Project name: DS561-WYC-5304

Function name: hw3-ds561

Function URL: https://hw3-ds561-p3irxs2pcq-ue.a.run.app/<filename>.html

Github Repository Link: https://github.com/wyc-wyll/ds561-hw-wyc.git

Before Running both Apps, make sure:

1. Run the pip install shell command on the local machine to install google-cloud-pubsub

```
pip install --upgrade google-cloud-pubsub
```

2. Change the path into `HW3` subdirectory of the git repository

```
cd HW3
```

To request few hundreds of files:

1. Run the following command

```
python3 http-client.py -d hw3-ds561-p3irxs2pcq-ue.a.run.app -b
/hw3-ds561 -w none -n 100 -i 11000 -s -v -f
```

   where after `-n` is the number of requests and after `-i` is the max filename index

2. Result would be a series of http responses as either of the following:

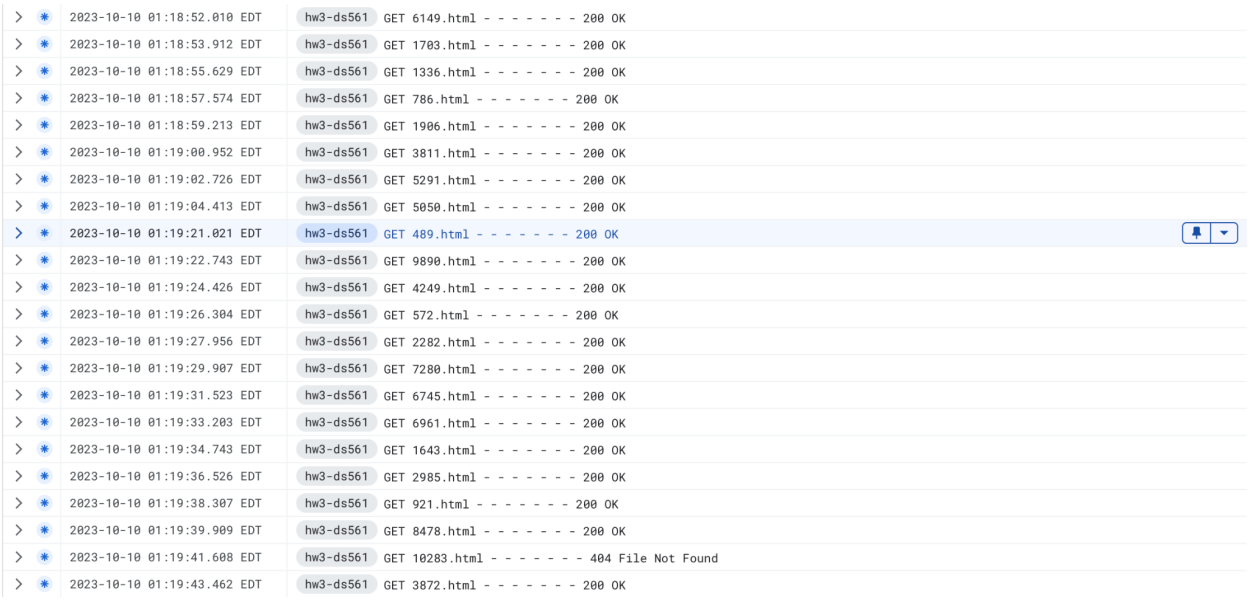
```
Requesting  /hw3-ds561/8478.html  from
hw3-ds561-p3irxs2pcq-ue.a.run.app 443
200 OK
content-type: text/html; charset=utf-8
X-Cloud-Trace-Context: f1a9c8bc4c57582f5690fcc91dc03b67
Date: Tue, 10 Oct 2023 05:19:39 GMT
Server: Google Frontend
Content-Length: 52994
Alt-Svc: h3=":443"; ma=2592000,h3-29=":443"; ma=2592000


b'<!DOCTYPE html>\n<html>\n<body>\nLorem ipsum dolor sit amet,
consectetur adipiscing elit, sed do eiusmod tempor incididunt ut
labore et dolore magna aliqua. Ut enim ad\nminim veniam, quis nostrud
exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat.
Duis aute irure dolor in reprehenderit in voluptate velit
esse\ncillum dolore eu fugiat nulla pariatur.
.(html content)
.(html content)
.(html content)
.(html content)
.(html content)
\n<a HREF="4221.html"> This is a link </a>\n<p>\nLorem ipsum dolor
sit amet, consectetur adipiscing elit, sed do eiusmod tempor
incididunt ut labore et dolore magna aliqua. Ut enim ad\nminim
veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex
ea commodo consequat. Duis aute irure dolor in reprehenderit in
voluptate velit esse\ncillum dolore eu fugiat nulla pariatur.
Excepteur sint occaecat cupidatat non proident, sunt in culpa qui
officia deserunt mollit anim id est laborum.\n<p>\n<a
HREF="6937.html"> This is a link </a>\n<p>\n</body>\n</html>\n'
```

   Above is a successful file retrieval since the file is found in the google cloud storage bucket

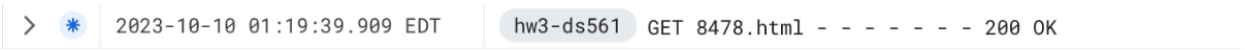
```
Requesting  /hw3-ds561/10283.html  from
hw3-ds561-p3irxs2pcq-ue.a.run.app 443
404 Not Found
content-type: text/html; charset=utf-8
X-Cloud-Trace-Context: 4f9e850110ee692911f9d2869d99695a;o=1
Date: Tue, 10 Oct 2023 05:19:41 GMT
Server: Google Frontend
Content-Length: 14
Alt-Svc: h3=":443"; ma=2592000,h3-29=":443"; ma=2592000
```

Above is a failed file retrieval since the file is not found in the google cloud storage bucket

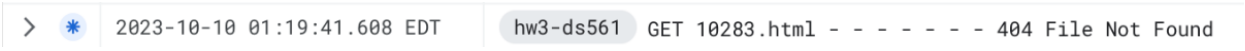
While the hundreds of requests are being made, cloud logging occurs as following:



For any successful file retrieval, http result would be `200 OK`.



For any failed file retrieval due to not found, http result would be `404 File Not Found`.



Using Curl:

1. To test the function using curl, run the following:

```
curl https://hw3-ds561-p3irxs2pcq-ue.a.run.app/<filename>.html -X
<METHOD> -v
```

2. Testing GET method

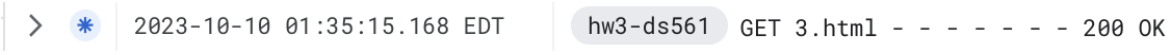
```
curl https://hw3-ds561-p3irxs2pcq-ue.a.run.app/3.html -X GET -v
```

Result:

```
Note: Unnecessary use of -X or --request, GET is already inferred.
*   Trying 216.239.38.53:443...
* Connected to hw3-ds561-p3irxs2pcq-ue.a.run.app (216.239.38.53) port
443 (#0)
* ALPN: offers h2,http/1.1
* (304) (OUT), TLS handshake, Client hello (1):
*  CAfile: /etc/ssl/cert.pem
*  CApath: none
* (304) (IN), TLS handshake, Server hello (2):
* (304) (IN), TLS handshake, Unknown (8):
* (304) (IN), TLS handshake, Certificate (11):
* (304) (IN), TLS handshake, CERT verify (15):
* (304) (IN), TLS handshake, Finished (20):
* (304) (OUT), TLS handshake, Finished (20):
* SSL connection using TLSv1.3 / AEAD-CHACHA20-POLY1305-SHA256
* ALPN: server accepted h2
* Server certificate:
*  subject: CN=*.a.run.app
*  start date: Sep 18 08:19:02 2023 GMT
*  expire date: Dec 11 08:19:01 2023 GMT
*  subjectAltName: host "hw3-ds561-p3irxs2pcq-ue.a.run.app" matched
cert's "*.a.run.app"
*  issuer: C=US; O=Google Trust Services LLC; CN=GTS CA 1C3
*  SSL certificate verify ok.
* using HTTP/2
* h2 [:method: GET]
* h2 [:scheme: https]
* h2 [:authority: hw3-ds561-p3irxs2pcq-ue.a.run.app]
* h2 [:path: /3.html]
```

```
* h2 [user-agent: curl/8.1.2]
* h2 [accept: */*]
* Using Stream ID: 1 (easy handle 0x15c80a800)
> GET /3.html HTTP/2
> Host: hw3-ds561-p3irxs2pcq-ue.a.run.app
> User-Agent: curl/8.1.2
> Accept: */*
>
< HTTP/2 200
< content-type: text/html; charset=utf-8
< x-cloud-trace-context: 6b17c3a8ad13454257e997731134a5cb;o=1
< date: Tue, 10 Oct 2023 05:37:16 GMT
< server: Google Frontend
< content-length: 4501
< alt-svc: h3=":443"; ma=2592000,h3-29=":443"; ma=2592000
<
<!DOCTYPE html>
<html>
<body>
- - - - - - - - - - - - - - Content - - - - - - - - - - - - - -
</body>
</html>
```

A Cloud Logging entry would be made:



3. Testing POST method

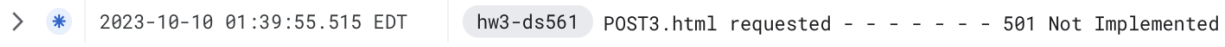
```
curl https://hw3-ds561-p3irxs2pcq-ue.a.run.app/3.html -X POST -v
```

Result:

```
*   Trying 216.239.38.53:443...
* Connected to hw3-ds561-p3irxs2pcq-ue.a.run.app (216.239.38.53) port
443 (#0)
* ALPN: offers h2,http/1.1
* (304) (OUT), TLS handshake, Client hello (1):
*  CAfile: /etc/ssl/cert.pem
*  CApath: none
```

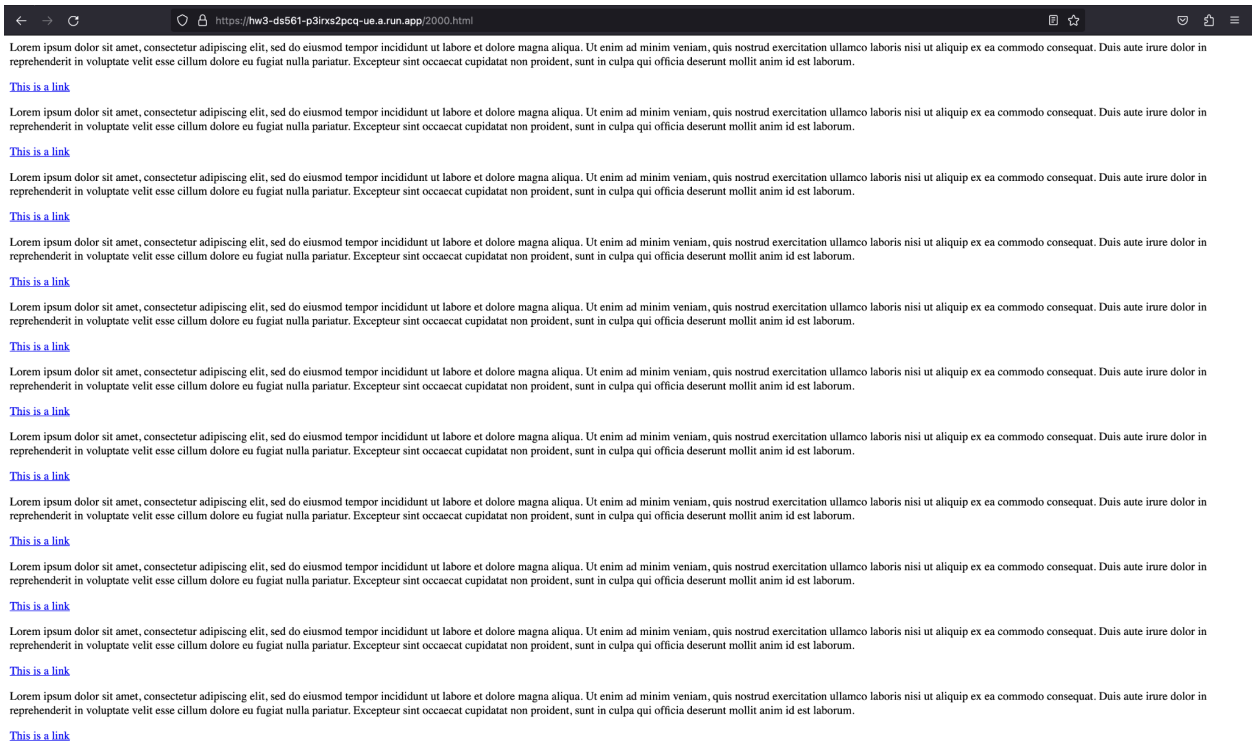
```
* (304) (IN), TLS handshake, Server hello (2):
* (304) (IN), TLS handshake, Unknown (8):
* (304) (IN), TLS handshake, Certificate (11):
* (304) (IN), TLS handshake, CERT verify (15):
* (304) (IN), TLS handshake, Finished (20):
* (304) (OUT), TLS handshake, Finished (20):
* SSL connection using TLSv1.3 / AEAD-CHACHA20-POLY1305-SHA256
* ALPN: server accepted h2
* Server certificate:
*  subject: CN=*.a.run.app
*  start date: Sep 18 08:19:02 2023 GMT
*  expire date: Dec 11 08:19:01 2023 GMT
*  subjectAltName: host "hw3-ds561-p3irxs2pcq-ue.a.run.app" matched
cert's "*.a.run.app"
*  issuer: C=US; O=Google Trust Services LLC; CN=GTS CA 1C3
*  SSL certificate verify ok.
* using HTTP/2
* h2 [:method: POST]
* h2 [:scheme: https]
* h2 [:authority: hw3-ds561-p3irxs2pcq-ue.a.run.app]
* h2 [:path: /3.html]
* h2 [user-agent: curl/8.1.2]
* h2 [accept: */*]
* Using Stream ID: 1 (easy handle 0x13180a800)
> POST /3.html HTTP/2
> Host: hw3-ds561-p3irxs2pcq-ue.a.run.app
> User-Agent: curl/8.1.2
> Accept: */*
>
< HTTP/2 501
< content-type: text/html; charset=utf-8
< x-cloud-trace-context: 0b17a123cd461d56f78f98c9e4c77d5c;o=1
< date: Tue, 10 Oct 2023 05:39:55 GMT
< server: Google Frontend
< content-length: 15
< alt-svc: h3=":443"; ma=2592000,h3-29=":443"; ma=2592000
<
* Connection #0 to host hw3-ds561-p3irxs2pcq-ue.a.run.app left intact
Not Implemented%
```

A Cloud Logging entry would be made:

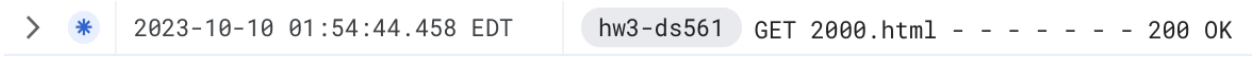


Testing with Browser:

1. `200 OK` Request
   Example URL used: https://hw3-ds561-p3irxs2pcq-ue.a.run.app/2000.html
   Result:

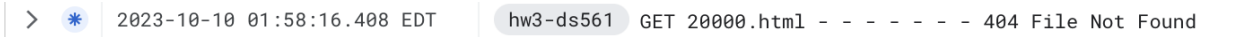


   Cloud Logging:

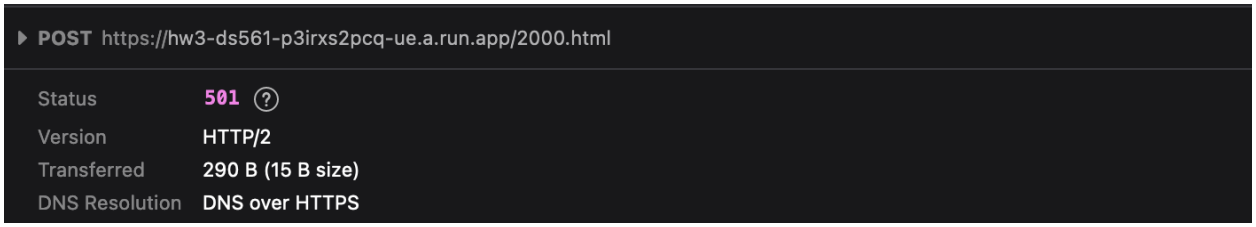


2. `404 File Not Found` Request
   Example URL used: https://hw3-ds561-p3irxs2pcq-ue.a.run.app/20000.html
   Result:

   Cloud Logging:



3. `501 Not Implemented` Request
   Example URL used: https://hw3-ds561-p3irxs2pcq-ue.a.run.app/2000.html
   Method: FireFox Web Developer Tool Network
   Result:



   Cloud Logging: