

Relazione laboratorio incApache

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is not comparable to Apache (incapaci :P) è il terzo ed ultimo laboratorio del corso di SETI, abbiamo parzialmente implementato un web server ispirato ad Apache. Il codice del server supporta le versioni 1.0 e 1.1 del protocollo http, permettendo soltanto l'utilizzo dei metodi HEAD e GET, a differenza di Apache, che permette l'utilizzo di altri metodi, quali: DEBUG, DELETE, MOVE, PUT, TRACE, TRACK, POST.

Di seguito riportiamo i risultati di alcuni test via macchina virtuale con Ubuntu 20.04:

RICHIESTA HTTP (FILE HTML):

```
Received the following request:
GET /internet40years.html HTTP/1.1
... method_str=GET, filename=/internet40years.html (0=/), protocol=HTTP/1.1 (len=8)
... http_method=2
http_option_line: Host: localhost
http_option_line: User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:95.0) Gecko/20100101 Firefox/95.0
http_option_line: Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,*/*;q=0.8
http_option_line: Accept-Language: en-US,en;q=0.5
http_option_line: Accept-Encoding: gzip, deflate
http_option_line: Connection: keep-alive
http_option_line: Referer: http://localhost/
http_option_line: Cookie: id=1
http_option_line: Upgrade-Insecure-Requests: 1
http_option_line: Sec-Fetch-Dest: document
http_option_line: Sec-Fetch-Mode: navigate
http_option_line: Sec-Fetch-Site: same-origin
http_option_line: Sec-Fetch-User: ?1
```

RESPONSE HEADER IN CASO DI RICHIESTA ACCETTATA (FILE HTML):

```
Sending the following response:
HTTP/1.0 200 OK
Date: Wed, 12 Jan 2022 10:00:35 GMT
Set-Cookie: UserID=4; Expires=Wed, 31 Jul 2022 23:59:59 GMT;
Server: incApache for SETI.
Connection: close
Content-Length: 1593
Content-Type: text/html; charset=us-ascii
Last-Modified: Fri, 07 Jan 2022 00:58:10 GMT
```

RICHIESTA HTTP (FILE CSS):

```
Received the following request:
GET /000_style.css HTTP/1.1
... method_str=GET, filename=/000_style.css (0=/), protocol=HTTP/1.1 (len=8)
... http_method=2
http_option_line: Host: localhost
http_option_line: User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:95.0) Gecko/20100101 Firefox/95.0
http_option_line: Accept: text/css,*/*;q=0.1
http_option_line: Accept-Language: en-US,en;q=0.5
http_option_line: Accept-Encoding: gzip, deflate
http_option_line: Connection: keep-alive
http_option_line: Referer: http://localhost/nonexistent.html
http_option_line: Cookie: id=1; UserID=6
http_option_line: Sec-Fetch-Dest: style
http_option_line: Sec-Fetch-Mode: no-cors
http_option_line: Sec-Fetch-Site: same-origin
```

RESPONSE HEADER IN CASO DI RICHIESTA ACCETTATA (FILE CSS):

```
Sending the following response:
HTTP/1.0 200 OK
Date: Wed, 12 Jan 2022 10:01:04 GMT
Set-Cookie: UserID=7; Expires=Wed, 31 Jul 2022 23:59:59 GMT;
Server: incApache for SETI.
Connection: close
Content-Length: 102
Content-Type: text/css;
Last-Modified: Fri, 07 Jan 2022 00:58:10 GMT
```

RICHIESTA HTTP (FILE JPG):

```
Received the following request:
GET /uncadunca.jpg HTTP/1.1
... method_str=GET, filename=/uncadunca.jpg (0=/), protocol=HTTP/1.1 (len=8)
... http_method=2
http_option_line: Host: localhost
http_option_line: User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:95.0) Gecko/20100101 Firefox/95.0
http_option_line: Accept: image/avif,image/webp,*/*
http_option_line: Accept-Language: en-US,en;q=0.5
http_option_line: Accept-Encoding: gzip, deflate
http_option_line: Connection: keep-alive
http_option_line: Referer: http://localhost/nonexistent.html
http_option_line: Cookie: id=1; UserID=6
http_option_line: Sec-Fetch-Dest: image
http_option_line: Sec-Fetch-Mode: no-cors
http_option_line: Sec-Fetch-Site: same-origin
```

RESPONSE HEADER IN CASO DI RICHIESTA ACCETTATA (FILE JPG):

```
Sending the following response:
HTTP/1.0 200 OK
Date: Wed, 12 Jan 2022 10:01:04 GMT
Set-Cookie: UserID=8; Expires=Wed, 31 Jul 2022 23:59:59 GMT;
Server: incApache for SETI.
Connection: close
Content-Length: 12385
Content-Type: image/jpeg; charset=binary
Last-Modified: Fri, 07 Jan 2022 00:58:10 GMT
```

RICHIESTA HTTP (FILE NON TROVATO):

```
Received the following request:
GET /nonexistent.html HTTP/1.1
... method_str=GET, filename=/nonexistent.html (0=/), protocol=HTTP/1.1 (len=8)
... http_method=2
http_option_line: Host: localhost
http_option_line: User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:95.0) Gecko/20100101 Firefox/95.0
http_option_line: Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,*/*;q=0.8
http_option_line: Accept-Language: en-US,en;q=0.5
http_option_line: Accept-Encoding: gzip, deflate
http_option_line: Connection: keep-alive
http_option_line: Referer: http://localhost/internet40years.html
http_option_line: Cookie: id=1; UserID=4
http_option_line: Upgrade-Insecure-Requests: 1
http_option_line: Sec-Fetch-Dest: document
http_option_line: Sec-Fetch-Mode: navigate
http_option_line: Sec-Fetch-Site: same-origin
http_option_line: Sec-Fetch-User: ?1
```

RESPONSE HEADER PER L'ERRORE 404:

```
Sending the following response:
HTTP/1.0 404 Not Found
Date: Wed, 12 Jan 2022 10:00:59 GMT
Set-Cookie: UserID=6; Expires=Wed, 31 Jul 2022 23:59:59 GMT;
Server: incApache for SETI.
Connection: close
Content-Length: 250
Content-Type: text/html; charset=us-ascii
Last-Modified: Fri, 07 Jan 2022 00:58:10 GMT
```

RICHIESTA HTTP (METODO NON IMPLEMENTATO):

```
Received the following request:
POST /index.html HTTP/1.1
... method_str=POST, filename=/index.html (0=/), protocol=HTTP/1.1 (len=8)
... http_method=0
http_option_line: Host: localhost
http_option_line: User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:95.0) Gecko/20100101 Firefox/95.0
http_option_line: Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,*/*;q=0.8
http_option_line: Accept-Language: en-US,en;q=0.5
http_option_line: Accept-Encoding: gzip, deflate
http_option_line: Content-Type: application/x-www-form-urlencoded
http_option_line: Content-Length: 55
http_option_line: Origin: http://localhost
http_option_line: Connection: keep-alive
http_option_line: Referer: http://localhost/
http_option_line: Cookie: id=1; UserID=8
http_option_line: Upgrade-Insecure-Requests: 1
http_option_line: Sec-Fetch-Dest: document
http_option_line: Sec-Fetch-Mode: navigate
http_option_line: Sec-Fetch-Site: same-origin
http_option_line: Sec-Fetch-User: ?1
method not implemented
```

RESPONSE HEADER PER L'ERRORE 501:

```
Sending the following response:
HTTP/1.0 501 Method Not Implemented
Allow: HEAD,GET
Date: Wed, 12 Jan 2022 10:02:19 GMT
Set-Cookie: UserID=9; Expires=Wed, 31 Jul 2022 23:59:59 GMT;
Server: incApache for SETI.
Connection: close
Content-Length: 311
Content-Type: text/html; charset=us-ascii
Last-Modified: Fri, 07 Jan 2022 00:58:10 GMT
```

Problemi riscontrati:

- Tra i primi c'è stato quello del parsing del cookie per ottenere lo UserID e contare il numero delle richieste dal client, abbiamo avuto difficoltà nella comprensione e gestione della funzione `strtok_r_save()`.
- Difficoltà nella gestione del codice per impostare un cookie permanente, all'inizio aumentavamo il valore intero nella struct `now_tm` e manipolando il valore delle variabili relative al cookie tramite le funzioni `strftime()` e `sprintf()`, senza che stampasse il risultato nel Response Header; alla fine abbiamo semplicemente optato per l'utilizzo del valore della stringa `COOKIE_EXPIRE`, riutilizzando `sprintf()`.
- In ultimo, abbiamo riscontrato problemi nella gestione delle risposte del server per stampare le richieste accettate (200 ok), abbiamo risolto riprogrammando il codice che gestisce il `mime-type`, `stat-p` e le informazioni del file (`file_size` e `file_modification_time`).