Online Jukebox

DOS Attack using Selenium WebDriver + Python Web Server + Cron Job

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Introduction - Selenium

Selenium is an open-source set of tools for testing web applications to operate across different browsers and operating systems.

Selenium Integrated Development Environment (IDE)
A Firefox plugin that lets testers to record their actions as they follow the workflow that they need to test.
Selenium Remote Control (RC)
The flagship testing framework that allowed more than simple browser actions and linear execution.
It makes use of the full power of programming languages such as Java, C#, PHP, Python, Ruby and PERL to create more complex tests.
Selenium WebDriver
The successor to Selenium RC which sends commands directly to the browser and retrieves results.
Selenium Grid
A tool used to run parallel tests across different machines and different browsers simultaneously which results in minimized execution time.

Advantages of Selenium

- Selenium is an open-source tool.
- Can be extended for various technologies that expose DOM.
- Has capabilities to execute scripts across different browsers.
- Can execute scripts on various operating systems.
- Supports mobile devices.
- Executes tests within the browser, so focus is NOT required while script execution is in progress.
- Can execute tests in parallel with the use of Selenium Grids.

Problem Statement

Project Description:
Online Jukebox + DOS attack using Selenium JUnit/WebDriver + Python Web Server + Cron Job

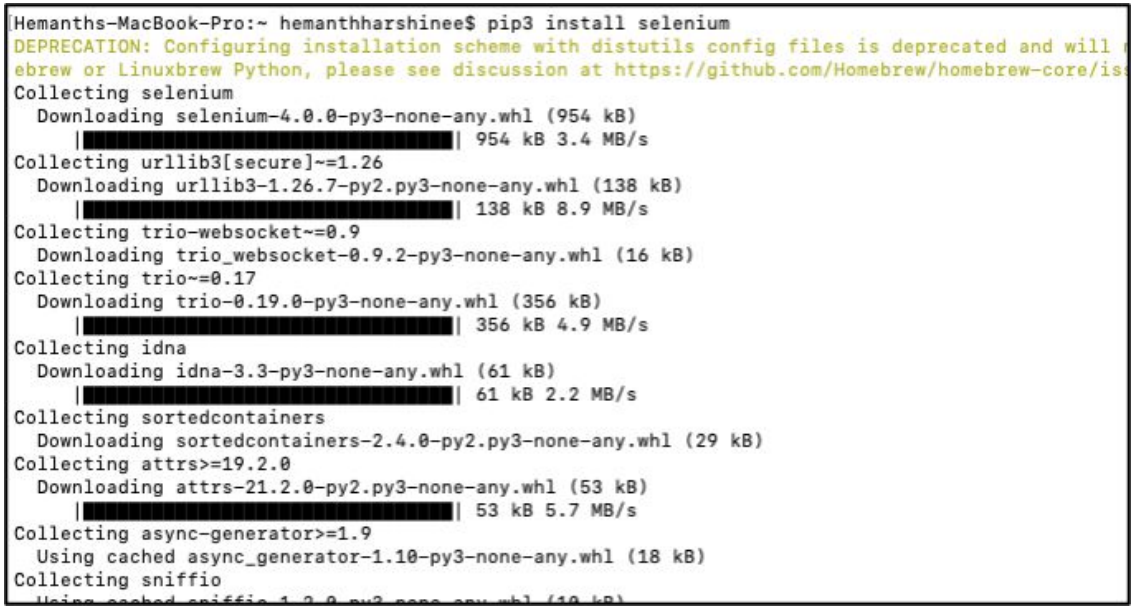
Process:

- Continue the previous Online Jukebox + DOS attack using Selenium IDE + Python Web Server task
- Replace the "DOS attack using Selenium IDE" with "DOS attack using Selenium WebDriver".
- The DOS attack should be done on a command line using Cron Job

Environment Setup

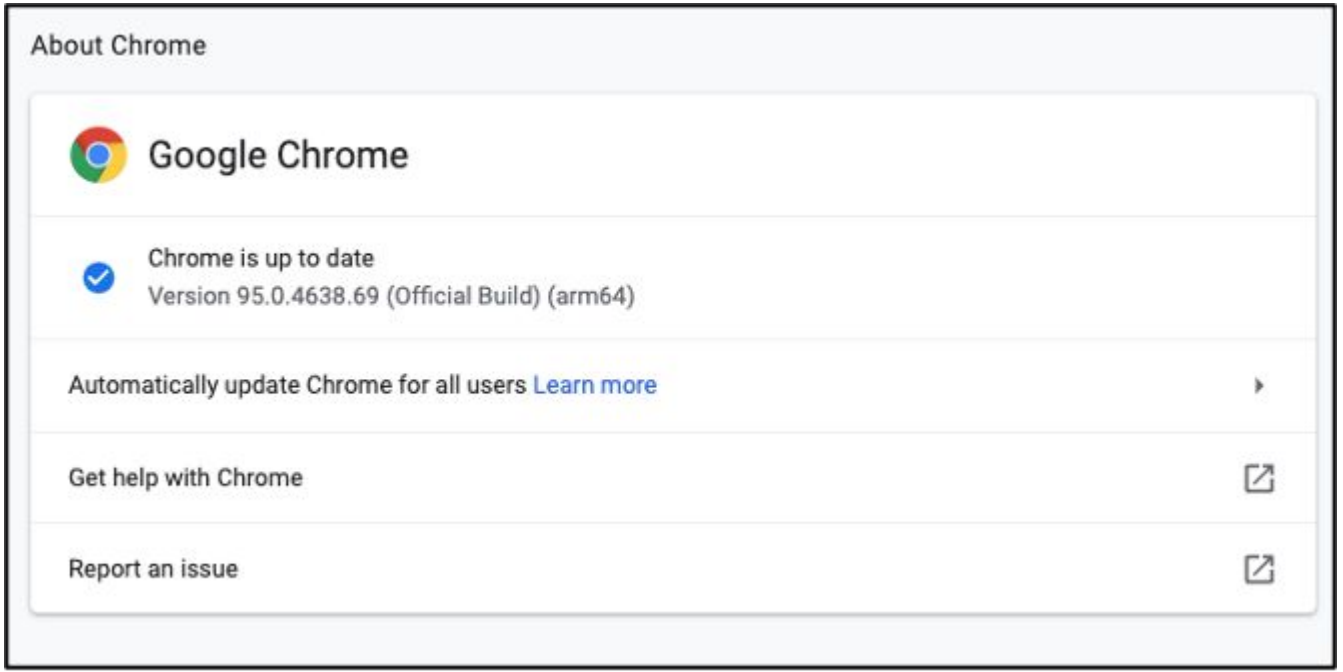
Step 1: Install selenium

Command: pip3 install selenium



Environment Setup

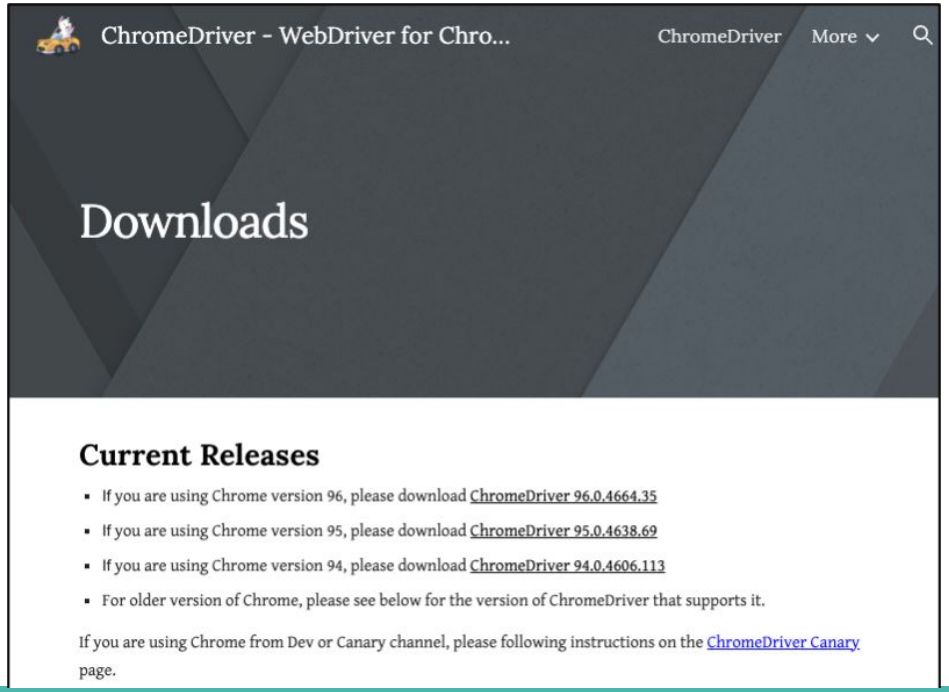
Step 2: Check the Google Chrome version – Click on 3 dots of the right side of the webpage and click on Help



Environment Setup

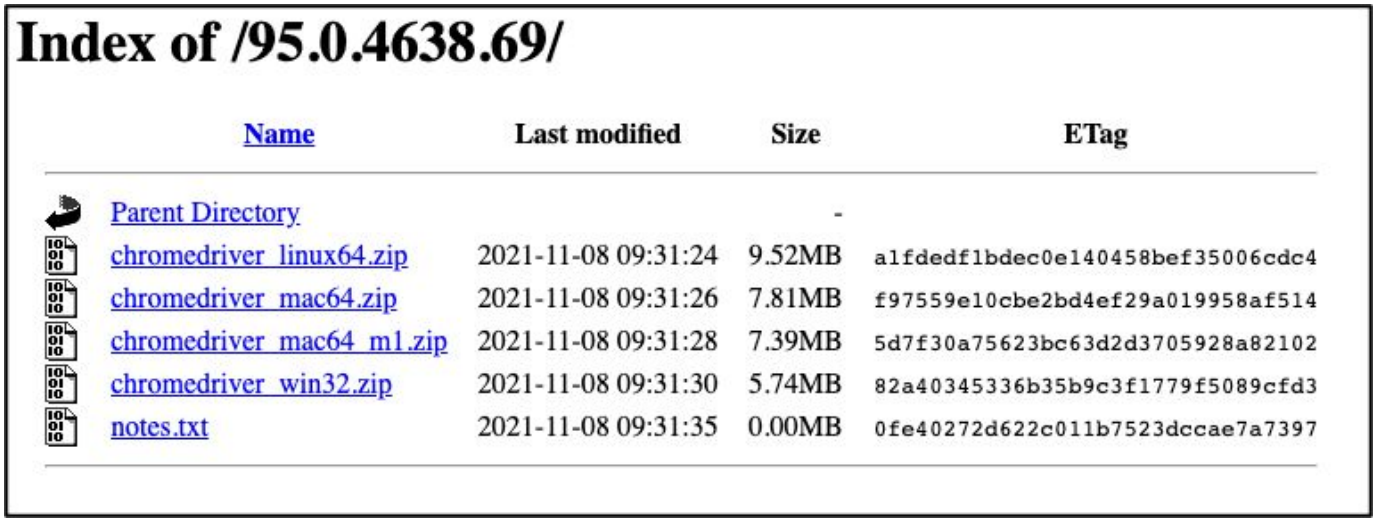
Step 3: Download the chrome driver

Go the website https://chromedriver.chromium.org/downloads and download the chrome driver corresponding to the Chrome version above.



Environment Setup

Download the zip file according to the OS you use. Chrome driver will be installed. Place it in the project folder you are working.



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Name	Last modified	Size	ETag
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chromedriver_linux64.zip	2021-11-08 09:31:24	9.52MB	a1fdedf1bdec0e140458bef35006cdc4
chromedriver_mac64.zip	2021-11-08 09:31:26	7.81MB	f97559e10cbe2bd4ef29a019958af514
chromedriver_mac64_m1.zip	2021-11-08 09:31:28	7.39MB	5d7f30a75623bc63d2d3705928a82102
chromedriver_win32.zip	2021-11-08 09:31:30	5.74MB	82a40345336b35b9c3f1779f5089cfd3
notes.txt	2021-11-08 09:31:35	0.00MB	0fe40272d622c011b7523dccae7a7397

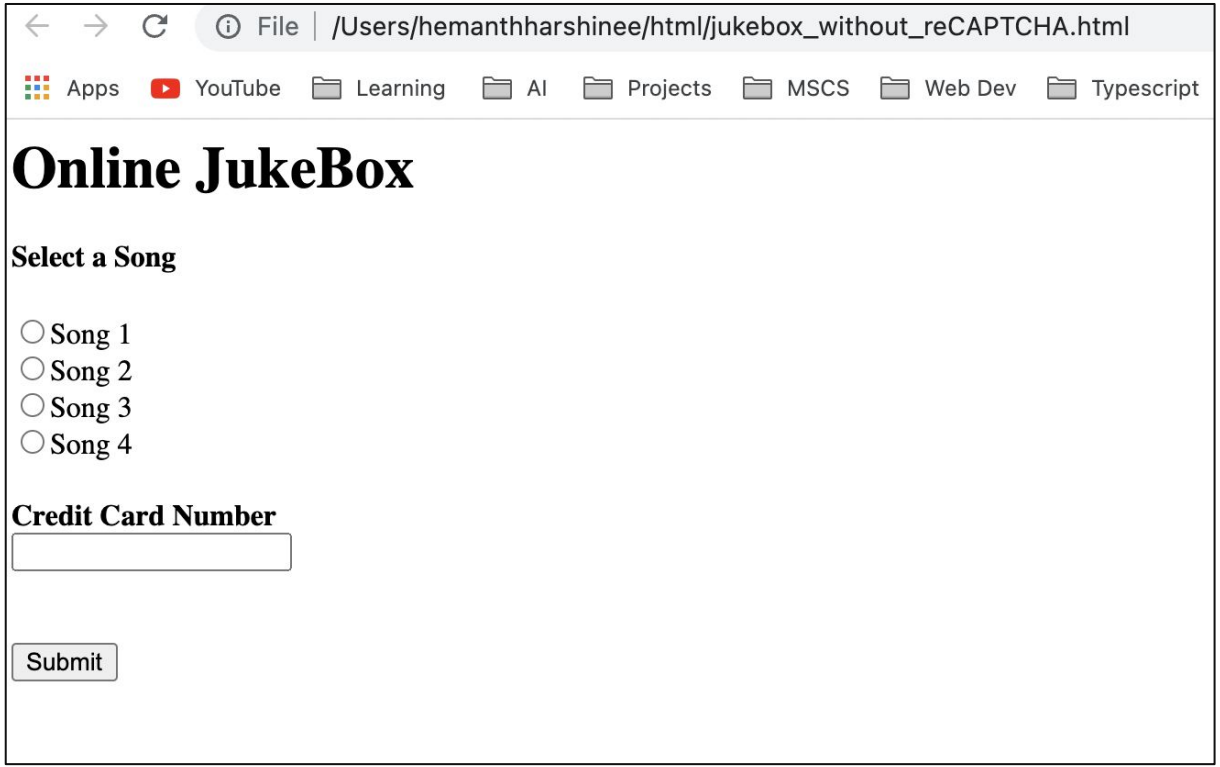
Design - Code - Online Jukebox

Welcome Guide | SeleniumWebdriveDOS.py | jukebox_without_reCAPTCHA.html

```
<html>
  <head>
    <title>JukeBox Form without reCAPTCHA</title>
    <h1>
        Online JukeBox
    </h1>
  </head>
  <body>
    <form name="select" action="/cgi-bin/without_reCAPTCHA.py" method="get">
        <h4>
            Select a Song
        </h4>
    <input type="radio" name="song" value="Song_1">Song 1</a>
    <br>
    <input type="radio" name="song" value="Song_2">Song 2</a>
    <br>
    <input type="radio" name="song" value="Song_3">Song 3</a>
    <br>
    <input type="radio" name="song" value="Song_4">Song 4</a>

    <h4>
    Credit Card Number
    <br><input type="text" name="cc_number">
    <h4>
      <br/>
      <input type="submit" value="Submit">
    </form>
  </body>
</html>
```

Design - Online Jukebox



Design - Code - without_reCAPTACHA.py

Welcome Guide | SeleniumWebdriveDOS.py | jukebox_without_reCAP

```
#!/Users/hemanthharshinee/opt/anaconda3/bin/python3

import cgi, cgitb
import pymysql.cursors

cgitb.enable()
form = cgi.FieldStorage()

song_placeholder = form.getvalue('song')
cc_number_placeholder = form.getvalue('cc_number')

print('Content-type:text/html\r\n\r\n')
print('<html>')
print('<head>')
print('<title>JukeBox Transaction</title>')
print('</head>')
print('<body>')
print('Song you select: %s' % (song_placeholder))
print('<br>')
print('Credit card Number is: %s' % (cc_number_placeholder))
print('</body>')
print('</html>')

connection = pymysql.connect(host='localhost',
                             user='root',
                             password='Redhawk@205',
                             database='JUKEBOX',
                             cursorclass=pymysql.cursors.DictCursor)

with connection:
    with connection.cursor() as cursor:
```

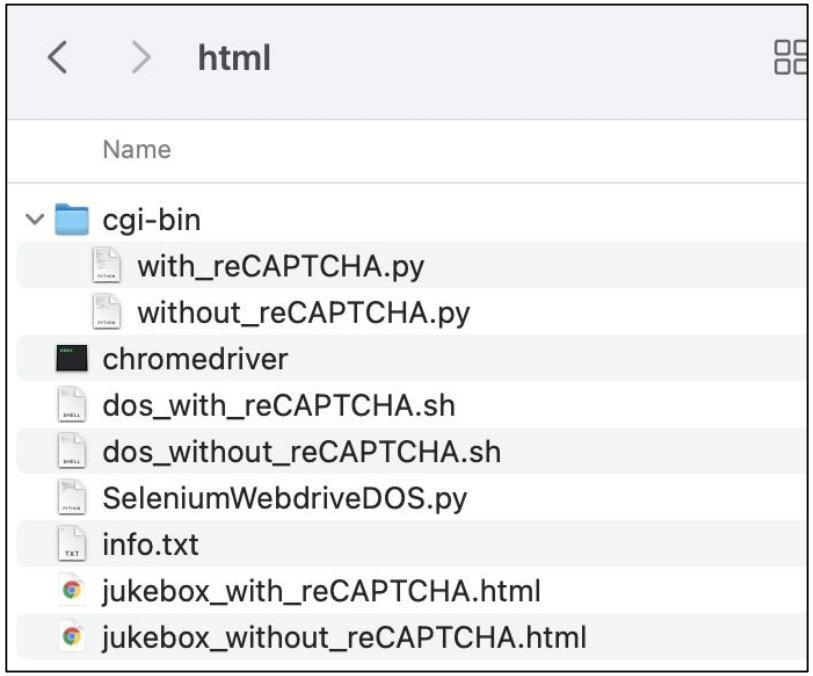
Design - Code - SeleniumWebdriveDOS.py

```python
import unittest
from selenium import webdriver
from selenium.webdriver.common.keys import Keys
from selenium.webdriver.chrome.service import Service
from selenium.webdriver.common.by import By

class ChromeSearch(unittest.TestCase):
    def setUp(self):
        s = Service('/Users/hemanthharshinee/Downloads/chromedriver')
        self.driver = webdriver.Chrome(service=s)
    def test_search_in_python_org(self):
        for i in range(10): #Simulate a DOS attack to run 10 times
            driver = self.driver
            driver.get("http://localhost:8000/jukebox_without_reCAPTCHA.html") #the website to be attacked
            driver.find_element(By.XPATH,'/html/body/form/input[3]').click()
            driver.find_element(By.XPATH,'/html/body/form/h4[2]/input').send_keys("ATTACK")
            driver.find_element(By.XPATH,"/html/body/form/h4[3]/input").submit()
            driver.back()
            i+=1
        print("Simulated DOS attack has been completed...")

    def tearDown(self):
        self.driver.close()
if __name__ == "__main__":
    unittest.main()
```

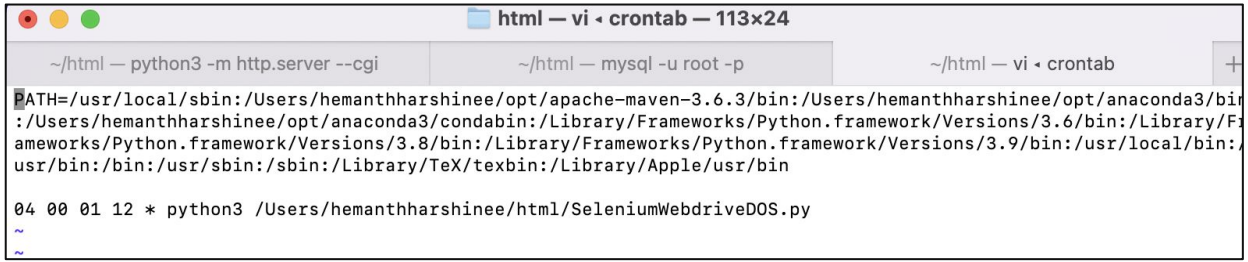
Design - Code - All the required files.



Implementation

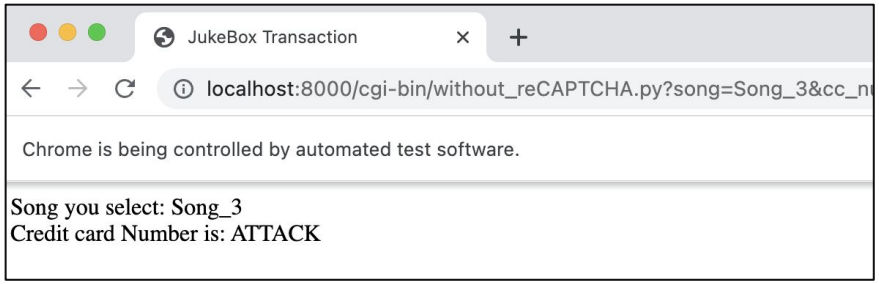
Make sure the Python Web server is running
Command: python3 -m http.server --cgi

Schedule a **Cron job** to perform DOS Attack



Implementation

During Attack



Result on Command Line

```
(base) hemanthharshinee@Hemanths-MacBook-Pro ~ % cd html
(base) hemanthharshinee@Hemanths-MacBook-Pro html % python3 -m http.server --cgi
Serving HTTP on :: port 8000 (http://[::]:8000/) ...
::1 - - [30/Nov/2021 23:58:39] "GET / HTTP/1.1" 200 -
::1 - - [30/Nov/2021 23:58:40] code 403, message CGI script is not a plain file ('/cgi-bin/')
::1 - - [30/Nov/2021 23:58:40] "GET /cgi-bin/ HTTP/1.1" 403 -
::1 - - [30/Nov/2021 23:58:56] "GET /cgi-bin/without_reCAPTCHA.py?song=Song_3&cc_number=1212 HTTP/1.1" 200 -
::1 - - [30/Nov/2021 23:59:06] "GET /cgi-bin/without_reCAPTCHA.py?song=Song_1&cc_number=10000000 HTTP/1.1" 200 -
::1 - - [01/Dec/2021 00:04:07] "GET /jukebox_without_reCAPTCHA.html HTTP/1.1" 200 -
::1 - - [01/Dec/2021 00:04:08] code 404, message File not found
::1 - - [01/Dec/2021 00:04:08] "GET /favicon.ico HTTP/1.1" 404 -
::1 - - [01/Dec/2021 00:04:09] "GET /cgi-bin/without_reCAPTCHA.py?song=Song_3&cc_number=ATTACK HTTP/1.1" 200 -
::1 - - [01/Dec/2021 00:04:09] "GET /jukebox_without_reCAPTCHA.html HTTP/1.1" 304 -
::1 - - [01/Dec/2021 00:04:09] "GET /cgi-bin/without_reCAPTCHA.py?song=Song_3&cc_number=ATTACK HTTP/1.1" 200 -
::1 - - [01/Dec/2021 00:04:10] "GET /jukebox_without_reCAPTCHA.html HTTP/1.1" 304 -
::1 - - [01/Dec/2021 00:04:10] "GET /cgi-bin/without_reCAPTCHA.py?song=Song_3&cc_number=ATTACK HTTP/1.1" 200 -
::1 - - [01/Dec/2021 00:04:10] "GET /jukebox_without_reCAPTCHA.html HTTP/1.1" 304 -
::1 - - [01/Dec/2021 00:04:10] "GET /cgi-bin/without_reCAPTCHA.py?song=Song_3&cc_number=ATTACK HTTP/1.1" 200 -
::1 - - [01/Dec/2021 00:04:11] "GET /jukebox_without_reCAPTCHA.html HTTP/1.1" 304 -
::1 - - [01/Dec/2021 00:04:11] "GET /cgi-bin/without_reCAPTCHA.py?song=Song_3&cc_number=ATTACK HTTP/1.1" 200 -
::1 - - [01/Dec/2021 00:04:11] "GET /jukebox_without_reCAPTCHA.html HTTP/1.1" 304 -
::1 - - [01/Dec/2021 00:04:12] "GET /cgi-bin/without_reCAPTCHA.py?song=Song_3&cc_number=ATTACK HTTP/1.1" 200 -
::1 - - [01/Dec/2021 00:04:12] "GET /jukebox_without_reCAPTCHA.html HTTP/1.1" 304 -
::1 - - [01/Dec/2021 00:04:12] "GET /cgi-bin/without_reCAPTCHA.py?song=Song_3&cc_number=ATTACK HTTP/1.1" 200 -
::1 - - [01/Dec/2021 00:04:12] "GET /jukebox_without_reCAPTCHA.html HTTP/1.1" 304 -
::1 - - [01/Dec/2021 00:04:13] "GET /cgi-bin/without_reCAPTCHA.py?song=Song_3&cc_number=ATTACK HTTP/1.1" 200 -
::1 - - [01/Dec/2021 00:04:13] "GET /jukebox_without_reCAPTCHA.html HTTP/1.1" 304 -
::1 - - [01/Dec/2021 00:04:13] "GET /cgi-bin/without_reCAPTCHA.py?song=Song_3&cc_number=ATTACK HTTP/1.1" 200 -
::1 - - [01/Dec/2021 00:04:14] "GET /jukebox_without_reCAPTCHA.html HTTP/1.1" 304 -
::1 - - [01/Dec/2021 00:04:14] "GET /cgi-bin/without_reCAPTCHA.py?song=Song_3&cc_number=ATTACK HTTP/1.1" 200 -
::1 - - [01/Dec/2021 00:14:07] "GET /jukebox_without_reCAPTCHA.html HTTP/1.1" 200 -
```

Implementation

Result in Crontab

```
Received: by Hemanths-MacBook-Pro.local (Postfix, from userid 501)
        id E76F1594CAA8; Wed,  1 Dec 2021 00:04:14 -0800 (PST)
From: hemanthharshinee@Hemanths-MacBook-Pro.local (Cron Daemon)
To: hemanthharshinee@Hemanths-MacBook-Pro.local
Subject: Cron <hemanthharshinee@Hemanths-MacBook-Pro> python3 /Users/hemanthharshinee/html/
SeleniumWebdriveDOS.py
X-Cron-Env: <PATH=/usr/local/sbin:/Users/hemanthharshinee/opt/apache-maven-3.6.3/bin:/Users/
hemanthharshinee/opt/anaconda3/bin:/Users/hemanthharshinee/opt/anaconda3/condabin:/Library/
Frameworks/Python.framework/Versions/3.6/bin:/Library/Frameworks/Python.framework/Versions/3.8/bin:/
Library/Frameworks/Python.framework/Versions/3.9/bin:/usr/local/bin:/usr/bin:/bin:/usr/sbin:/sbin:/
Library/TeX/texbin:/Library/Apple/usr/bin>
X-Cron-Env: <SHELL=/bin/sh>
X-Cron-Env: <LOGNAME=hemanthharshinee>
X-Cron-Env: <USER=hemanthharshinee>
Message-Id: <20211201080414.E76F1594CAA8@Hemanths-MacBook-Pro.local>
Date: Wed,  1 Dec 2021 00:04:14 -0800 (PST)

./Users/hemanthharshinee/opt/anaconda3/lib/python3.8/unittest/suite.py:84: ResourceWarning: unclosed
<socket.socket fd=7, family=AddressFamily.AF_INET6, type=SocketKind.SOCK_STREAM, proto=6,
laddr=('::1', 49441, 0, 0), raddr=('::1', 49437, 0, 0)>
  return self.run(*args, **kwds)
ResourceWarning: Enable tracemalloc to get the object allocation traceback

----------------------------------------------------------------------
Ran 1 test in 13.440s

OK
Simulated DOS attack has been completed...
```

Implementation

Database before and after attack

```
MySQL [jukebox]> select * from transaction;
+--------+-----------+
| song   | cc_number |
+--------+-----------+
| Song_1 | 121212    |
| Song_1 | 121212    |
| Song_1 | 121212    |
| Song_1 | 121212    |
| Song_1 | 121212    |
| Song_1 | 121212    |
| Song_1 | 121212    |
| Song_1 | 121212    |
| Song_1 | 121212    |
| Song_1 | 121212    |
| Song_1 | 1111      |
| Song_1 | 1111      |
| Song_1 | 1111      |
| Song_1 | 1111      |
| Song_1 | 1111      |
| Song_1 | 1111      |
| Song_1 | 1111      |
| Song_1 | 1111      |
| Song_1 | 1111      |
| Song_1 | 1111      |
| Song_1 | 121212    |
| Song_1 | 121212    |
| Song_1 | 121212    |
| Song_1 | 121212    |
| Song_3 | 1212      |
| Song_1 | 10000000  |
+--------+-----------+
27 rows in set (0.000 sec)
```

```
MySQL [jukebox]> select * from transaction;
+--------+-----------+
| song   | cc_number |
+--------+-----------+
| Song_1 | 121212    |
| Song_1 | 121212    |
| Song_1 | 121212    |
| Song_1 | 121212    |
| Song_1 | 121212    |
| Song_1 | 121212    |
| Song_1 | 121212    |
| Song_1 | 121212    |
| Song_1 | 121212    |
| Song_1 | 121212    |
| Song_1 | 1111      |
| Song_1 | 1111      |
| Song_1 | 1111      |
| Song_1 | 1111      |
| Song_1 | 1111      |
| Song_1 | 1111      |
| Song_1 | 1111      |
| Song_1 | 1111      |
| Song_1 | 1111      |
| Song_1 | 1111      |
| Song_1 | 121212    |
| Song_1 | 121212    |
| Song_1 | 121212    |
| Song_1 | 121212    |
| Song_3 | 1212      |
| Song_1 | 10000000  |
| Song_3 | ATTACK    |
| Song_3 | ATTACK    |
| Song_3 | ATTACK    |
| Song_3 | ATTACK    |
| Song_3 | ATTACK    |
| Song_3 | ATTACK    |
| Song_3 | ATTACK    |
| Song_3 | ATTACK    |
| Song_3 | ATTACK    |
| Song_3 | ATTACK    |
+--------+-----------+
37 rows in set (0.001 sec)
```

Conclusion

DOS Attack was successfully done using Selenium Web driver using Cronjob.

Bibliography

https://npu85.npu.edu/~henry/npu/classes/qa/selenium_tutorialspoint/slide/exercise_tutorialspoint.html

Link to view the presentation

https://docs.google.com/presentation/d/1_LvN1M7nzJBqrw2A1nvCU7vuxfIP6GI6JDoB3KDSZP0/edit?usp=sharing