Socket Programming Assignment

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1 Overview

Code repository: `https://github.com/jserra7d5/cs-372-assignment-1`

This assignment demonstrates socket programming in Python using the raw socket API. Three programs were implemented to showcase different aspects of network communication:

1. **simple_get.py** - Basic HTTP GET client for small files
2. **large_file_get.py** - HTTP GET client with loop for large files
3. **simple_server.py** - Simple HTTP server

All programs use the Python socket API as required.

2 Implementation Details

2.1 Simple GET Client (simple_get.py)

This program connects to `gaia.cs.umass.edu` and retrieves a small HTML file using a single `recv()` call.

Usage:

```
python3 simple_get.py
```

Screenshot of simple_get.py execution:

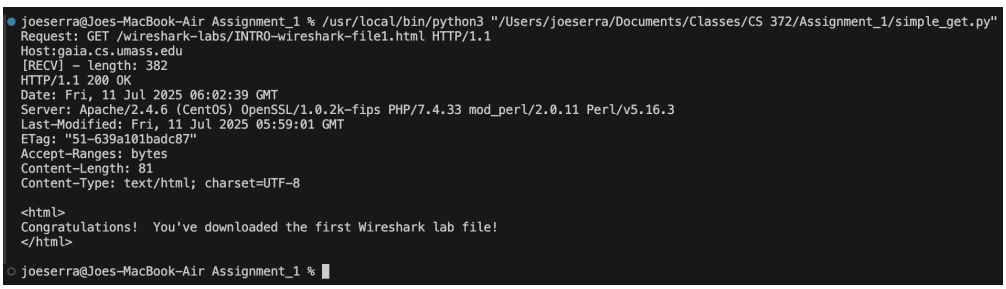

Figure 1: Execution of simple_get.py showing HTTP GET request and response

2.2 Large File GET Client (large_file_get.py)

This program demonstrates handling larger files by implementing a receive loop that continues until the server closes the connection.

Usage:

```
python3 large_file_get.py
```

Screenshot of large_file_get.py execution:

Figure 2: (Pt. 1) Execution of large_file_get.py showing chunked file retrieval

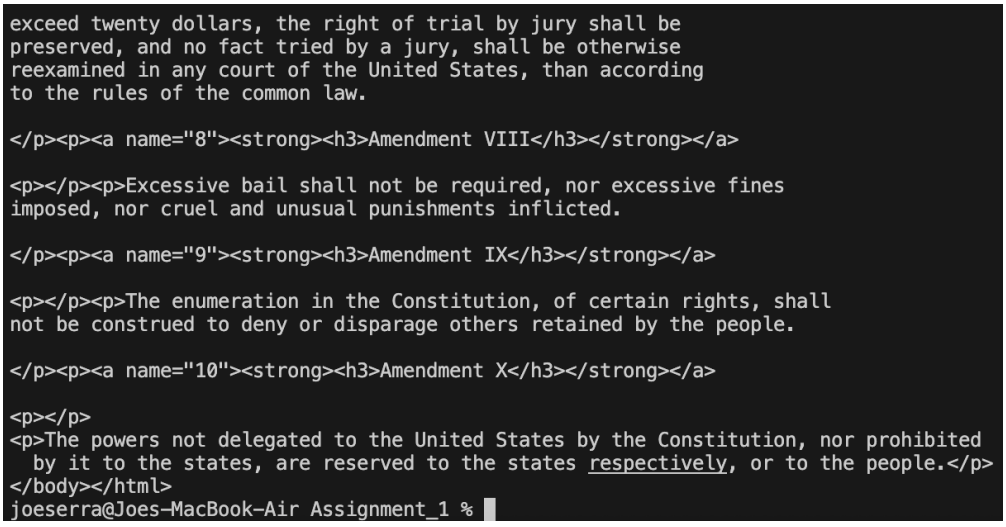

Figure 3: (Pt. 2) Execution of large_file_get.py showing chunked file retrieval

2.3 Simple HTTP Server (simple_server.py)

This program creates a basic HTTP server that listens on localhost and serves a simple HTML response to web browsers.

Usage:

```
python3 simple_server.py
```

Then open browser to: `http://127.0.0.1:8080`
Screenshot of simple_server.py execution:

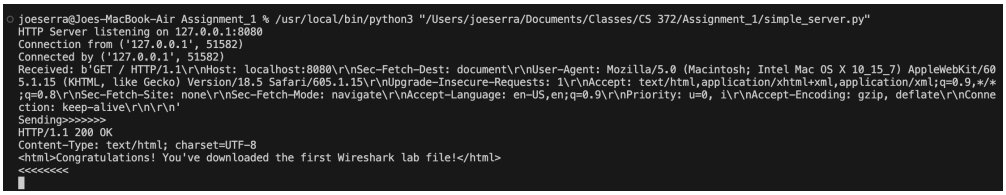

Figure 4: Execution of simple_server.py showing server startup and client connections

Screenshot of browser accessing the server:

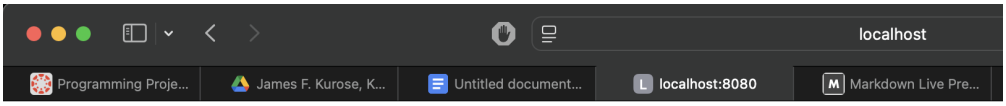

Figure 5: Browser view of the HTTP server response

3 References

1. Python Software Foundation. "Socket Programming in Python." Python Documentation. `https://docs.python.org/3/library/socket.html`

2. Fielding, R., et al. "Hypertext Transfer Protocol – HTTP/1.1." RFC 2616, Internet Engineering Task Force, 1999. `https://tools.ietf.org/html/rfc2616`

3. Kurose, James F., and Keith W. Ross. *Computer Networking: A Top-Down Approach*. 8th ed., Pearson, 2021.

4. Stevens, W. Richard, et al. *UNIX Network Programming, Volume 1: The Sockets Networking API*. 3rd ed., Addison-Wesley, 2003.

5. Mozilla Developer Network. "HTTP Messages." MDN Web Docs. `https://developer.mozilla.org/en-US/docs/Web/HTTP/Messages`