Week 12 Lecture:
Python, Sockets, and the Web

Adam Hartz
hz@mit.edu

4 May 2020
What Is a Web Application?

Example: CAT-SOOP: collect and assess online exercises
Written in Python, 2011-now

Based on a program called “the tutor” by Tomás Lozano-Pérez
(written in the Scheme dialect of LISP!)

Structurally, CAT-SOOP is a fairly standard web application. What does it do?

- **Receive request from user**
  (show me a page, submit this answer, etc)

- **Find relevant information**
  (page content, user info, history of submissions, etc)

- **Log new information if necessary**, and

- **Send response**
  (typically, HTML to be displayed in the browser)
The World Wide Web

HTTP Request Message

HTTP Response Message

HTTP over TCP/IP

HTTP Server (Web Server)

https://www.ntu.edu.sg/home/ehchua/programming/webprogramming/HTTP_Basics.html
Most of the implementation of the inversion filter has been completed for you.

Before you do that, however, let's add a simple test case so that we can test
whether our code is working.

Let's start with a 1×4 image that is defined with the following parameters:

```python
python>
```
What Is a Server?
What Is a Server?
Sockets

Sockets allow communication across processes (on the same machine or different machines).

Typically, a server will wait for a client to make a connection on a designated port (a virtual endpoint for a connection).

Once the client connects, the socket allows for communication between the server and the client.

Client and server can each send/receive data via the socket.

Example: yelling echo server.
The World Wide Web

https://www.ntu.edu.sg/home/ehchua/programming/webprogramming/HTTP_Basics.html
HTTP Request and Response

GET /doc/test.html HTTP/1.1
Host: www.test101.com
Accept: image/gif, image/jpeg, */*
Accept-Language: en-us
Accept-Encoding: gzip, deflate
User-Agent: Mozilla/4.0
Content-Length: 35

bookId=12345&author=Tan+Ah+Teck

HTTP/1.1 200 OK
Date: Sun, 08 Feb xxxx 01:11:12 GMT
Server: Apache/1.3.29 (Win32)
Last-Modified: Sat, 07 Feb xxxx
ETag: "0-23-4024c3a5"
Accept-Ranges: bytes
Connection: close
Content-Type: text/html

<h1>My Home page</h1>
The Rest of Today

Designing a:

• Web Server
• Web Application Framework
• Web Application