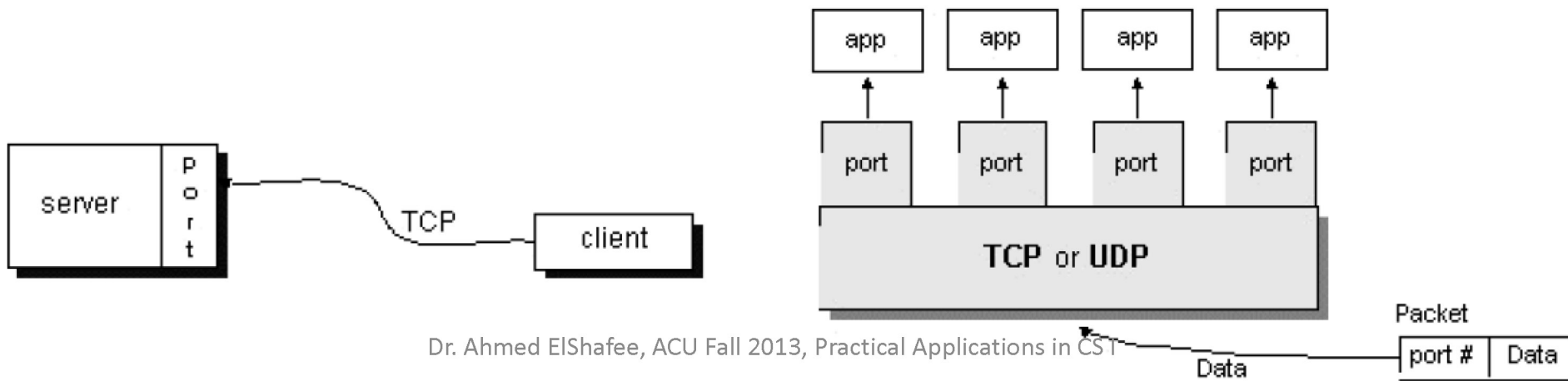
Socket Programming - 01

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Concepts of socket programming

Ports

- Ports are a virtual channels that enables applications to share the single network channel to exchange data.
- Port numbers are represented by 16-bit numbers. (0 to 65,535) The port numbers ranging from 0 - 1023 reserved for use by well known application
- services such as HTTP and FTP and other system services.



Sockets

You can reach required service via its network and port IDs. what then?

a) If you are a client

- you need an API that will allow you to send messages to that service and read replies from it

b) If you are a server

- you need to be able to create a port and listen at it.
- you need to be able to read the message comes in and reply to it.

The **Socket** and **ServerSocket** are the Java client and server classes to do this.

Network Layers

Decides what to do with the data



Application Layer

Ensure that packets are received in the order and no data is lost or corrupted.



Transport Layer
(TCP,UDP)

Defines arrangement of data and addressing scheme.



Internet Layer
(IP)

Java never sees this layer



Physical Layer

Application Layer

Transport Layer
(TCP,UDP)

Internet Layer
(IP)

TCP and UDP

Java only supports TCP (Transmission Control Protocol), UDP (User Datagram Protocol) and application layer protocols built on top of these.

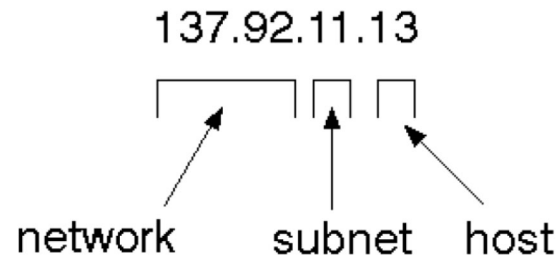
TCP/IP client/server



Internet Addressing

Internet address (IP address) is a unique number for identifying a device connected to the Internet.

The current standard is IPv4 which are four bytes long.



The hostname and IP address is, in Java, represented by `java.net.InetAddress`.

`InetAddress` is used by many other networking classes, including `Socket`, `ServerSocket`, `URL`, `DatagramSocket`, `DatagramPacket`, and more.

Internet Addressing (2)

InetAddress class

methods:

- .getLocalHost()
- .getByName ("webserver name")
- .getByAddress(byte[4])
- .getHostAddress()
- .getHostName()

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Assignment

The screenshot shows a Windows application window with a title bar containing a maximize button, a minimize button, and a close button. The window contains the following elements:

- Local Host** label with a **Get** button next to it.
- IP** label with a text box containing `192.168.44.1`.
- Name** label with a text box containing `ACU-Laptop`.
- WebServer Address Name** label with a text box containing `google.com`.
- A **Get IP Address** button.
- A text box containing `173.194.113.232`.
- WebServer IP Address** label with four separate text boxes containing `173`, `149`, `113`, and `232`.
- A **Get Address Name** button.
- A text box containing `173-149-113-232.pools.spcsdns.net`.

Internet Addressing (3)

The URL Class

.getProtocol()

.getHost()

.getPath()

.getQuery()

.getRef()

.getUserInfo()

.getAuthority()

.openConnection()

Internet Addressing (4)

For example, given the URL :

`http://www.ibiblio.org/javafaq/javabooks/index.html?isbn=123456789#toc`

1. Protocol: http
2. authority : www.ibiblio.org
3. path : /javafaq/books/javabooks/index.html
4. query string : isbn=123456789
5. fragment identifier : toc

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Assignment

The screenshot shows a window titled 'URL Parser' with a toolbar containing back, forward, and close buttons. The main area contains several input fields and two buttons. The fields are labeled as follows:

- URL:** `ibiblio.org/javafaq/javabooks/index.html?isbn=123456789#toc`
- Buttons:** 'Split Information' and 'Test' (disabled).
- Protocol:** `http`
- Host:** `www.ibiblio.org`
- Path:** `/javafaq/javabooks/index.html`
- Query:** `isbn=123456789`
- Refrence:** `toc`
- User Info:** (empty)
- Authority:** `www.ibiblio.org`

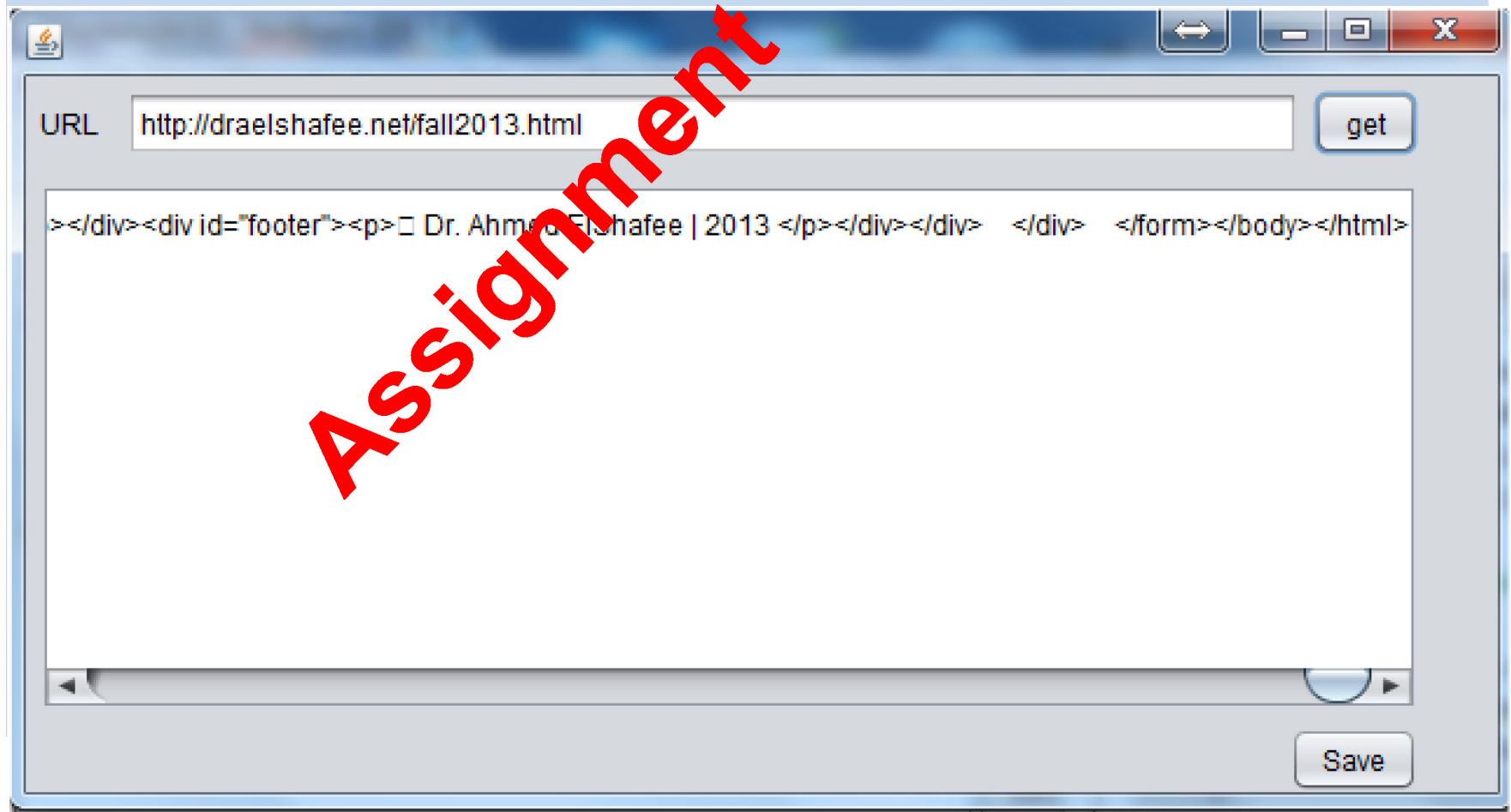
Internet Addressing (4)

URLConnection class

- `urlc.getInputStream()`

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A screenshot of a web browser window. The address bar shows the URL `http://draelshafee.net/fall2013.html`. Below the address bar, there is a text area containing HTML code: `></div><div id="footer"><p>□ Dr. Ahmed Elshafee | 2013 </p></div></div> </div> </form></body></html>`. A large red diagonal watermark reading "Assignment" is overlaid across the center of the browser window. The browser window has standard navigation buttons (back, forward, home, stop) and window control buttons (minimize, maximize, close). A "get" button is located to the right of the URL bar, and a "Save" button is at the bottom right of the window.

Thanks,..
See you next week (ISA),...