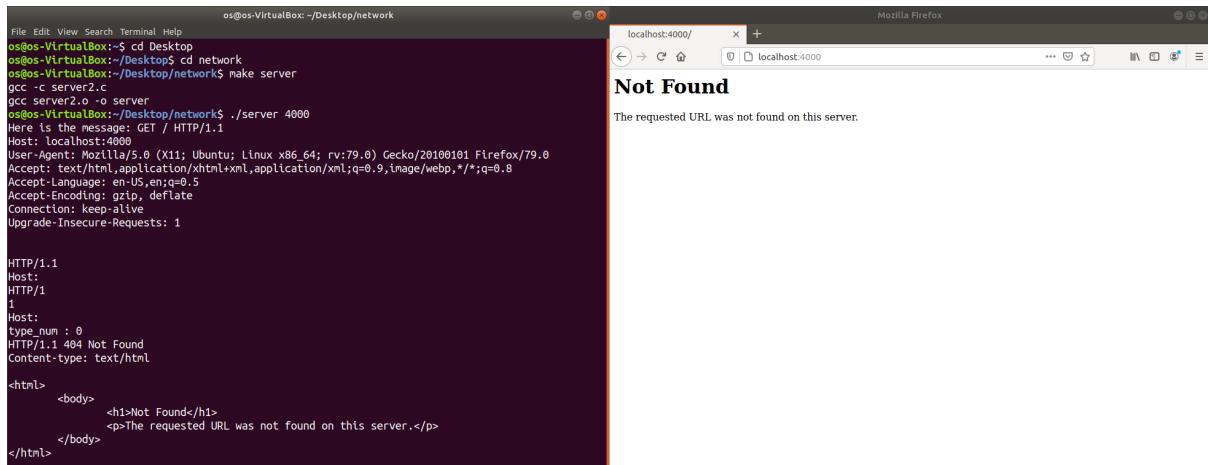


Computer Network Socket Programming

2017012351 이영섭

기본으로 작성되어 있던 server.c의 파일을 사용하여 부가적인 기능을 구현하였습니다. 웹 서버는 HTTP request가 들어왔을 때 그에 맞는 답을 보내야 하고 이는 계속 끊기지 않으며 accept()를 실행해야 하므로 while문 안에서 동작하도록 하였습니다. 그 후, 요청받은 파일의 이름과 타입을 이용해 맞는 파일을 보내주는 함수인 type_select를 통해 클라이언트에게 요청받은 파일을 보내주었습니다. type_select함수는 주소창의 값이 저장된 버퍼와 보내줄 값이 있을 때 보내줄 accept_mes 기본 뼈대, 그리고 연결된 소켓을 인자로 받아 실행됩니다. 버퍼에 저장된 내용을 strtok을 이용해 이름과 타입으로 나누고 타입에 따라 if문을 통해 실행되는 코드가 달라집니다. 문제를 해결하는 과정에서 가장 어려웠던 점은 바이너리 파일을 처리하는 것이었습니다. html파일은 http message의 뒤에 붙이는 것으로 해결할 수 있었는데, 이와 다르게 바이너리 파일은 새로운 방법이 필요하였습니다. 이를 해결하기 위해 정말 많은 검색을 통하여 해결하였고, stackoverflow와 같은 사이트들에서 정보를 얻을 수 있었습니다.

파일이름이 잘못되었거나 없는 경우

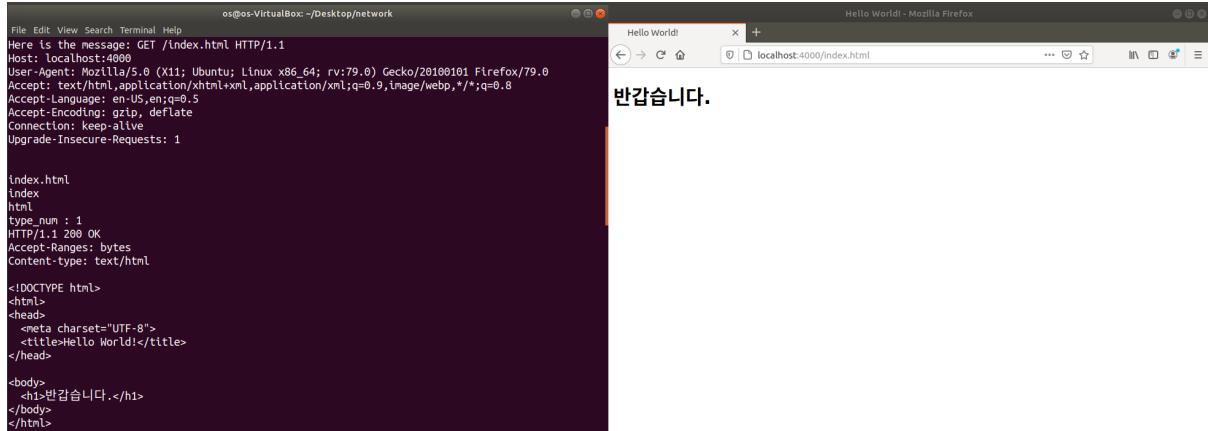


```
os@os-VirtualBox: ~/Desktop/network
File Edit View Search Terminal Help
os@os-VirtualBox: ~/Desktop
os@os-VirtualBox: ~/Desktop$ cd network
os@os-VirtualBox: ~/Desktop/network$ make server
gcc -c server2.c
gcc server2.o -o server
os@os-VirtualBox: ~/Desktop/network$ ./server 4000
Here is the message: GET / HTTP/1.1
Host: localhost:4000
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:79.0) Gecko/20100101 Firefox/79.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: keep-alive
Upgrade-Insecure-Requests: 1

HTTP/1.1
Host:
HTTP/1
Host:
type_num : 0
HTTP/1.1 404 Not Found
Content-type: text/html

<html>
    <body>
        <h1>Not Found</h1>
        <p>The requested URL was not found on this server.</p>
    </body>
</html>
```

html



```
os@os-VirtualBox: ~/Desktop/network
File Edit View Search Terminal Help
Here is the message: GET /index.html HTTP/1.1
Host: localhost:4000
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:79.0) Gecko/20100101 Firefox/79.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: keep-alive
Upgrade-Insecure-Requests: 1

Index.html
index
html
type_num : 1
HTTP/1.1 200 OK
Accept-Ranges: bytes
Content-type: text/html

<!DOCTYPE html>
<html>
<head>
    <meta charset="UTF-8">
    <title>Hello World!</title>
</head>
<body>
    <h1>반갑습니다.</h1>
</body>
</html>
```

gif

```
os@os-VirtualBox: ~/Desktop/network
File Edit View Search Terminal Help
html
type_num : 1
HTTP/1.1 200 OK
Accept-Ranges: bytes
Content-type: text/html

<!DOCTYPE html>
<html>
<head>
    <meta charset="UTF-8">
    <title>Hello World!</title>
</head>

<body>
    <h1>안갑습니다.</h1>
</body>
</html>

Here is the message: GET /favicon.ico HTTP/1.1
Host: localhost:4000
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:79.0) Gecko/20100101 Firefox/79.0
Accept: image/webp,*/*
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: keep-alive
Upgrade-Insecure-Requests: 1

favicon.ico
favicon
ico
type_num : 3
Here is the message: GET /sample.gif HTTP/1.1
Host: localhost:4000
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:79.0) Gecko/20100101 Firefox/79.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: keep-alive
Upgrade-Insecure-Requests: 1

sample.gif
sample
gif
type_num : 2
HTTP/1.1 200 OK
Accept-Ranges: bytes
Content-type: image/gif

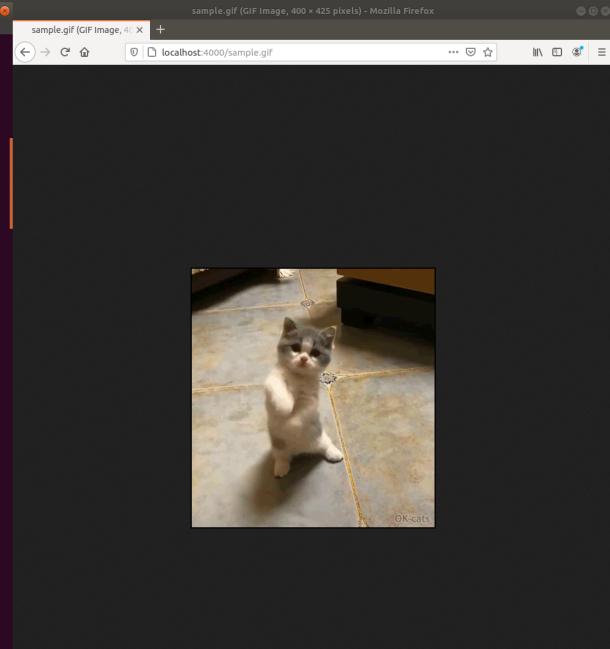
Here is the message: GET /sample.gif HTTP/1.1
Host: localhost:4000
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:79.0) Gecko/20100101 Firefox/79.0
Accept: image/webp,*/*
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: keep-alive
Upgrade-Insecure-Requests: 1

sample.gif
sample
gif
type_num : 2
HTTP/1.1 200 OK
Accept-Ranges: bytes
Content-type: image/gif

Here is the message: GET /favicon.ico HTTP/1.1
Host: localhost:4000
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:79.0) Gecko/20100101 Firefox/79.0
Accept: image/webp,*/*
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: keep-alive
Upgrade-Insecure-Requests: 1

favicon.ico
favicon
ico
type_num : 3
Here is the message: GET /sample.mp3 HTTP/1.1
Host: localhost:4000
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:79.0) Gecko/20100101 Firefox/79.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: keep-alive
Upgrade-Insecure-Requests: 1

sample.mp3
sample
mp3
type_num : 2
HTTP/1.1 200 OK
Accept-Ranges: bytes
Content-type: audio/mpeg
```



mp3

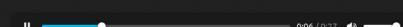
```
os@os-VirtualBox: ~/Desktop/network
File Edit View Search Terminal Help
type_num : 2
Here is the message: GET /sample.mp3 HTTP/1.1
Host: localhost:4000
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:79.0) Gecko/20100101 Firefox/79.0
Accept: image/webp,*/*
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: keep-alive
Upgrade-Insecure-Requests: 1

sample.mp3
sample
mp3
type_num : 2
HTTP/1.1 200 OK
Accept-Ranges: bytes
Content-type: audio/mpeg

Here is the message: GET /favicon.ico HTTP/1.1
Host: localhost:4000
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:79.0) Gecko/20100101 Firefox/79.0
Accept: image/webp,*/*
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: keep-alive
Upgrade-Insecure-Requests: 1

favicon.ico
favicon
ico
type_num : 3
Here is the message: GET /sample.mp3 HTTP/1.1
Host: localhost:4000
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:79.0) Gecko/20100101 Firefox/79.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: keep-alive
Upgrade-Insecure-Requests: 1

sample.mp3
sample
mp3
type_num : 2
HTTP/1.1 200 OK
Accept-Ranges: bytes
Content-type: audio/mpeg
```



pdf

```
os@os-VirtualBox:~/Desktop/network
File Edit View Search Terminal Help
Here is the message: GET /sample.mp3 HTTP/1.1
Host: localhost:4000
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:79.0) Gecko/20100101 Firefox/79.0
Accept: video/webm,video/ogg,video/*;q=0.9,application/ogg;q=0.7,audio/*;q=0.6,*/*;q=0.5
Accept-Language: en-US,en;q=0.5
Range: bytes=1087849-
Connection: keep-alive
Referer: http://localhost:4000/sample.mp3

sample.mp3
sample
mp3
type_num : 2
HTTP/1.1 200 OK
Accept-Ranges: bytes
Content-type: audio/mpeg

Here is the message: GET /favicon.ico HTTP/1.1
Host: localhost:4000
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:79.0) Gecko/20100101 Firefox/79.0
Accept: image/webp,*/*
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: keep-alive

favicon.ico
favicon
ico
type_num : 3
Here is the message: GET /sample.pdf HTTP/1.1
Host: localhost:4000
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:79.0) Gecko/20100101 Firefox/79.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: keep-alive
Upgrade-Insecure-Requests: 1

sample.pdf
sample
pdf
type_num : 2
HTTP/1.1 200 OK
Accept-Ranges: bytes
Content-type: application/pdf
```

sample.pdf - Mozilla Firefox

sample.pdf - Mozilla Firefox

sample.pdf

localhost:4000/sample.pdf

CSE3027: Computer Networks
Project 1:
Concurrent Web Server using BSD Sockets
Spring 2018
Instructor: Prof. Suk-Bok Lee

Due: 11:59 PM, Friday, April 13, 2018

1 Goal

In this project, we are going to develop a Web server in C/C++. Also, we will take the chance to learn a little bit more about how Web browser and server work behind the scene.

2 Getting Started

Reading Chapter 2 of the textbook will help you to understand how HTTP works. However, there are some differences:

- You must program in C/C++ (not Java). Examples of socket programming Client/Server code in C are available on the CourseWeb.
- Instead of using port 80 or 8080 or 6789 for the listening socket, you can pick your own port to avoid conflicts. You need to make this server port number as input in your web server execute command. It is suggested NOT to use port numbers 0-1024.
- Your program should run on a linux machine. Your submitted code will be tested and evaluated on linux machines.

3 Instructions

1. The project consists of Part A and Part B, which are specified as following:

- Part A: Implement a "Web Server" that dumps request messages to the console. This is a good chance to observe how HTTP works. So start a browser, e.g. Internet Explorer, Firefox, Chrome, etc (browser is the client side), connect to your server, record the request message, and find out what the fields in the message mean by looking up in the textbook or *RFC 1945*.
- Part B: Based on the code you have done in Part A, add one more function to the "Web server", that is, the "Web server" parses the HTTP request from the browser, creates an HTTP response message consisting of the requested file preceded by header lines, then sends the response directly to the client.

2. Pay attention to the following issues when you are implementing the project:

- Your web server has only one command line:
%myserver <port number>
<port number> is a port number of your web server for the listening socket. This way you can

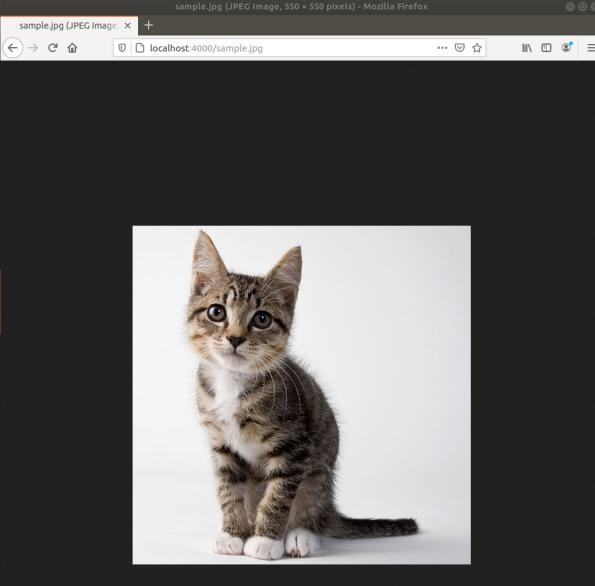
jpg

```
os@os-VirtualBox:~/Desktop/network
File Edit View Search Terminal Help
sample.pdf
sample
pdf
type_num : 2
HTTP/1.1 200 OK
Accept-Ranges: bytes
Content-type: application/pdf

Here is the message: GET /favicon.ico HTTP/1.1
Host: localhost:4000
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:79.0) Gecko/20100101 Firefox/79.0
Accept: image/webp,*/*
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: keep-alive

favicon.ico
favicon
ico
type_num : 3
Here is the message: GET /sample.jpg HTTP/1.1
Host: localhost:4000
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:79.0) Gecko/20100101 Firefox/79.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: keep-alive
Upgrade-Insecure-Requests: 1

sample.jpg
sample
jpg
type_num : 2
HTTP/1.1 200 OK
Accept-Ranges: bytes
Content-type: image/jpeg
```



jpeg

```
os@os-VirtualBox:~/Desktop/network
File Edit View Search Terminal Help
type_num : 2
HTTP/1.1 200 OK
Accept-Ranges: bytes
Content-type: image/jpeg

Here is the message: GET /favicon.ico HTTP/1.1
Host: localhost:4000
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:79.0) Gecko/20100101 Firefox/79.0
Accept: image/webp,*/*
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: keep-alive
Upgrade-Insecure-Requests: 1

favicon.ico
favicon
ico
type_num : 3
Here is the message: GET /sample.jpeg HTTP/1.1
Host: localhost:4000
User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:79.0) Gecko/20100101 Firefox/79.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
Connection: keep-alive
Upgrade-Insecure-Requests: 1

sample.jpeg
sample
jpeg
type_num : 2
HTTP/1.1 200 OK
Accept-Ranges: bytes
Content-type: image/jpeg
```

