CS150 - Networking

Announcements

- HW due Friday

- Review for final - two weeks from yesterday

About Networking : definitions

URL : http:// www. mathcs. slu. edu

network protocol

host name

translated by domain name server — DNS

IP address : 165.134.12.1

IP_v 4

Networking (cont).

The <u>network</u> <u>protocol</u>, such as http, smtp, ssh, dhcp, etc., tells the computer what the connection is trying to do.

To help quickly distingush types & individual connections, each network connection specifies a <u>port</u> which it tries to connect on.

These range from 0 to 65535.

Ports:

Can choose arbitrary numbers, but
some conventions exist:

Port #	Connection type
22	ssh
53	DNS
80, 8080	http

Sockets

To manage network connects, programmers use an abstraction called a _socket_.

When 2 machines connect each establishes a dedicated socket. The OS uses this socket as an input/output for data going along this connection.

In Python, this is just an object imported from the socket library — a bit like file I/O.

Ex:

```
from socket import socket
s = socket()

s.connect(('maths.slu.edu', 80))
        #will raise error if can't connect

print  s.recv(1024)

s.close()


#also s.send(data)
```

builtin library → (arrow to `import socket`)

characters → (arrow to `1024`)

string → (arrow to `data`)

Models for network communication

Many models out there.

Two common ones:

① Client-server:
Server waits for a client to connect & request data, then sends that data

② Peer-to-peer:
two connected machines w/ roughly the same capabilities

Protocols

In any model, need an established protocol.

Each machine needs to know what is expected to happen next, so that their programming can handle the communication.

Ex: daytime protocol

The daytime protocol is a very simple one running on port 13.

When a connection opens, the server immediately sends a string containing info about the day and the time.

Format: '\n 54169   07-03-10   02:43:18
                52   0   0   594.5   UTC(NIST) *\n'

day: 07-03-10   time: 02:43:18

Managed   time.nist.gov

An example script

We'll code a program that connects to this & prints the day and time in a nice format.

Note: mathcs.slu.edu only works from turing

time.nist.gov won't work on campus

Servers

A bit more complex than clients which make a request, wait, & then process the request.

Servers initalize & need to wait for clients to contact them.

TCPServer class is provided to help with this setup.

We'll set up a class that inherits from a BaseRequestHandler class.

TCPServer

- Will initialize socket, & save it
  as self.request.

  So we can use send and recv
  (as the server!)

- We'll set up our server & put it
  in a loop (like our Tkinter stuff)
  so it will always listen.

- Our example will be an _echo server_