Day-Month

2019

Table of Contents

Student Names (Student IDs)

Teacher Name:

HIGHER COLLEGES OF TECHNOLOGY

1. Introduction:

Write a paragraph (less than 100 words) to describe what is project all about

1.1.Objectives if Projects

Write a paragraph/list (100-150 words) to describe the Objective of the project

1.2.Deliverables

Write a paragraph/list (100-150 words) to describe What are the deliverables of the project.

2. Design a scraper to scrape information from a website

Web scraping is a simple means of collecting data from different websites. It allows the Users to collect and manage data as per their requirements. It has wide applications in domains such as price monitoring and collecting huge datasets for various machine learning tasks.

In this component of the project, a Python based scraping tool Scrapy is used to scrape information from the first page of Amazon website's search on earphones. The information extracted includes product name, the link to the product image and the ratings of the product. The output is displayed on the terminal along with being stored in a JSON file.

2.1.Coding a scraper

The code for the **website_spider.py** of the scraper along with it’s **items.py** is as follows:

website_spider.py

```
import scrapy
import csv
from ..items import WebsitescraperItem

class WebsiteSpiderSpider(scrapy.Spider):
    name = 'website_spider'
                                                              start_urls            =
['https://www.amazon.in/s?k=earphones+with+mic&i=electronics&rh=p_72%3A131
8476031&dc&crid=2N58U5A6XCGT2&qid=1586958396&rnid=1318475031&spre
fix=ear%2Celectronics%2C355&ref=sr_nr_p_72_1']

    def parse(self, response):
            product = WebsitescraperItem()


                                                                  product_name      =
response.css('.a-color-base.a-text-normal').css('::text').extract()
                          product_image_link   =   response.css('.s-image-fixed-height
.s-image::attr(src)').extract()
            product_rating = response.css('.a-icon-alt::text').extract()



            product['product_name'] =  product_name
            product['product_image_link'] =  product_image_link
            product['product_rating'] = product_rating[4:]


            yield product

    pass
```

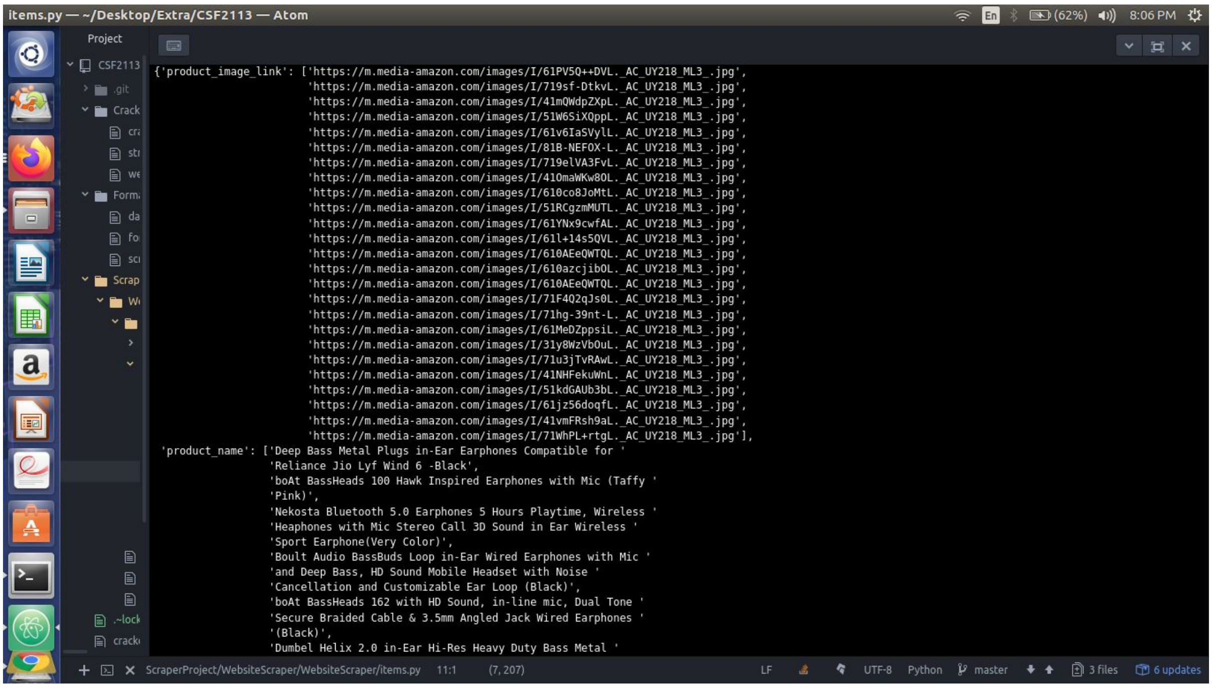
items.py

```
import scrapy


class WebsitescraperItem(scrapy.Item):
    # define the fields for your item here like:
     product_name = scrapy.Field()
     product_image_link = scrapy.Field()
     product_rating = scrapy.Field()

pass
```

For the entire working code, refer to the code submitted.

2.2.Testing a scraper

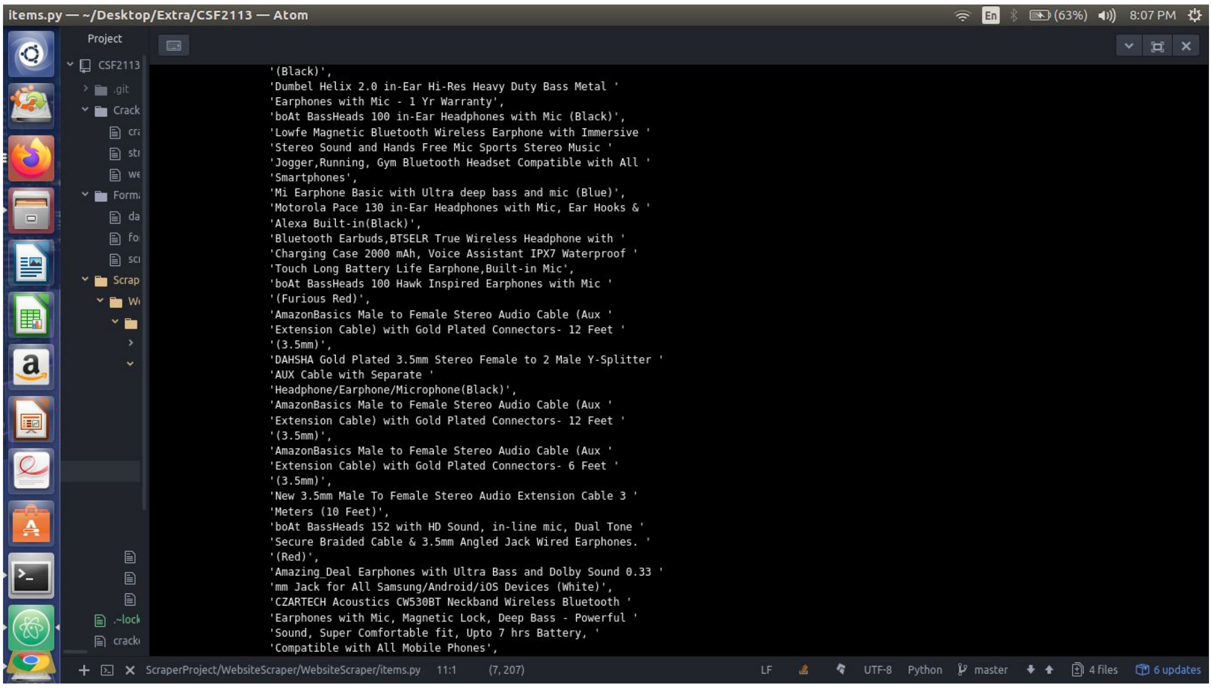
The output displayed on the terminal is as follows:



items.py — ~/Desktop/Extra/CSF2113 — Atom
Project
CSF2113
ScraperProject/WebsiteScraper/WebsiteScraper/items.py 11:1 (7, 207)
LF
UTF-8
Python
master
3 files
6 updates

```
{'product_image_link': ['https://m.media-amazon.com/images/I/61PV5Q++DVL._AC_UY218_ML3_.jpg',
                        'https://m.media-amazon.com/images/I/719sf-DtkvL._AC_UY218_ML3_.jpg',
                        'https://m.media-amazon.com/images/I/41mQWdpZXpL._AC_UY218_ML3_.jpg',
                        'https://m.media-amazon.com/images/I/51W6SiXQppL._AC_UY218_ML3_.jpg',
                        'https://m.media-amazon.com/images/I/61v6IaSVylL._AC_UY218_ML3_.jpg',
                        'https://m.media-amazon.com/images/I/81B-NEFOX-L._AC_UY218_ML3_.jpg',
                        'https://m.media-amazon.com/images/I/719elVA3FvL._AC_UY218_ML3_.jpg',
                        'https://m.media-amazon.com/images/I/41OmaWKw8OL._AC_UY218_ML3_.jpg',
                        'https://m.media-amazon.com/images/I/610co8JoMtL._AC_UY218_ML3_.jpg',
                        'https://m.media-amazon.com/images/I/51RCgzmMUTL._AC_UY218_ML3_.jpg',
                        'https://m.media-amazon.com/images/I/61YNx9cwfAL._AC_UY218_ML3_.jpg',
                        'https://m.media-amazon.com/images/I/61l+14s5QVL._AC_UY218_ML3_.jpg',
                        'https://m.media-amazon.com/images/I/610AEeQWTQL._AC_UY218_ML3_.jpg',
                        'https://m.media-amazon.com/images/I/610azcjibOL._AC_UY218_ML3_.jpg',
                        'https://m.media-amazon.com/images/I/610AEeQWTQL._AC_UY218_ML3_.jpg',
                        'https://m.media-amazon.com/images/I/71F4Q2qJs0L._AC_UY218_ML3_.jpg',
                        'https://m.media-amazon.com/images/I/71hg-39nt-L._AC_UY218_ML3_.jpg',
                        'https://m.media-amazon.com/images/I/61MeDZppsiL._AC_UY218_ML3_.jpg',
                        'https://m.media-amazon.com/images/I/31y8WzVbOuL._AC_UY218_ML3_.jpg',
                        'https://m.media-amazon.com/images/I/71u3jTvRAwL._AC_UY218_ML3_.jpg',
                        'https://m.media-amazon.com/images/I/41NHFekuWnL._AC_UY218_ML3_.jpg',
                        'https://m.media-amazon.com/images/I/51kdGAUb3bL._AC_UY218_ML3_.jpg',
                        'https://m.media-amazon.com/images/I/61jz56doqfL._AC_UY218_ML3_.jpg',
                        'https://m.media-amazon.com/images/I/41vmFRsh9aL._AC_UY218_ML3_.jpg',
                        'https://m.media-amazon.com/images/I/71WhPL+rtgL._AC_UY218_ML3_.jpg'],
 'product_name': ['Deep Bass Metal Plugs in-Ear Earphones Compatible for '
                  'Reliance Jio Lyf Wind 6 -Black',
                  'boAt BassHeads 100 Hawk Inspired Earphones with Mic (Taffy '
                  'Pink)',
                  'Nekosta Bluetooth 5.0 Earphones 5 Hours Playtime, Wireless '
                  'Heaphones with Mic Stereo Call 3D Sound in Ear Wireless '
                  'Sport Earphone(Very Color)',
                  'Boult Audio BassBuds Loop in-Ear Wired Earphones with Mic '
                  'and Deep Bass, HD Sound Mobile Headset with Noise '
                  'Cancellation and Customizable Ear Loop (Black)',
                  'boAt BassHeads 162 with HD Sound, in-line mic, Dual Tone '
                  'Secure Braided Cable & 3.5mm Angled Jack Wired Earphones '
                  '(Black)',
                  'Dumbel Helix 2.0 in-Ear Hi-Res Heavy Duty Bass Metal '
```

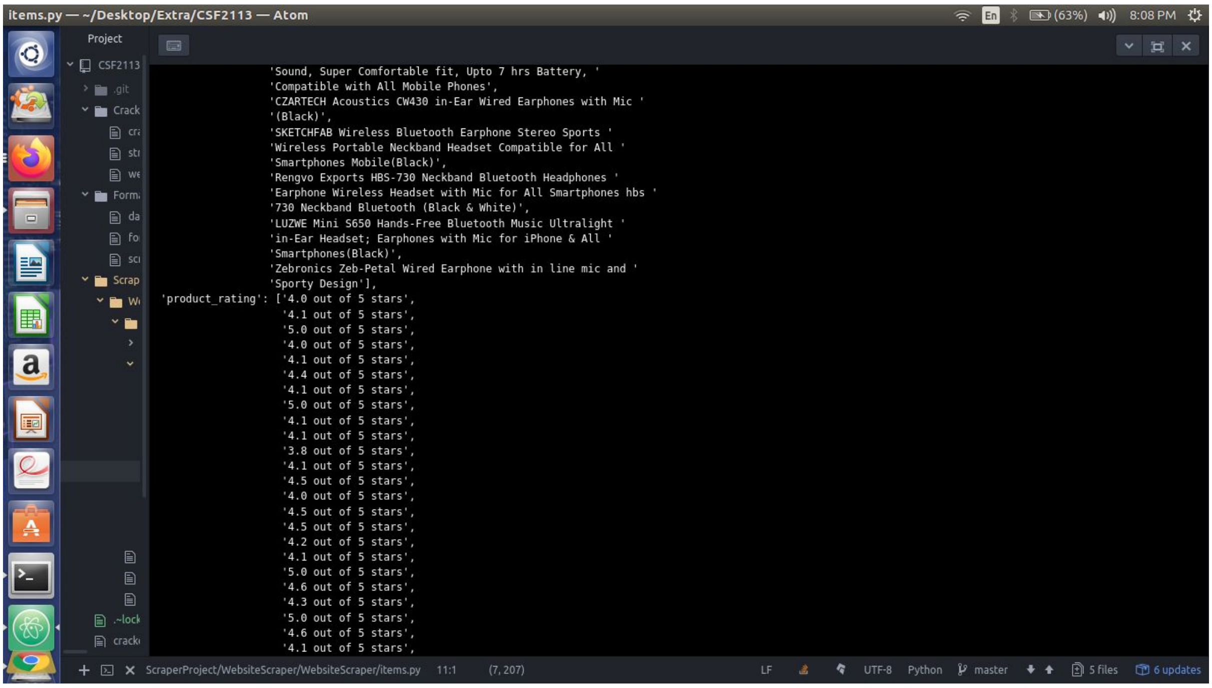
Terminal Output Part 1



items.py — ~/Desktop/Extra/CSF2113 — Atom
Project
CSF2113
ScraperProject/WebsiteScraper/WebsiteScraper/items.py 11:1 (7, 207)
LF
UTF-8
Python
master
4 files
6 updates

```
                  '(Black)',
                  'Dumbel Helix 2.0 in-Ear Hi-Res Heavy Duty Bass Metal '
                  'Earphones with Mic - 1 Yr Warranty',
                  'boAt BassHeads 100 in-Ear Headphones with Mic (Black)',
                  'Lowfe Magnetic Bluetooth Wireless Earphone with Immersive '
                  'Stereo Sound and Hands Free Mic Sports Stereo Music '
                  'Jogger,Running, Gym Bluetooth Headset Compatible with All '
                  'Smartphones',
                  'Mi Earphone Basic with Ultra deep bass and mic (Blue)',
                  'Motorola Pace 130 in-Ear Headphones with Mic, Ear Hooks & '
                  'Alexa Built-in(Black)',
                  'Bluetooth Earbuds,BTSELR True Wireless Headphone with '
                  'Charging Case 2000 mAh, Voice Assistant IPX7 Waterproof '
                  'Touch Long Battery Life Earphone,Built-in Mic',
                  'boAt BassHeads 100 Hawk Inspired Earphones with Mic '
                  '(Furious Red)',
                  'AmazonBasics Male to Female Stereo Audio Cable (Aux '
                  'Extension Cable) with Gold Plated Connectors- 12 Feet '
                  '(3.5mm)',
                  'DAHSHA Gold Plated 3.5mm Stereo Female to 2 Male Y-Splitter '
                  'AUX Cable with Separate '
                  'Headphone/Earphone/Microphone(Black)',
                  'AmazonBasics Male to Female Stereo Audio Cable (Aux '
                  'Extension Cable) with Gold Plated Connectors- 12 Feet '
                  '(3.5mm)',
                  'AmazonBasics Male to Female Stereo Audio Cable (Aux '
                  'Extension Cable) with Gold Plated Connectors- 6 Feet '
                  '(3.5mm)',
                  'New 3.5mm Male To Female Stereo Audio Extension Cable 3 '
                  'Meters (10 Feet)',
                  'boAt BassHeads 152 with HD Sound, in-line mic, Dual Tone '
                  'Secure Braided Cable & 3.5mm Angled Jack Wired Earphones. '
                  '(Red)',
                  'Amazing_Deal Earphones with Ultra Bass and Dolby Sound 0.33 '
                  'mm Jack for All Samsung/Android/iOS Devices (White)',
                  'CZARTECH Acoustics CW530BT Neckband Wireless Bluetooth '
                  'Earphones with Mic, Magnetic Lock, Deep Bass - Powerful '
                  'Sound, Super Comfortable fit, Upto 7 hrs Battery, '
                  'Compatible with All Mobile Phones',
```

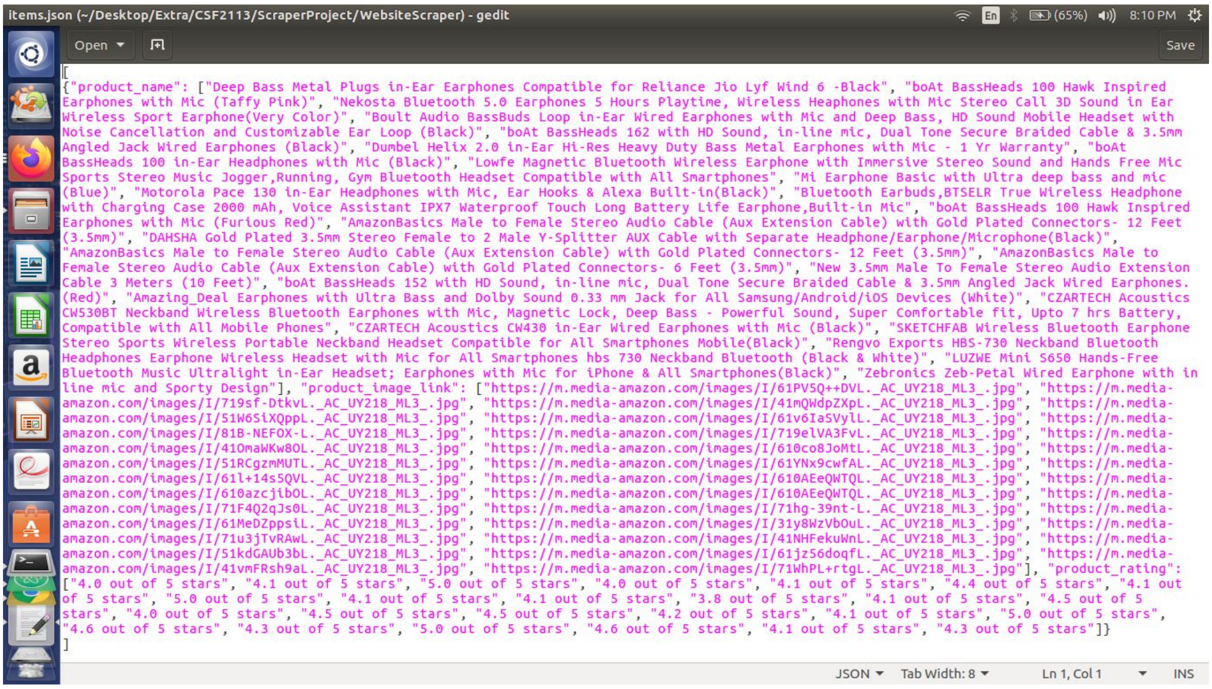
Terminal Output Part 2


items.py — ~/Desktop/Extra/CSF2113 — Atom
(63%) 8:08 PM
Project
CSF2113
ScraperProject/WebsiteScraper/WebsiteScraper/items.py 11:1 (7, 207) LF UTF-8 Python master 5 files 6 updates

```
                    'Sound, Super Comfortable fit, Upto 7 hrs Battery, '
                    'Compatible with All Mobile Phones',
                    'CZARTECH Acoustics CW430 in-Ear Wired Earphones with Mic '
                    '(Black)',
                    'SKETCHFAB Wireless Bluetooth Earphone Stereo Sports '
                    'Wireless Portable Neckband Headset Compatible for All '
                    'Smartphones Mobile(Black)',
                    'Rengvo Exports HBS-730 Neckband Bluetooth Headphones '
                    'Earphone Wireless Headset with Mic for All Smartphones hbs '
                    '730 Neckband Bluetooth (Black & White)',
                    'LUZWE Mini S650 Hands-Free Bluetooth Music Ultralight '
                    'in-Ear Headset; Earphones with Mic for iPhone & All '
                    'Smartphones(Black)',
                    'Zebronics Zeb-Petal Wired Earphone with in line mic and '
                    'Sporty Design'],
 'product_rating': ['4.0 out of 5 stars',
                     '4.1 out of 5 stars',
                     '5.0 out of 5 stars',
                     '4.0 out of 5 stars',
                     '4.1 out of 5 stars',
                     '4.4 out of 5 stars',
                     '4.1 out of 5 stars',
                     '5.0 out of 5 stars',
                     '4.1 out of 5 stars',
                     '4.1 out of 5 stars',
                     '3.8 out of 5 stars',
                     '4.1 out of 5 stars',
                     '4.5 out of 5 stars',
                     '4.0 out of 5 stars',
                     '4.5 out of 5 stars',
                     '4.5 out of 5 stars',
                     '4.2 out of 5 stars',
                     '4.1 out of 5 stars',
                     '5.0 out of 5 stars',
                     '4.6 out of 5 stars',
                     '4.3 out of 5 stars',
                     '5.0 out of 5 stars',
                     '4.6 out of 5 stars',
                     '4.1 out of 5 stars',
```

Terminal Output Part 3

The output is also stored in a JSON file:


items.json (~/Desktop/Extra/CSF2113/ScraperProject/WebsiteScraper) - gedit
(65%) 8:10 PM
Open
Save
JSON
Tab Width: 8
Ln 1, Col 1
INS

```
[
{"product_name": ["Deep Bass Metal Plugs in-Ear Earphones Compatible for Reliance Jio Lyf Wind 6 -Black", "boAt BassHeads 100 Hawk Inspired
Earphones with Mic (Taffy Pink)", "Nekosta Bluetooth 5.0 Earphones 5 Hours Playtime, Wireless Heaphones with Mic Stereo Call 3D Sound in Ear
Wireless Sport Earphone(Very Color)", "Boult Audio BassBuds Loop in-Ear Wired Earphones with Mic and Deep Bass, HD Sound Mobile Headset with
Noise Cancellation and Customizable Ear Loop (Black)", "boAt BassHeads 162 with HD Sound, in-line mic, Dual Tone Secure Braided Cable & 3.5mm
Angled Jack Wired Earphones (Black)", "Dumbel Helix 2.0 in-Ear Hi-Res Heavy Duty Bass Metal Earphones with Mic - 1 Yr Warranty", "boAt
BassHeads 100 in-Ear Headphones with Mic (Black)", "Lowfe Magnetic Bluetooth Wireless Earphone with Immersive Stereo Sound and Hands Free Mic
Sports Stereo Music Jogger,Running, Gym Bluetooth Headset Compatible with All Smartphones", "Mi Earphone Basic with Ultra deep bass and mic
(Blue)", "Motorola Pace 130 in-Ear Headphones with Mic, Ear Hooks & Alexa Built-in(Black)", "Bluetooth Earbuds,BTSELR True Wireless Headphone
with Charging Case 2000 mAh, Voice Assistant IPX7 Waterproof Touch Long Battery Life Earphone,Built-in Mic", "boAt BassHeads 100 Hawk Inspired
Earphones with Mic (Furious Red)", "AmazonBasics Male to Female Stereo Audio Cable (Aux Extension Cable) with Gold Plated Connectors- 12 Feet
(3.5mm)", "DAHSHA Gold Plated 3.5mm Stereo Female to 2 Male Y-Splitter AUX Cable with Separate Headphone/Earphone/Microphone(Black)",
"AmazonBasics Male to Female Stereo Audio Cable (Aux Extension Cable) with Gold Plated Connectors- 12 Feet (3.5mm)", "AmazonBasics Male to
Female Stereo Audio Cable (Aux Extension Cable) with Gold Plated Connectors- 6 Feet (3.5mm)", "New 3.5mm Male To Female Stereo Audio Extension
Cable 3 Meters (10 Feet)", "boAt BassHeads 152 with HD Sound, in-line mic, Dual Tone Secure Braided Cable & 3.5mm Angled Jack Wired Earphones.
(Red)", "Amazing_Deal Earphones with Ultra Bass and Dolby Sound 0.33 mm Jack for All Samsung/Android/iOS Devices (White)", "CZARTECH Acoustics
CW530BT Neckband Wireless Bluetooth Earphones with Mic, Magnetic Lock, Deep Bass - Powerful Sound, Super Comfortable fit, Upto 7 hrs Battery,
Compatible with All Mobile Phones", "CZARTECH Acoustics CW430 in-Ear Wired Earphones with Mic (Black)", "SKETCHFAB Wireless Bluetooth Earphone
Stereo Sports Wireless Portable Neckband Headset Compatible for All Smartphones Mobile(Black)", "Rengvo Exports HBS-730 Neckband Bluetooth
Headphones Earphone Wireless Headset with Mic for All Smartphones hbs 730 Neckband Bluetooth (Black & White)", "LUZWE Mini S650 Hands-Free
Bluetooth Music Ultralight in-Ear Headset; Earphones with Mic for iPhone & All Smartphones(Black)", "Zebronics Zeb-Petal Wired Earphone with in
line mic and Sporty Design"], "product_image_link": ["https://m.media-amazon.com/images/I/61PV5Q++DVL._AC_UY218_ML3_.jpg", "https://m.media-
amazon.com/images/I/719sf-DtkvL._AC_UY218_ML3_.jpg", "https://m.media-amazon.com/images/I/41mQWdpZXpL._AC_UY218_ML3_.jpg", "https://m.media-
amazon.com/images/I/51W6SiXQppL._AC_UY218_ML3_.jpg", "https://m.media-amazon.com/images/I/61v6IaSVylL._AC_UY218_ML3_.jpg", "https://m.media-
amazon.com/images/I/81B-NEFOX-L._AC_UY218_ML3_.jpg", "https://m.media-amazon.com/images/I/719elVA3FvL._AC_UY218_ML3_.jpg", "https://m.media-
amazon.com/images/I/41OmaWKw8OL._AC_UY218_ML3_.jpg", "https://m.media-amazon.com/images/I/610co8JoMtL._AC_UY218_ML3_.jpg", "https://m.media-
amazon.com/images/I/51RCgzmMUTL._AC_UY218_ML3_.jpg", "https://m.media-amazon.com/images/I/61YNx9cwfAL._AC_UY218_ML3_.jpg", "https://m.media-
amazon.com/images/I/61l+14s5QVL._AC_UY218_ML3_.jpg", "https://m.media-amazon.com/images/I/610AEeQWTQL._AC_UY218_ML3_.jpg", "https://m.media-
amazon.com/images/I/610azcjibOL._AC_UY218_ML3_.jpg", "https://m.media-amazon.com/images/I/610AEeQWTQL._AC_UY218_ML3_.jpg", "https://m.media-
amazon.com/images/I/71F4Q2qJs0L._AC_UY218_ML3_.jpg", "https://m.media-amazon.com/images/I/71hg-39nt-L._AC_UY218_ML3_.jpg", "https://m.media-
amazon.com/images/I/61MeDZppsiL._AC_UY218_ML3_.jpg", "https://m.media-amazon.com/images/I/31y8WzVbOuL._AC_UY218_ML3_.jpg", "https://m.media-
amazon.com/images/I/71u3jTvRAwL._AC_UY218_ML3_.jpg", "https://m.media-amazon.com/images/I/41NHFekuWnL._AC_UY218_ML3_.jpg", "https://m.media-
amazon.com/images/I/51kdGAUb3bL._AC_UY218_ML3_.jpg", "https://m.media-amazon.com/images/I/61jz56doqfL._AC_UY218_ML3_.jpg", "https://m.media-
amazon.com/images/I/41vmFRsh9aL._AC_UY218_ML3_.jpg", "https://m.media-amazon.com/images/I/71WhPL+rtgL._AC_UY218_ML3_.jpg"], "product_rating":
["4.0 out of 5 stars", "4.1 out of 5 stars", "5.0 out of 5 stars", "4.0 out of 5 stars", "4.1 out of 5 stars", "4.4 out of 5 stars", "4.1 out
of 5 stars", "5.0 out of 5 stars", "4.1 out of 5 stars", "4.1 out of 5 stars", "3.8 out of 5 stars", "4.1 out of 5 stars", "4.5 out of 5
stars", "4.0 out of 5 stars", "4.5 out of 5 stars", "4.5 out of 5 stars", "4.2 out of 5 stars", "4.1 out of 5 stars", "5.0 out of 5 stars",
"4.6 out of 5 stars", "4.3 out of 5 stars", "5.0 out of 5 stars", "4.6 out of 5 stars", "4.1 out of 5 stars", "4.3 out of 5 stars"]}
]
```

Output JSON file

3. Design a formatter to format output data in CSV file

The formatter takes the “json” file generated by the scrapper as its input and returns the data in a “tsv” file named “scrapped_data.tsv”, in a human friendly format. The json file obtained through scrapping does not have data in a human friendly format. Hence, the data needs to be formatted according to the various attributes that it represents. For our present project, we have decided to use scrap “amazon.in” and we obtain data corresponding to three different tags, which are :

1. Product name
2. Product image url
3. Product rating

The formatter parses the json file and creates a data-frame using the python library pandas. The columns in the data-frame correspond to the above mentioned attributes. All scrapped data-instances are arranged according to the same and then stored in a tab-seperated-value manner (as the instances contained strings which contain commas, we could not use csv file format for seperation). The formatter saves the dataframe in the “scrapped_data.tsv”.

3.1.Coding a formatter

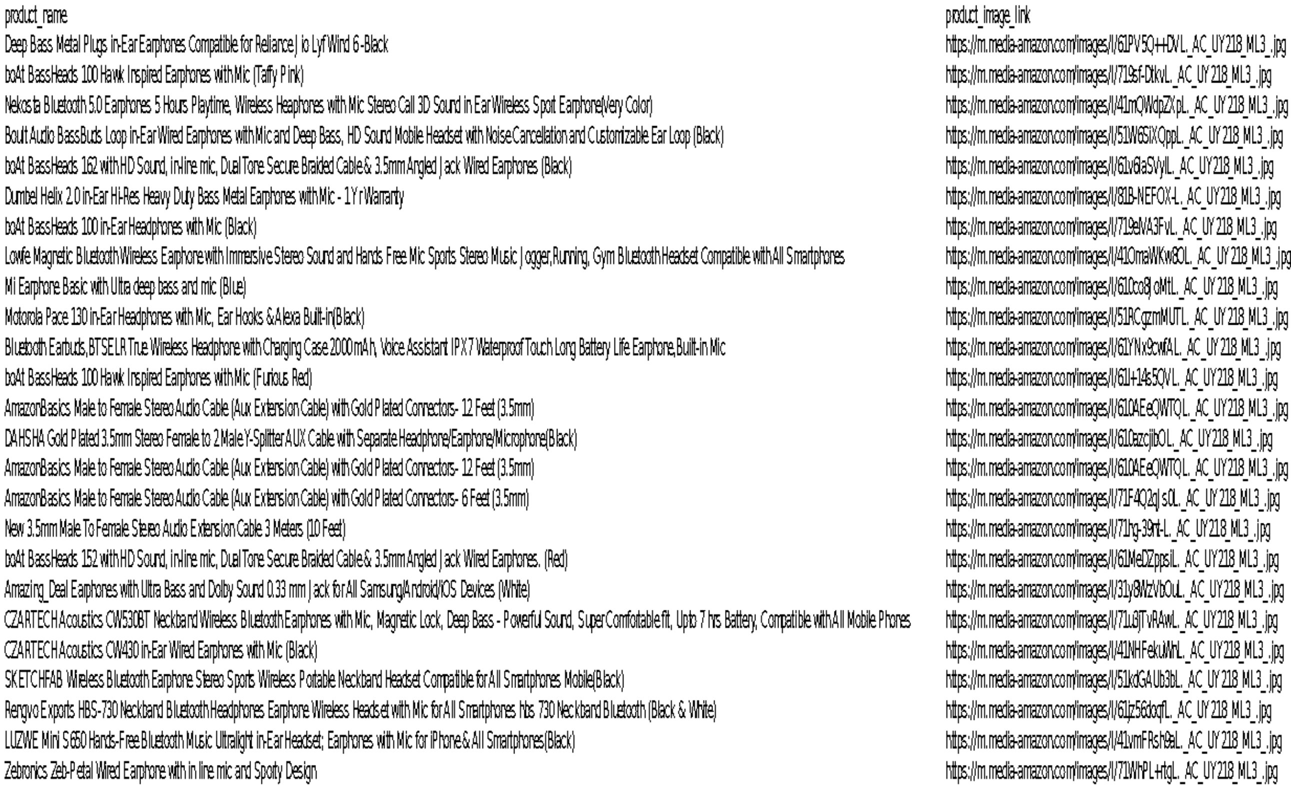
```
import sys
import pandas as pd



""" The script takes the input in the following format :

-> python formatter.py <path for the json file obtained through scrapper>

and the script produces the output in a file named scrapped_data.tsv """



# the following piece checks for the availability of the input

if len(sys.argv) == 1:

        print("Need Filename!")

        sys.exit(-1)

else:

        path = sys.argv[1]
```

```
# opening the file in read_only mode

try :

        file = open(path, "r")

except :

        print("File failed to open! Please verify if the path-name is correctly specified")

        quit()


# the input is expected as a json file and hence, the following piece of code is to extract all the relevant

data from a json file

tag = 0

for each in file:

        if tag == 1 :

                data = each[:-1]

                break

        tag = tag + 1

file.close()


# formatting the data

i = 0

columns = []

dataset = []

while i < len(data):

        if data[i] == ":":

                if data[i-1] == "":

                name = ""

                j = -2

                while data[i+j] != "":
```

```
                name = name + data[i+j]
                j = j - 1
            columns.append(name[::-1])
            aux = ""
            tag = 0
            while data[i] != "]":
                if data[i] == "[":
                    tag = 1
                    i = i + 1
                if tag == 1:
                    aux = aux + data[i]
                i = i + 1
            dataset.append(aux)
        i = i + 1
column_data = [[] for i in range(len(columns))]

tag = 0
for each in dataset:
    i = 0
    while i < len(each):
        if each[i] == '"':
            word = ""
            i = i + 1
            while each[i] != '"':
                word = word + each[i]
                i = i + 1
            column_data[tag].append(word)
        i = i + 1
    tag = tag + 1


# encoding the data into a pandas data_frame
dataset = [[] for i in range(len(column_data[0]))]
i = 0
while i < len(column_data[0]):
    j = 0
    aux = []
    while j < len(columns):
        aux.append(column_data[j][i])
        j = j + 1
    dataset[i] = aux
    i = i + 1


# saving the data as a tab-seperated file using pandas
df = pd.DataFrame(dataset, columns = columns)
df.to_csv("scrapped_data.tsv", sep = "\t", index = False)
```

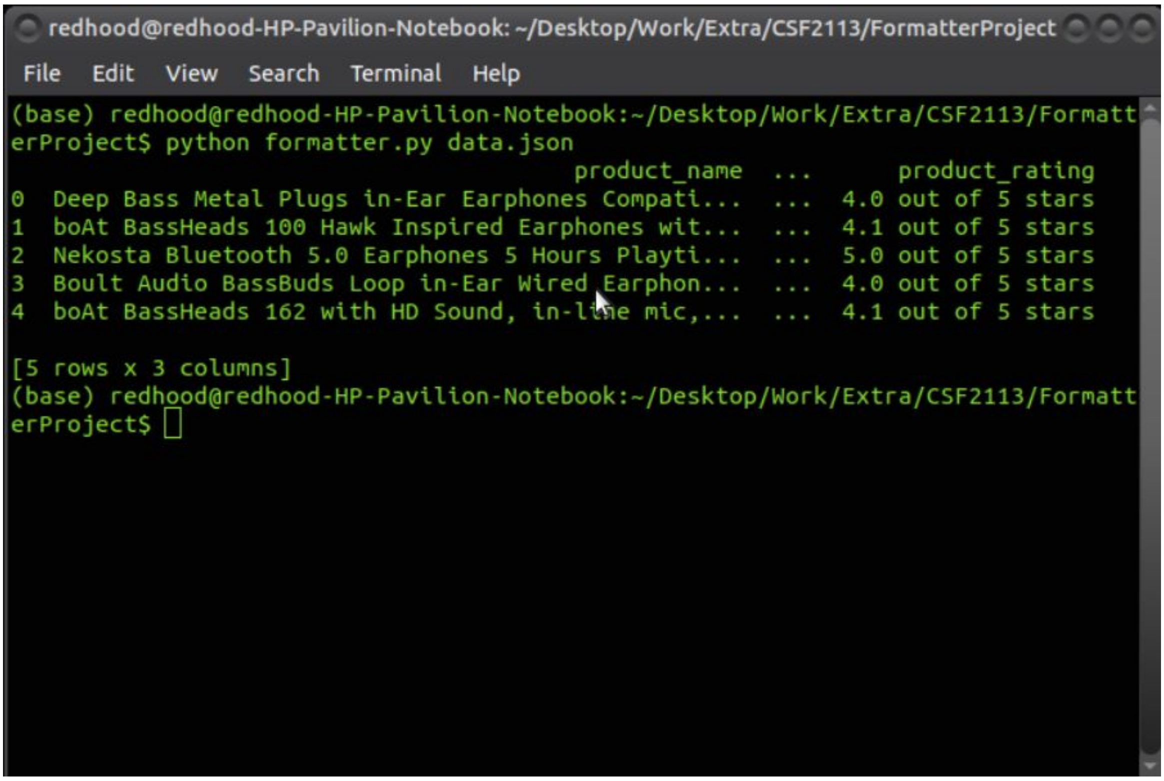
3.2.Testing a formatter

* The screenshots have also been added in the “Images” folder.
* The file generated as the output has also been included in the ‘FormatterProject’ folder.



product_name	product_image_link
Deep Bass Metal Plugs in-Ear Earphones Compatible for Reliance Jio Lyf Wind 6-Black	https://m.media-amazon.com/images/I/61PV5Q++DVL._AC_UY218_ML3_.jpg
boAt BassHeads 100 Hawk Inspired Earphones with Mic (Taffy Pink)	https://m.media-amazon.com/images/I/719sf-DtkvL._AC_UY218_ML3_.jpg
Nekosta Bluetooth 5.0 Earphones 5 Hours Playtime, Wireless Heaphones with Mic Stereo Call 3D Sound in Ear Wireless Sport Earphone(Very Color)	https://m.media-amazon.com/images/I/41mQWdpZXpL._AC_UY218_ML3_.jpg
Boult Audio BassBuds Loop in-Ear Wired Earphones with Mic and Deep Bass, HD Sound Mobile Headset with Noise Cancellation and Customizable Ear Loop (Black)	https://m.media-amazon.com/images/I/51W6SiXQppL._AC_UY218_ML3_.jpg
boAt BassHeads 162 with HD Sound, in-line mic, Dual Tone Secure Braided Cable & 3.5mm Angled Jack Wired Earphones (Black)	https://m.media-amazon.com/images/I/61v6laSVyIL._AC_UY218_ML3_.jpg
Dumbel Helix 2.0 in-Ear Hi-Res Heavy Duty Bass Metal Earphones with Mic - 1 Yr Warranty	https://m.media-amazon.com/images/I/81B-NEFOX-L._AC_UY218_ML3_.jpg
boAt BassHeads 100 in-Ear Headphones with Mic (Black)	https://m.media-amazon.com/images/I/719eNA3FvL._AC_UY218_ML3_.jpg
Lowfe Magnetic Bluetooth Wireless Earphone with Immersive Stereo Sound and Hands Free Mic Sports Stereo Music Jogger,Running, Gym Bluetooth Headset Compatible with All Smartphones	https://m.media-amazon.com/images/I/41OmaWKw8OL._AC_UY218_ML3_.jpg
Mi Earphone Basic with Ultra deep bass and mic (Blue)	https://m.media-amazon.com/images/I/610co8JoMtL._AC_UY218_ML3_.jpg
Motorola Pace 130 in-Ear Headphones with Mic, Ear Hooks & Alexa Built-in(Black)	https://m.media-amazon.com/images/I/51RCgzmMUTL._AC_UY218_ML3_.jpg
Bluetooth Earbuds,BTSELR True Wireless Headphone with Charging Case 2000mAh, Voice Assistant IPX7 Waterproof Touch Long Battery Life Earphone,Built-in Mic	https://m.media-amazon.com/images/I/61YNx9cwfAL._AC_UY218_ML3_.jpg
boAt BassHeads 100 Hawk Inspired Earphones with Mic (Furious Red)	https://m.media-amazon.com/images/I/61J+14s5QVL._AC_UY218_ML3_.jpg
AmazonBasics Male to Female Stereo Audio Cable (Aux Extension Cable) with Gold Plated Connectors- 12 Feet (3.5mm)	https://m.media-amazon.com/images/I/610AEeQWTQL._AC_UY218_ML3_.jpg
DAHSHA Gold Plated 3.5mm Stereo Female to 2 Male Y-Splitter AUX Cable with Separate Headphone/Earphone/Microphone(Black)	https://m.media-amazon.com/images/I/610azcjibOL._AC_UY218_ML3_.jpg
AmazonBasics Male to Female Stereo Audio Cable (Aux Extension Cable) with Gold Plated Connectors- 12 Feet (3.5mm)	https://m.media-amazon.com/images/I/610AEeQWTQL._AC_UY218_ML3_.jpg
AmazonBasics Male to Female Stereo Audio Cable (Aux Extension Cable) with Gold Plated Connectors- 6 Feet (3.5mm)	https://m.media-amazon.com/images/I/71F4Q2qJs0L._AC_UY218_ML3_.jpg
New 3.5mm Male To Female Stereo Audio Extension Cable 3 Meters (10 Feet)	https://m.media-amazon.com/images/I/71hg-39nt-L._AC_UY218_ML3_.jpg
boAt BassHeads 152 with HD Sound, in-line mic, Dual Tone Secure Braided Cable & 3.5mm Angled Jack Wired Earphones. (Red)	https://m.media-amazon.com/images/I/61MeDZppsiL._AC_UY218_ML3_.jpg
Amazing_Deal Earphones with Ultra Bass and Dolby Sound 0.33 mm Jack for All Samsung/Android/iOS Devices (White)	https://m.media-amazon.com/images/I/31y8NzVbOuL._AC_UY218_ML3_.jpg
CZARTECH Acoustics CW530BT Neckband Wireless Bluetooth Earphones with Mic, Magnetic Lock, Deep Bass - Powerful Sound, Super Comfortable fit, Upto 7 hrs Battery, Compatible with All Mobile Phones	https://m.media-amazon.com/images/I/71u3jTvRAwL._AC_UY218_ML3_.jpg
CZARTECH Acoustics CW430 in-Ear Wired Earphones with Mic (Black)	https://m.media-amazon.com/images/I/41NHFekuMhL._AC_UY218_ML3_.jpg
SKETCHFAB Wireless Bluetooth Earphone Stereo Sports Wireless Portable Neckband Headset Compatible for All Smartphones Mobile(Black)	https://m.media-amazon.com/images/I/51kdGAUb3bL._AC_UY218_ML3_.jpg
Rengvo Exports HBS-730 Neckband Bluetooth Headphones Earphone Wireless Headset with Mic for All Smartphones hbs 730 Neckband Bluetooth (Black & White)	https://m.media-amazon.com/images/I/61jz56doqfL._AC_UY218_ML3_.jpg
LUZWE Mini S650 Hands-Free Bluetooth Music Ultralight in-Ear Headset; Earphones with Mic for iPhone & All Smartphones(Black)	https://m.media-amazon.com/images/I/41vmFRsh9aL._AC_UY218_ML3_.jpg
Zebronics Zeb-Petal Wired Earphone with in line mic and Sporty Design	https://m.media-amazon.com/images/I/71WhPL+rtgL._AC_UY218_ML3_.jpg

Fig: The above picture shows the snapshot of the 'scrapped_data.tsv' file



redhood@redhood-HP-Pavilion-Notebook: ~/Desktop/Work/Extra/CSF2113/FormatterProject
File
Edit
View
Search
Terminal
Help

```
(base) redhood@redhood-HP-Pavilion-Notebook:~/Desktop/Work/Extra/CSF2113/Formatt
erProject$ python formatter.py data.json
                                        product_name  ...      product_rating
0  Deep Bass Metal Plugs in-Ear Earphones Compati...  ...  4.0 out of 5 stars
1  boAt BassHeads 100 Hawk Inspired Earphones wit...  ...  4.1 out of 5 stars
2  Nekosta Bluetooth 5.0 Earphones 5 Hours Playti...  ...  5.0 out of 5 stars
3  Boult Audio BassBuds Loop in-Ear Wired Earphon...  ...  4.0 out of 5 stars
4  boAt BassHeads 162 with HD Sound, in-line mic,...  ...  4.1 out of 5 stars

[5 rows x 3 columns]
(base) redhood@redhood-HP-Pavilion-Notebook:~/Desktop/Work/Extra/CSF2113/Formatt
erProject$ 
```

Fig: The above figure shows the output in the terminal. The top 5 rows of the dataframe has been printed (dataframe.head())

4. Design a cracker to crack a password

The cracker designed in the current project performs a variety of tasks.
To start with, we have defined passwords into two categories :
1. Strong – passwords which contain at least one small-alphabet, one capital-alphabet, one numeric instance and one special character.
2. Weak – all other strings consisting of valid characters but not satisfying at least one of the above criteria.

The cracker is then designed to generate passwords randomly. These can be either strong or weak and of any length that the user desires. For this, generate_strong_password() and generate_weak_password() functions can be used respectively.
The check_pass_word_type() function in the cracker takes a candidate password as its input and determines whether the password is valid or invalid, and if it is valid, whether it is strong or weak. The above mentioned conditions are utilized for the decision making process. The generate_password_dictionary() function takes in the number of strong passwords and the number of weak passwords to be generated, it generates these passwords randomly (all of length = 8) and stores in a python dictionary. The dictionary has keys as the string representing the password and the values as it's corresponding md5 hash. The save_dictionary() function takes in a password_dictionary (as described in the previous step) and saves all the passwords in the dictionary in two separate files, which are - 'strong_passwords.txt' and 'weak_passwords.txt'. All the passwords in the dictionary are classified on the run into the two types, and saved in the corresponding text files respectively.

Additionally, the cracker file also provides for :
1. Loading a dictionary from a text-file (where each line corresponds to a password string).
2. Using a dictionary to perform brute-password cracking (it uses a dictionary and attempts to crack a password(provided as an md5 hash input) by comparing the md5 hash values of all the passwords stored in the dictionary.

4.1. Coding to generate the combination of password and to classify the generated passwords

```
import random

import hashlib

import numpy as np
```

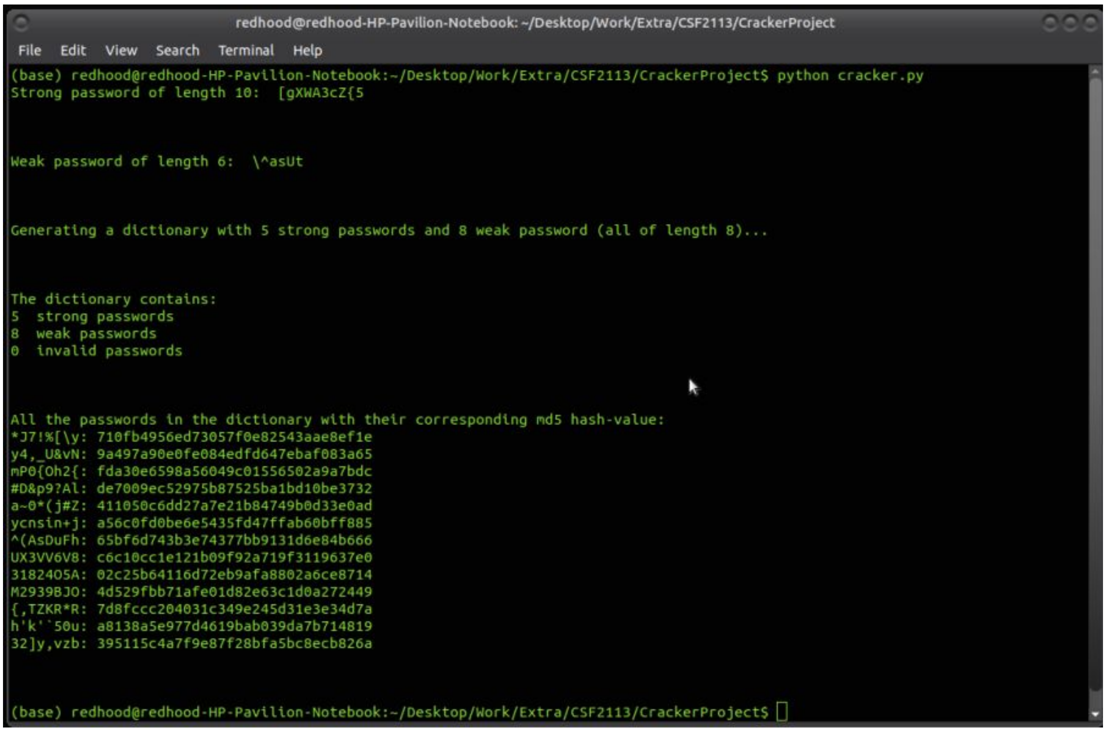
```
""" The passwords can be of two types, strong or weak.
Strong passwords are made up of a combination of at least one capital
letter, small letter, number and a special character.
Weak passwords do not cater to all the above conditions. """

# 33 - 47 and 58 - 64 and 91 - 96 and 123 - 126: special characters
# 48 - 57 : numbers
# 65 - 90 : capital letters
# 97 - 122 : small letters

# declaring the various types of allowed characters in the password.
If a password contains any other characters it is deemed invalid
special = [i for i in range(33,48)]
special.extend([i for i in range(58,65)])
special.extend([i for i in range(91,97)])
special.extend([i for i in range(123,127)])

numbers = [i for i in range(48,58)]
capital = [i for i in range(65,91)]
small = [i for i in range(97,123)]

# gives a random numric character
def get_random_number():
      return chr(numbers[np.random.randint(low = 0, high =
len(numbers), size = 1)[0]])
```

```
# gives a random small-alphabet character
def get_random_small():
    return chr(small[np.random.randint(low = 0, high = len(small),
size = 1)[0]])

# gives a random capital-alphabet character
def get_random_capital():
    return chr(capital[np.random.randint(low = 0, high =
len(capital), size = 1)[0]])

# gives a random special character
def get_random_special():
    return chr(special[np.random.randint(low = 0, high =
len(special), size = 1)[0]])

# function to print a dictionary in 'key : value' format
def print_dict(d):
    for each in d.keys():
        print(each, end = ": ")
        print(d[each])

# the following function generates a random strong password (the
default length of the generated password is 8)

def generate_strong_password(size = 8):
    if size < 4:
        print("Error! A strong password needs to be at least 4
characters in length")
        return "-1"

num = get_random_number()
small = get_random_small()
cap = get_random_capital()
spec = get_random_special()

out = np.random.randint(low = 33, high = 127, size = size-4)
pwd = num + small + cap + spec

for each in out:
    pwd = pwd + chr(each)

pwd = ''.join(random.sample(pwd, len(pwd)))
return pwd

# the following function generates a random weak password (the default
length of the generated password is 8)

def generate_weak_password(size = 8):
    rand = np.random.randint(low = 0, high = 4, size = 3)
    pwd = ""
    while len(pwd) < size:
        rand2 = np.random.randint(low = 0, high = 3, size = 1)
        if rand[rand2][0] == 0:
            pwd = pwd + get_random_capital()
        elif rand[rand2][0] == 1:
            pwd = pwd + get_random_number()
        elif rand[rand2][0] == 2:
            pwd = pwd + get_random_small()
        else :
            pwd = pwd + get_random_special()
    return pwd

# returns 0 for a weak password and returns 1 for a strong password
and returns -1 if the password is invalid

def check_pass_word_type(password):
    arr = [0 for i in range(4)]
    i = 0
    while i < len(password):
        if ord(password[i]) in special:
            arr[0] = 1
        elif ord(password[i]) in numbers:
            arr[1] = 1
        elif ord(password[i]) in capital:
            arr[2] = 1
        elif ord(password[i]) in small:
            arr[3] = 1
        else :
            return -1
        i = i + 1
    for each in arr :
        if each == 0:
            return 0
    return 1

# takes in the number of strong passwords and weak passwords to be
generated and generates a dictionary
# the dictionary contains the passwords as its key value and it's md5
hash as its value

def generate_password_dict(num_strong = 10, num_weak = 10):
    passwords = {}
    i = 0
    while i < (num_strong):
        _ = generate_strong_password()
        if _ not in passwords.keys():
            passwords[_] =
hashlib.md5(_.encode("utf-8")).hexdigest()
            i = i + 1
    i = 0
    while i < (num_weak):
        _ = generate_weak_password()
        if _ not in passwords.keys():
            passwords[_] =
hashlib.md5(_.encode("utf-8")).hexdigest()
            i = i + 1
    return passwords

# takes a dictionary as the input and stores the passwords in the
dictionary in two seperate files. The seperation is based on the basis
of password type (strong and weak)

def save_dictionary(dic):
    f = open("weak_passwords.txt", "w")
    for each in dic.keys():
        if check_pass_word_type(each) == 0:
            f.write(each)
            f.write("\n")
    f.close()
    f = open("strong_passwords.txt", "w")
    for each in dic.keys():
        if check_pass_word_type(each) == 1:
            f.write(each)
            f.write("\n")
    f.close()
    return 1

# takes in path name as the input and generates a dictionary with all
the passwords present in the path name

def load_dictionary(path):
    try :
```

```
                f = open(path, "r")
        except :
                print("Invalid path name!")
                quit()

        d = {}
        for each in f :
                each = each[:-1]
                if check_pass_word_type(each) in [0,1]:
                        d[each] =
hashlib.md5(each.encode("utf-8")).hexdigest()
        f.close()
        return d

# takes in a dictionary and a password and adds the password to the
dictionary

def add_password_to_dict(dic, password):
        if check_pass_word_type(password) == -1:
                print("Invalid password!")
                return -1
        if password in dic.keys():
                print("Password already exists!")
                return -1
        dic[password] =
hashlib.md5(password.encode("utf-8")).hexdigest()
        return 1
```

```
# takes in a dictionary as the input and gives information regarding
the passwords stored in the dictionary

def analyze_dic(dic):
    strong_pass = 0
    weak_pass = 0
    invalid_pass = 0
    for each in dic.keys():
        if check_pass_word_type(each) == 1:
            strong_pass = strong_pass + 1
        elif check_pass_word_type(each) == 0 :
            weak_pass = weak_pass + 1
        else :
            invalid_pass = invalid_pass + 1
    print("The dictionary contains: ")
    print(strong_pass, " strong passwords")
    print(weak_pass, " weak passwords")
    print(invalid_pass, " invalid passwords")
    return 1

# takes a dictionary of passwords and a md5 hash as the input and
attempts to crack the password.
# if successful, it returns the password from the dictionary

def crack_pass_using_dic(dic, inp):
    for each in dic.keys():
        if dic[each] == inp:
            return (1, each)
    return (0, "No match found")
```

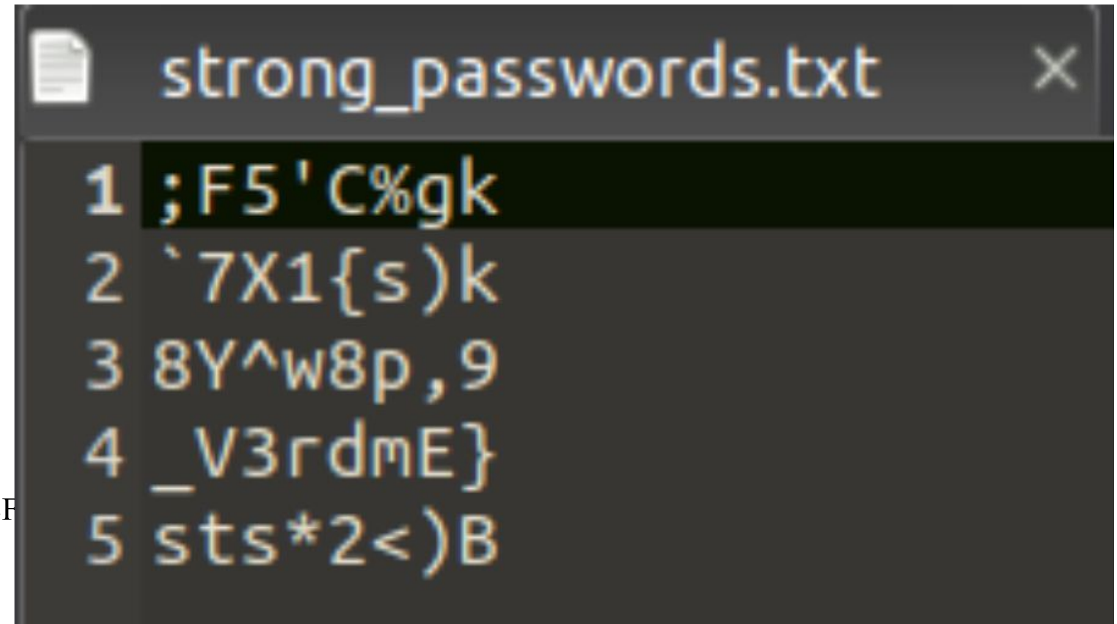
4.2.Testing password generation


redhood@redhood-HP-Pavilion-Notebook: ~/Desktop/Work/Extra/CSF2113/CrackerProject
File Edit View Search Terminal Help

```
(base) redhood@redhood-HP-Pavilion-Notebook:~/Desktop/Work/Extra/CSF2113/CrackerProject$ python cracker.py
Strong password of length 10:  [gXWA3cZ{5



Weak password of length 6:  \^asUt



Generating a dictionary with 5 strong passwords and 8 weak password (all of length 8)...



The dictionary contains:
5  strong passwords
8  weak passwords
0  invalid passwords



All the passwords in the dictionary with their corresponding md5 hash-value:
*J7!%[\y: 710fb4956ed73057f0e82543aae8ef1e
y4,_U&vN: 9a497a90e0fe084edfd647ebaf083a65
mP0{Oh2{: fda30e6598a56049c01556502a9a7bdc
#D&p9?Al: de7009ec52975b87525ba1bd10be3732
a~0*(j#Z: 411050c6dd27a7e21b84749b0d33e0ad
ycnsin+j: a56c0fd0be6e5435fd47ffab60bff885
^(AsDuFh: 65bf6d743b3e74377bb9131d6e84b666
UX3VV6V8: c6c10cc1e121b09f92a719f3119637e0
318240SA: 02c25b64116d72eb9afa8802a6ce8714
M2939BJO: 4d529fbb71afe01d82e63c1d0a272449
{,TZKR*R: 7d8fccc204031c349e245d31e3e34d7a
h'k'`50u: a8138a5e977d4619bab039da7b714819
32]y,vzb: 395115c4a7f9e87f28bfa5bc8ecb826a



(base) redhood@redhood-HP-Pavilion-Notebook:~/Desktop/Work/Extra/CSF2113/CrackerProject$ 
```

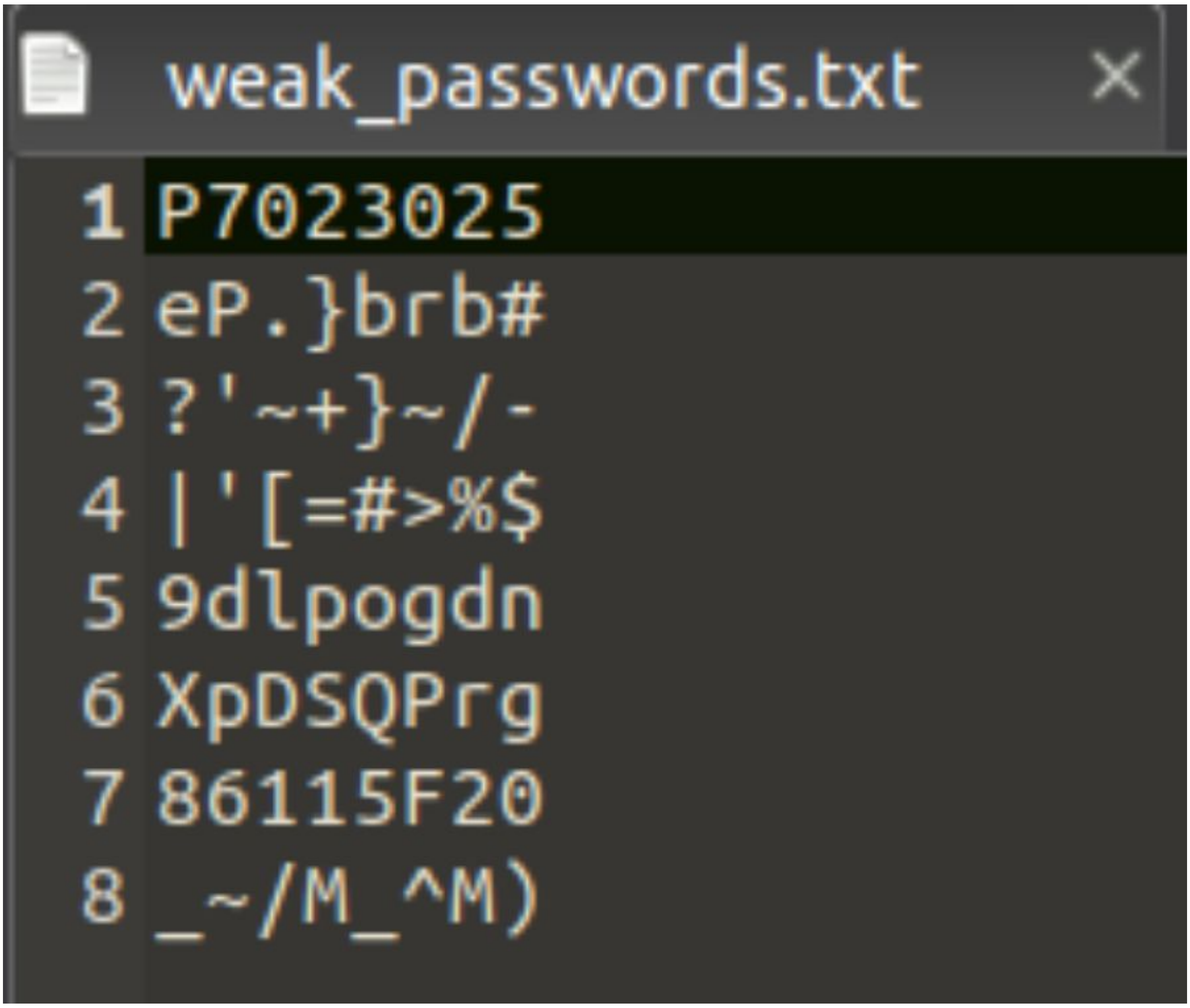
Fig: The above figure shows the terminal output of the cracker.

4.3.Testing password classification



```
1 ;F5'C%gk
2 `7X1{s)k
3 8Y^w8p,9
4 _V3rdmE}
5 sts*2<)B
```

Fig: The above figure shows the text-file where the generated strong passwords have been stored



```
P7023025
eP.}brb#
?'~+}~/-
|'[=#>%$
9dlpogdn
XpDSQPrg
86115F20
_~/M_^M)
```

Fig: The above figure shows the text-file where the generated weak passwords have been stored

5. Reflection

5.1.Write the reflection of student1

Write down the reflection of student1

5.2.Write the reflection of student2

Write down the reflection of student1

5.3.Write the reflection of student3

Write down the reflection of student1

6. Reference Page

Include all the external references that you might have used. Use MLA or APA referencing style (Any One).

7. Appendix Page(s).

Include any other documents/code/information related to the project.