Networks and Distributed Computing — Spring 2019 — Homework 3

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# 1 TCP Demo Program

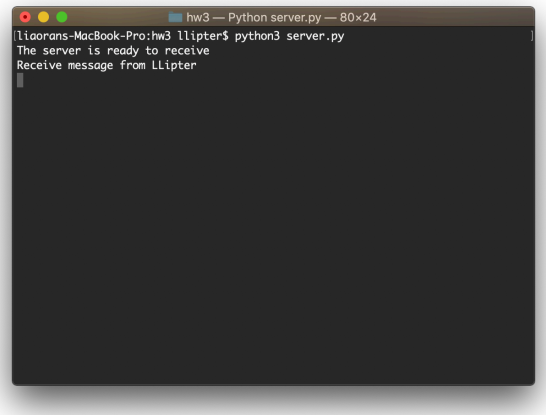


图 1: server.py

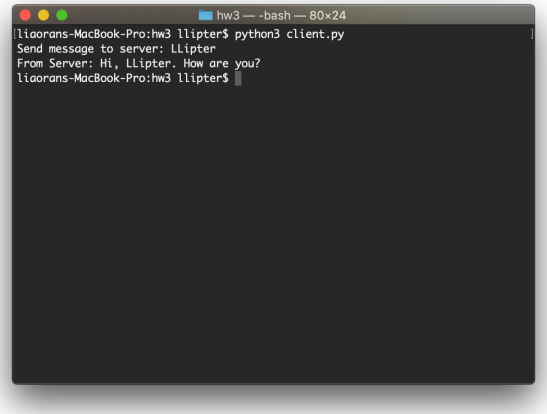


图 2: client.py

## 2 Problem 1

**Suppose Client A requests a web page from Server S through HTTP and its socket is associated with port 33000.**

(a) **What are the source and destination ports for the segments sent from A to S?**

Source port is 33000 and destination port is 80.

(b) **What are the source and destination ports for the segments sent from S to A?**

Source port is 80 and destination port is 33000.

(c) **Can Client A contact to Server S using UDP as the transport protocol?**

No. HTTP is built upon TCP.

(d) **Can Client A request multiple resources in a single TCP connection**

Yes. there's no limit on how many data can be transported through a single TCP connection.

## 3 Problem 2

**Consider Figure 3.5. What are the source and destination port values in the seg- ments flowing from the server back to the clients' processes? What are the IP addresses in the network-layer datagrams carrying the transport-layer segments?**

Suppose the IP addresses of the hosts $A, B$, and $C$ are $a, b, c$, respectively.

To host $A$: Source port = 80, source IP address = $b$, dest port = 26145, dest IP address = $a$.

To host $C$, left process: Source port = 80, source IP address = $b$, dest port = 7532, dest IP address = $c$.

To host $C$, right process: Source port = 80, source IP address = $b$, dest port = 26145, dest IP address = $c$.

# 4 Problem 4

Consider the following string of ASCII characters that were captured by Wireshark when the browser sent an HTTP GET message (i.e., this is the actual content of an HTTP GET message). The characters <cr><lf> are carriage return and line-feed characters (that is, the italized character string <cr> in the text below represents the single carriage-return character that was contained at that point in the HTTP header). Answer the following questions, indicating where in the HTTP GET message below you find the answer.

GET /cs453/index.html HTTP/1.1<cr><lf>Host: gaia.cs.umass.edu<cr><lf>User-Agent: Mozilla/5.0 ( Windows;U; Windows NT 5.1; en-US; rv:1.7.2) Gec ko/20040804 Netscape/7.2 (ax) <cr> <lf>Accept:ex t/xml, application/xml, application/xhtml+xml, text /html; q=0.9, text/plain; q=0.8,image/png,*/*; q=0.5<cr><lf>Accept-Language: en-us,en;q=0.5<cr><lf>Accept- Encoding: zip,deflate<cr><lf>Accept-Charset: ISO -8859-1,utf-8;q=0.7,*;q=0.7<cr><lf>Keep-Alive: 300<cr> <lf>Connection:keep-alive<cr><lf><cr><lf>

(a) **What is the URL of the document requested by the browser?**

gaia.cs.umass.edu/cs453/index.html

(b) **What version of HTTP is the browser running?**

HTTP/1.1

(c) **Does the browser request a non-persistent or a persistent connection?**

Persistent connection.

(d) **What is the IP address of the host on which the browser is running?**

No such information in HTTP request.

(e) **What type of browser initiates this message? Why is the browser type needed in an HTTP request message?**

Mozilla/5.0. Given this message, the server can send different version of objects to different browser to improve performance.

# 5 Problem 4

The text below shows the reply sent from the server in response to the HTTP GET message in the question above. Answer the following questions, indicat- ing where in the message below you find the answer.

HTTP/1.1 200 OK<cr><lf>Date: Tue, 07 Mar 2008 12:39:45GMT<cr><lf>Server: Apache/ 2.0.52 (Fedora) <cr><lf>Last-Modified: Sat, 10 Dec2005 18:27:46 GMT<cr><lf>ETag: ”526c3-f22-a88a4c80”<cr><lf>Accept- Ranges: bytes<cr><lf>Content-Length: 3874<cr><lf> Keep-Alive: timeout=max=100<cr><lf>Connection: Keep-Alive<cr><lf>Content-Type: text/ html; charset = ISO-8859-1 <cr><lf><cr><lf><!doctype html public ”- //w3c//dtd html 4.0transitional//en”><lf><html><lf> <head> <lf> <meta http-equiv=”Content-Type”content=”text /html; charset=iso-8859-1”><lf> <meta name=”GENERATOR”content=”Mozilla/4.79 [en] (Windows NT 5.0; U) Netscape]”><lf> <title>CMPSCI 453 / 591 / NTU-ST550ASpring 2005 homepage </title><lf> </head><lf> <much more document text following here (not shown)>

(a) **Was the server able to successfully find the document or not? What time was the document reply provided?**

Yes. It's on Tue, 07 Mar 2008 12:39:45GMT.

(b) **When was the document last modified?**

Sat, 10 Dec2005 18:27:46 GMT.

(c) **How many bytes are there in the document being returned?**

3874

(d) **What are the first 5 bytes of the document being returned? Did the server agree to a persistent connection?**

The first 5 byte is <!doc. And the server agree to open a persistent connection.

# 6 Problem 17

Consider accessing your e-mail with POP3.

(a) **Suppose you have configured your POP mail client to operate in the download-and-delete mode.**

C: list

S: 1 498

S: 2 912

S: .

C: retr 1

S: blah blah ...

S: .....blah

S: .

C: dele 1

C: retr 2

S: (blah blah ...

S: .....blah)

S: .

C: dele 2

C: quit

S: +OK POP3 server signing off

(b) **What is the total response time for the scenario illustrated in Figure 2.20?**

C: list

S: 1 498

S: 2 912

S: .

C: retr 1

S: blah blah ...

S: .....blah

S: .

C: retr 2

S: blah blah ...

S: .....blah

S: .

C: quit

S: +OK POP3 server signing off

(c) **Suppose you have configured your POP mail client to operate in the download-and-keep mode. Using your transcript in part (b), suppose you retrieve messages 1 and 2, exit POP, and then five minutes later you again access POP to retrieve new e-mail. Suppose that in the five-minute interval no new mes- sages have been sent to you. Provide a transcript of this second POP session.**

C: list

S: 1 498

S: 2 912

S: .

C: retr 1

S: blah .....

S: ....blah

S: .

C: retr 2

S: blah blah ...

S: .....blah

S: .

C: quit

S: +OK POP3 server signing off