Assignment 2: HTTP Parser

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Instructions

Estimated Effort Required: 6-9 hours

Learning Outcome: Students will gain an understanding of how HTTP are constructed and what HTTP servers must do to validate the structure of an HTTP request.

Assignment Goal: You will write a parser for HTTP. This parser will also serve as the basis for both assignments 3 and 4, so it will be very hard to complete those assignments if assignment 2 is not completed.

Questions: Because this is the first assignment and because the software written for this assignment is critical to assignments 2 and 3, it is crucial that you ask questions via email, slack, or discussion boards as quickly as possible.

Preface: The following words should be interpreted as per RFC 2119 for this assignment: must, must not, required, shall, shall not, should, should not, recommended, may, and optional.

Description:

Hypertext Transfer Protocol requests and responses are the core of the web. However, over the lifetime of the web, HTTP has been extended to do many tasks that it was never intended to handle. As we proceed forward in this course, it is important to know that the list of things HTTP was never intended to handle includes security and privacy.

HTTP is defined in RFC 2616. These request for comment documents describe, in detail, the Hypertext Transfer Protocol. This includes details about how HTTP servers should operate and a formal grammar. These detail a fictional protocol that, while not suitable for use in production, is useful for becoming familiar with HTTP since it requires the use of most HTTP components. HTTP RFC 7230 and RFC 7231 may also be helpful.

Your task will be to write a parser which determines whether an HTTP request is valid and generate appropriate HTTP result response. You must consult both RFC documents to determine how HTTP requests and responses should be constructed.

Requirements:

1. 1. Python is recommended for its extensive string parsing libraries.
    a. You may use any programming language..
    b. The instructor may not be able to assist with specific programming errors if languages other than C, C++, PHP, Java, or Python are chosen.
2. You must not use any libraries built for parsing HTTP requests. You may use traditional string parsing libraries and functionality.
    a. If you have questions about whether a library is permissible, please ask.
    b. A simple litmus test is 'Do I need to import this?'
3. Your parser may be named whatever you wish.
4. Your parser must have exactly one command-line argument:
    a. The file path to a text file containing exactly one HTTP request

5. You must support the following methods discussed in the HTTP RFC: GET, POST, PUT, DELETE, CONNECT along with one other method of your choice (HEAD or CONNECT suggested).
6. Your HTTP parser must parse requests in the following way:
    a. If the request is valid, it should return a 200 OK response.
    b. If the request is not valid, it should return a 400 BAD REQUEST response.
    c. If an exception occurs while processing the HTTP request, it should fail gracefully and return a 500 INTERNAL SERVER ERROR response.
7. Your code must be documented(commented) using the following guidelines.
    a. https://medium.freecodecamp.org/code-comments-the-good-the-bad-and-the-ugly-be9cc65fbf83
8. Your code must execute on Ubuntu 18.04.

Deliverables:

1. A zip file that...
    a. Must include a readme text file which provides:
        i. Instructions on how to install any additional dependencies your code may have, including compilers/interpreters and development environments that are necessary to run your code.
        ii. Instructions for how to compile your code
        iii. Instructions on how to execute your code
    b. Should include a script that can be run to install any additional dependencies your code may have, if applicable.
    c. May include a script that can be used to compile your code, if applicable.
    d. Must include your source code

Rubric for assignments

DUE: 2/12/2021 @ 11:55 PM

Start Date

Feb 3, 2021 12:00 AM

Due Date

Feb 12, 2021 11:59 PM

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— / 28

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