

CPSC449-Project3

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0 Installation

Make sure you are in the project root and run:

"foreman start"

1 Background

For this project we will learn to make HTTP requests from a Python program and use this ability to store server-side session data in a separate service.

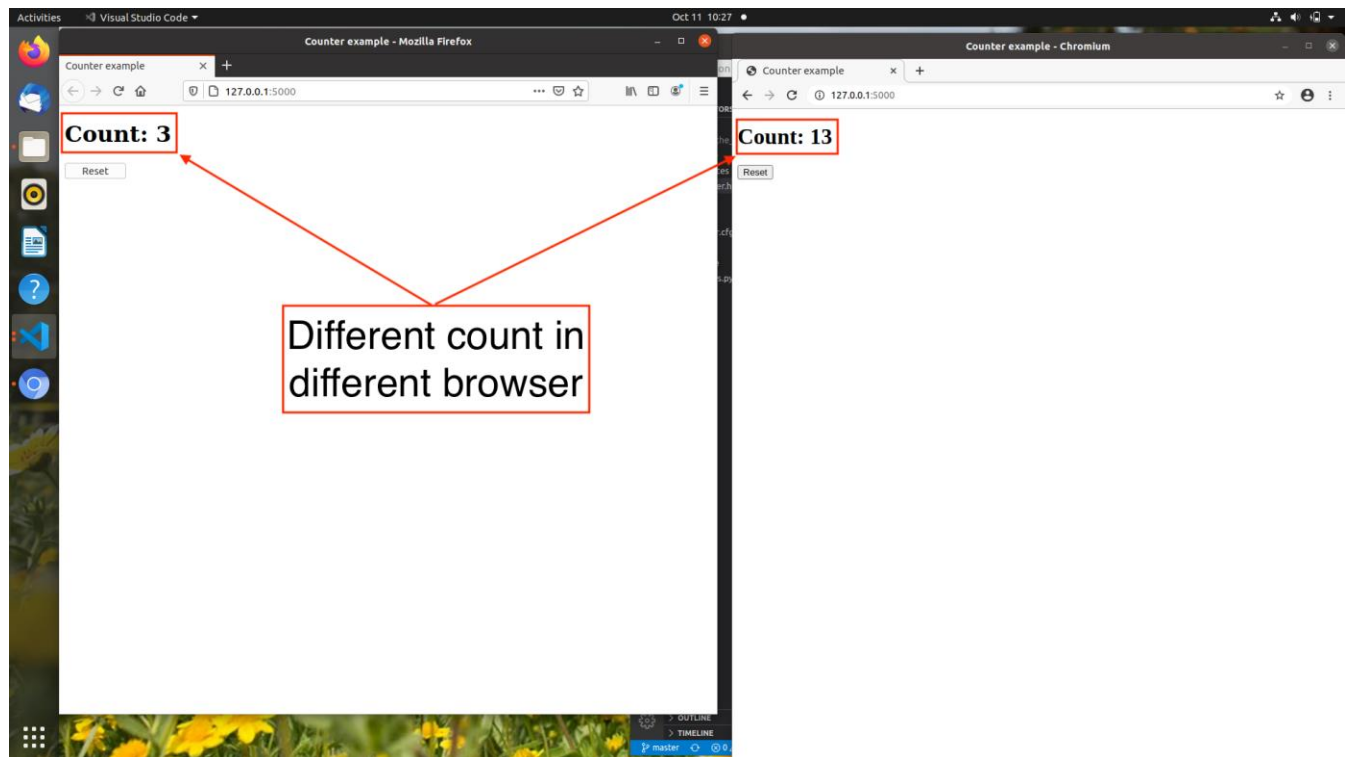
This project was completed by 2 people. Whose names are listed in the very top of this paper.

2 Learning HTTP request

Question 2

When `USE_SESSION_STORE = False`

Flask will use default session implementation: storing the session variables count in a signed cookie on the client side.



Notice that the two browsers do not share the same count variable.

Question 3

Browser developer tools

Here are viewing the Set-Cookies: response header

Counter example - Chromium

Counter example x +

127.0.0.1:5000

Count: 25

Reset

Elements Console Sources Network Performance Memory Application Security Lighthouse

Filter Hide data URLs XHR JS CSS Img Media Font Doc WS Manifest Other Has blocked cookies Blocked Requests

100 ms 200 ms 300 ms 400 ms 500 ms 600 ms 700 ms 800 ms 900 ms 1000 ms 1100 ms 1200 ms

Name X Headers Preview Response Initiator Timing Cookies

127.0.0.1

General

Request URL: http://127.0.0.1:5000/
Request Method: GET
Status Code: 200 OK
Remote Address: 127.0.0.1:5000
Referrer Policy: no-referrer-when-downgrade

Response Headers view source

Content-Length: 263
Content-Type: text/html; charset=utf-8
Date: Sun, 11 Oct 2020 17:34:43 GMT
Server: Werkzeug/1.0.1 Python/3.8.2
Set-Cookie: sessioneyJ3b3VudCI6IjV9.X4NCW.266L0Mg57xakc5p5EG1fdGYHQ; HttpOnly; Path=/
Vary: Cookie

Request Headers view source

Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.9
Accept-Encoding: gzip, deflate, br
Accept-Language: en-US,en;q=0.9
Cache-Control: max-age=0
Connection: keep-alive
Cookie: sessioneyJ3b3VudCI6IjV9.X4NCW.CX23HAK6--Lxlt-xX0betk0dcl
Host: 127.0.0.1:5000
Referer: http://127.0.0.1:5000/
Sec-Fetch-Dest: document
Sec-Fetch-Mode: navigate
Sec-Fetch-Site: same-origin
Sec-Fetch-User: ?1
Upgrade-Insecure-Requests: 1
User-Agent: Mozilla/5.0 (X11; Linux x86_64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/85.0.4183.121 Safari/537.36

1 requests 522 B transferred

Notice that it changes each time the page is refreshed.

Counter example - Chromium

Counter example x +

127.0.0.1:5000

Count: 26

Reset

Elements Console Sources Network Performance Memory Application Security Lighthouse

Filter Hide data URLs XHR JS CSS Img Media Font Doc WS Manifest Other Has blocked cookies Blocked Requests

10 ms 20 ms 30 ms 40 ms 50 ms 60 ms 70 ms 80 ms 90 ms 100 ms 110 ms

Name X Headers Preview Response Initiator Timing Cookies

127.0.0.1

General

Request URL: http://127.0.0.1:5000/
Request Method: GET
Status Code: 200 OK
Remote Address: 127.0.0.1:5000
Referrer Policy: no-referrer-when-downgrade

Response Headers view source

Content-Length: 263
Content-Type: text/html; charset=utf-8
Date: Sun, 11 Oct 2020 17:38:29 GMT
Server: Werkzeug/1.0.1 Python/3.8.2
Set-Cookie: sessioneyJ3b3VudCI6IjV9.X4NDFQ.VWU286B-CAYVsigX2X82f8e6-k; HttpOnly; Path=/
Vary: Cookie

Request Headers view source

Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.9
Accept-Encoding: gzip, deflate, br
Accept-Language: en-US,en;q=0.9
Cache-Control: max-age=0
Connection: keep-alive
Cookie: sessioneyJ3b3VudCI6IjV9.X4NCW.266L0Mg57xakc5p5EG1fdGYHQ
Host: 127.0.0.1:5000
Referer: http://127.0.0.1:5000/
Sec-Fetch-Dest: document
Sec-Fetch-Mode: navigate
Sec-Fetch-Site: same-origin
Sec-Fetch-User: ?1
Upgrade-Insecure-Requests: 1
User-Agent: Mozilla/5.0 (X11; Linux x86_64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/85.0.4183.121 Safari/537.36

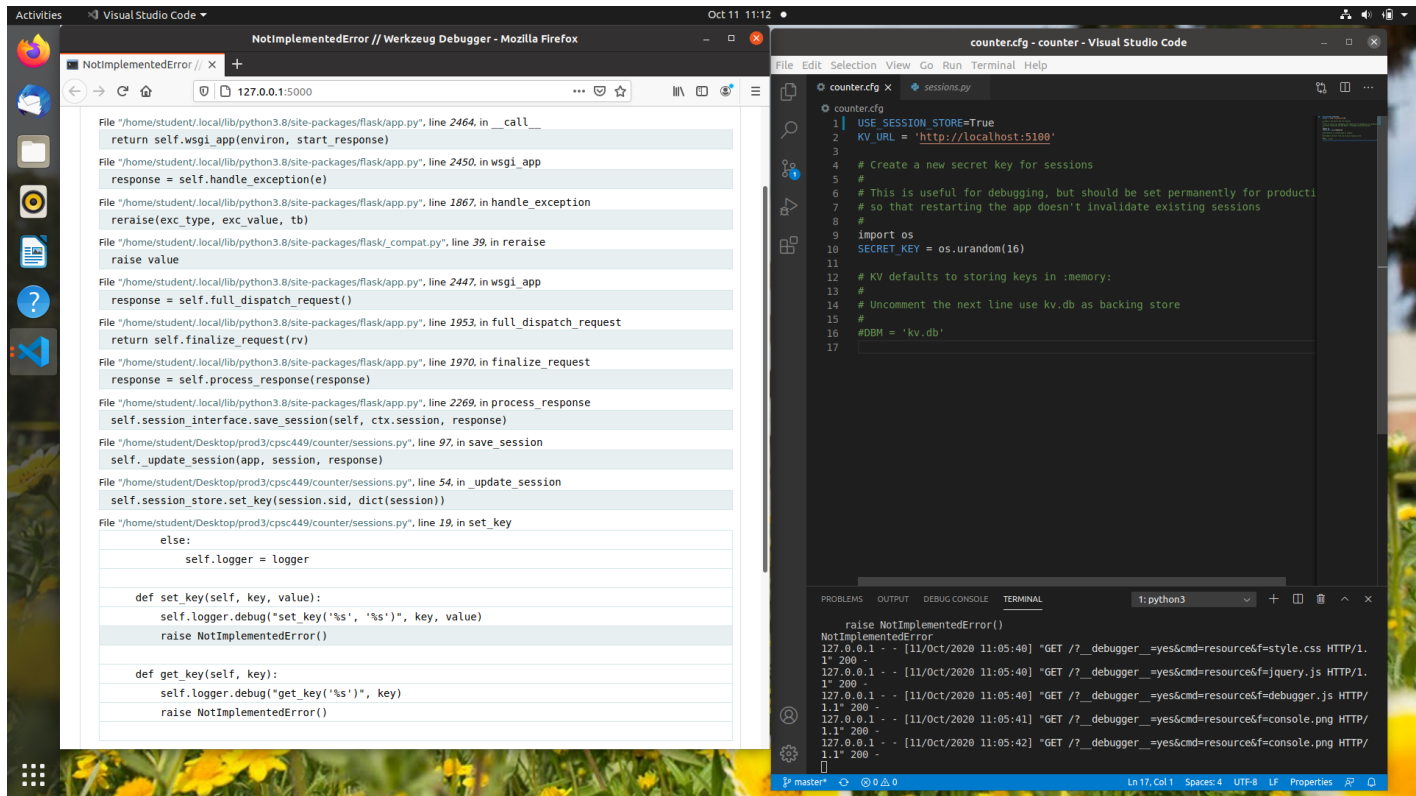
1 requests 522 B transferred

Question 6

counter.html

When USE_SESSION_STORE = True

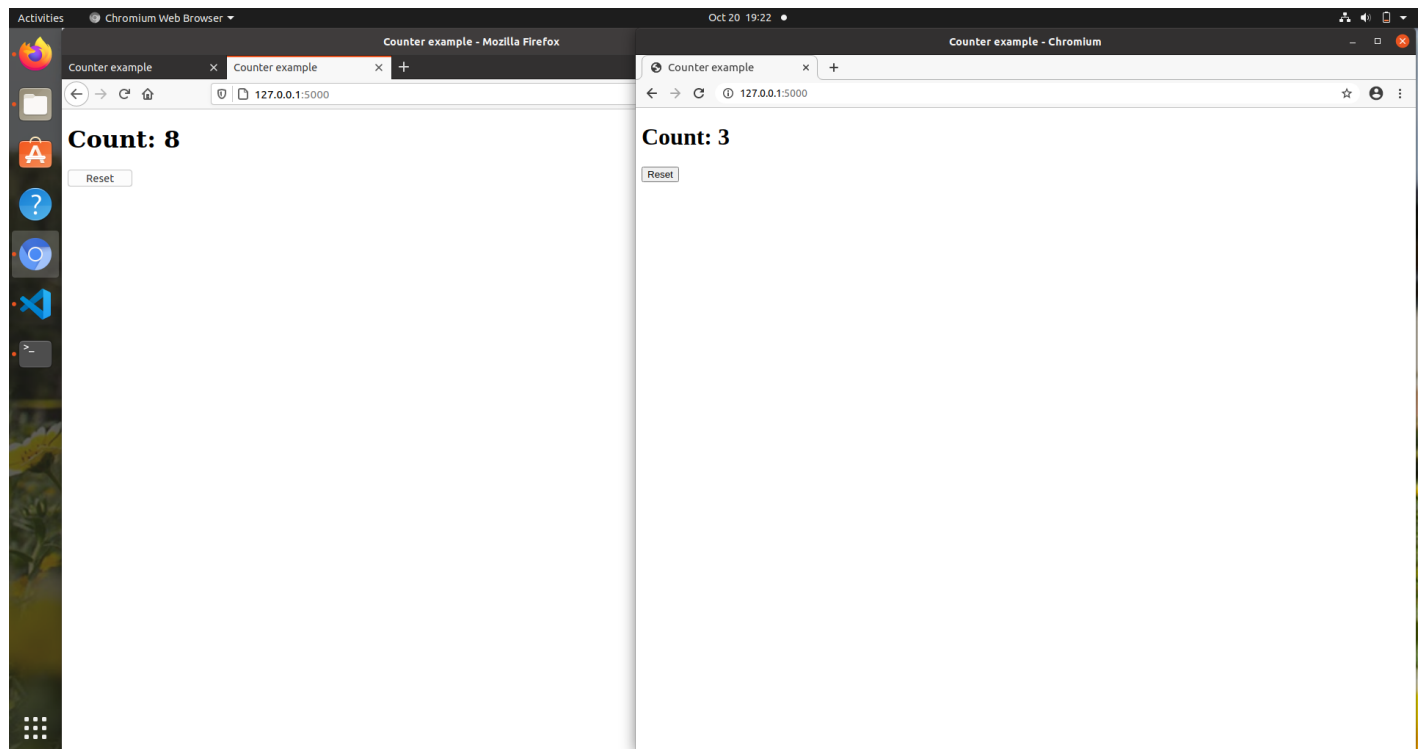
Flask will load the counter page.



Notice the methods of `keyValueSessionStore` have not yet been implemented.

Question 8

Flask will use now store sessions into a key-value store.



But, notice that the two browsers do not share the same count variable.

Question 9

Here are viewing the `Set-Cookies: response header`

Counter example - Chromium

Counter example x +

← → ↻ ⓘ 127.0.0.1:5000

Count: 2

Reset

Elements Console Sources Network Performance Memory Application >>

Filter Hide data URLs All XHR JS CSS Img Media Font Doc WS Manifest Other

Has blocked cookies Blocked Requests

50 ms 100 ms 150 ms 200 ms 250 ms 300 ms

Name Headers Preview Response Initiator Timing Cookies

127.0.0.1

General

Request URL: http://127.0.0.1:5000/
Request Method: GET
Status Code: 200 OK
Remote Address: 127.0.0.1:5000
Referrer Policy: no-referrer-when-downgrade

Response Headers view source

Content-Length: 262
Content-Type: text/html; charset=utf-8
Date: Wed, 21 Oct 2020 03:06:29 GMT
Server: Werkzeug/1.0.1 Python/3.8.2
Set-Cookie: session=29f71736-f2c6-458a-9cfb-c74db053b443; HttpOnly; Path=/

Request Headers view source

Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.9
Accept-Encoding: gzip, deflate, br
Accept-Language: en-US,en;q=0.9
Cache-Control: max-age=0
Connection: keep-alive
Cookie: session=29f71736-f2c6-458a-9cfb-c74db053b443
Host: 127.0.0.1:5000
Referer: http://127.0.0.1:5000/
Sec-Fetch-Dest: document
Sec-Fetch-Mode: navigate
Sec-Fetch-Site: same-origin
Sec-Fetch-User: ?1
Upgrade-Insecure-Requests: 1
User-Agent: Mozilla/5.0 (X11; Linux x86_64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/86.0.4240.75 Safari/537.36

1 requests | 492 B transferred

Notice that it `Set-Cookies` does not change each time the page is refreshed.

The screenshot shows a web browser window titled "Counter example - Chromium". The address bar shows the URL "127.0.0.1:5000". The page content displays "Count: 3" and a "Reset" button. The Network tab is open, showing a single request to "127.0.0.1". The request details are as follows:

Name	Headers	Preview	Response	Initiator	Timing	Cookies
127.0.0.1	<p>General</p> <p>Request URL: http://127.0.0.1:5000/ Request Method: GET Status Code: 200 OK Remote Address: 127.0.0.1:5000 Referrer Policy: no-referrer-when-downgrade</p> <p>Response Headers view source</p> <p>Content-Length: 262 Content-Type: text/html; charset=utf-8 Date: Wed, 21 Oct 2020 03:09:55 GMT Server: Werkzeug/1.0.1 Python/3.8.2 Set-Cookie: session=29f71736-f2c6-458a-9cfb-c74db053b443; HttpOnly; Path=/</p> <p>Request Headers view source</p> <p>Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.9 Accept-Encoding: gzip, deflate, br Accept-Language: en-US,en;q=0.9 Cache-Control: max-age=0 Connection: keep-alive Cookie: session=29f71736-f2c6-458a-9cfb-c74db053b443 Host: 127.0.0.1:5000 Referer: http://127.0.0.1:5000/ Sec-Fetch-Dest: document Sec-Fetch-Mode: navigate Sec-Fetch-Site: same-origin Sec-Fetch-User: ?1 Upgrade-Insecure-Requests: 1 User-Agent: Mozilla/5.0 (X11; Linux x86_64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/86.0.4240.75 Safari/537.36</p>					

At the bottom of the Network tab, it shows "1 requests" and "492 B transferred".

Question 10

Here are going to Click the Reset Button, notice that the POST request clears the session cookie.

Counter example - Chromium

Counter example 127.0.0.1:5000

Count: 1

Reset

Network

Filter: Hide data URLs All XHR JS CSS Img Media Font Doc WS Manifest Other

Has blocked cookies Blocked Requests

20 ms 40 ms 60 ms 80 ms 100 ms 120 ms 140 ms 160 ms

Name reset 127.0.0.1

Headers

General

Request URL: http://127.0.0.1:5000/reset

Request Method: POST

Status Code: 302 FOUND

Remote Address: 127.0.0.1:5000

Referrer Policy: no-referrer-when-downgrade

Response Headers

Content-Length: 209

Content-Type: text/html; charset=utf-8

Date: Wed, 21 Oct 2020 03:12:28 GMT

Location: http://127.0.0.1:5000/

Server: Werkzeug/1.0.1 Python/3.8.2

Set-Cookie: session=; Expires=Thu, 01-Jan-1970 00:00:00 GMT; Max-Age=0; Path=/

Request Headers

Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.9

Accept-Encoding: gzip, deflate, br

Accept-Language: en-US,en;q=0.9

Cache-Control: max-age=0

Connection: keep-alive

Content-Length: 0

Content-Type: application/x-www-form-urlencoded

Cookie: session=29f71736-f2c6-458a-9cfb-c74db053b443

Host: 127.0.0.1:5000

Origin: http://127.0.0.1:5000

Referer: http://127.0.0.1:5000/

Sec-Fetch-Dest: document

Sec-Fetch-Mode: navigate

Sec-Fetch-Site: same-origin

2 requests 763 B transferred

Then the subsequent GET request generates a new session id.

The screenshot shows a web browser window titled "Counter example - Chromium". The address bar shows the URL "127.0.0.1:5000". The page content displays "Count: 1" and a "Reset" button. The Network tab is open, showing a list of requests. The selected request is "127.0.0.1". The details for this request are shown on the right:

- General:**
 - Request URL: http://127.0.0.1:5000/
 - Request Method: GET
 - Status Code: 200 OK
 - Remote Address: 127.0.0.1:5000
 - Referrer Policy: no-referrer-when-downgrade
- Response Headers:**
 - Content-Length: 262
 - Content-Type: text/html; charset=utf-8
 - Date: Wed, 21 Oct 2020 03:12:28 GMT
 - Server: Werkzeug/1.0.1 Python/3.8.2
 - Set-Cookie: session=5b9ee1f8-f496-4f71-9bee-5ed41cd56083; HttpOnly; Path=/**
- Request Headers:**
 - Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.9
 - Accept-Encoding: gzip, deflate, br
 - Accept-Language: en-US,en;q=0.9
 - Cache-Control: max-age=0
 - Connection: keep-alive
 - Host: 127.0.0.1:5000
 - Referer: http://127.0.0.1:5000/
 - Sec-Fetch-Dest: document
 - Sec-Fetch-Mode: navigate
 - Sec-Fetch-Site: same-origin
 - Sec-Fetch-User: ?1
 - Upgrade-Insecure-Requests: 1
 - User-Agent: Mozilla/5.0 (X11; Linux x86_64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/86.0.4240.75 Safari/537.36

At the bottom of the Network tab, it shows "2 requests" and "763 B transferred".

Question 11

Then we are going to use our dump.py script to list the active sessions in the key-value store.

```
student@tuffix-vm: ~/Desktop/pr3/CPSC449-Project3
student@tuffix-vm:~/Desktop/pr3/CPSC449-Project3$ python3 dump.py http://127.0.0.1:5100/
{'651c81d4-e977-4964-84bd-3724471f6c27': {'count': 1}}
{'5b9ee1f8-f496-4f71-9bee-5ed41cd56083': {'count': 1}}
student@tuffix-vm:~/Desktop/pr3/CPSC449-Project3$
```