

WEB SCRAPING

FLIPKART

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INTRODUCTION

What is web Scraping?

Web Scraping is the process of automatically downloading the data displayed on the website using some computer program. A web scraping tool can scrape multiple pages from a website & automate the tedious task of manually copying and pasting the data displayed. Web Scraping is important because, irrespective of the industry, the web contains information that can provide actionable insights for businesses to gain an advantage over competitors.

What are the Steps Involved in Web Scraping?

- Find the URL that we want to scrape.
- Inspecting the Page.
- Finding the data we want to extract.
- Write the code.
- Run the code & extract the data.
- Finally, Store the data in the required format.

Code and Resources

We attempted to Scrap data from Flipkart through Web Scraping to analyze the dataset using python.

Importing all libraries

```
In [1]: import csv
import requests
from bs4 import BeautifulSoup
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

import warnings
warnings.filterwarnings('ignore')
%matplotlib inline
```

url

```
In [2]: url='https://www.flipkart.com/search?q=mobiles&as=on&as-show=on&otracker=AS_Query_TrendingAutoSuggest_1_0_na_na_na&otrack
```

```
In [4]: # to check status code
r=requests.get(url)
r.status_code
```

```
Out[4]: 200
```

In [5]: #to print
print(r.text)

```
<!doctype html><html lang="en"><head><link href="https://rukminim1.flixcart.com" rel="preconnect"/><link rel="stylesheet" href="//static-assets-web.flixcart.com/www/linchpin/fk-cp-zion/css/app_modules.chunk.94b5e7.css"/><link rel="stylesheet" href="//static-assets-web.flixcart.com/www/linchpin/fk-cp-zion/css/app.chunk.dd97f3.css"/><meta http-equiv="Content-type" content="text/html; charset=utf-8"/><meta http-equiv="X-UA-Compatible" content="IE=Edge"/><meta property="fb:page_id" content="102988293558"/><meta property="fb:admins" content="658873552,624500995,100000233612389"/><meta name="robots" content="nooodp"/><link rel="shortcut icon" href="https://static-assets-web.flixcart.com/www/promos/new/20150528-140547-favicon-retina.ico"/><link type="application/opensearchdescription+xml" rel="search" href="/osdd.xml?v=2"/><meta property="og:type" content="website"/><meta name="og_site_name" property="og:site_name" content="Flipkart.com"/><link rel="apple-touch-icon" sizes="57x57" href="/apple-touch-icon-57x57.png"/><link rel="apple-touch-icon" sizes="72x72" href="/apple-touch-icon-72x72.png"/><link rel="apple-touch-icon" sizes="114x114" href="/apple-touch-icon-114x114.png"/><link rel="apple-touch-icon" sizes="144x144" href="/apple-touch-icon-144x144.png"/><link rel="apple-touch-icon" href="/apple-touch-icon-57x57.png"/><meta name="twitter:card" content="app"/><meta name="twitter:site" content="@flipkart"/><meta name="twitter:creator" content="@flipkart"/><meta name="twitter:title" content="Mobiles- Buy Products Online at Best Price in India - All Categories | Flipkart.com"/><meta name="twitter:description" content="Shop for electronics, apparels & more using our Flipkart app Free shipping & COD."/><meta name="twitter:app:country" content="in"/><meta name="al:ios:app_name" content="Flipkart"/><meta name="al:ios:app_store_id" content="742044692"/><meta name="twitter:app:name:iphone" content="Flipkart"/><meta name="twitter:app:id:iphone" content="742044692"/><meta name="twitter:app:url:iphone" content="http://dl.flipkart.com/dl/home?"/><meta name="twitter:app:app:name:ipad" content="Flipkart"/><meta name="twitter:app:id:ipad" content="742044692"/><meta name="twitter:app:url:ipad" content="http://dl.flipkart.com/dl/home?"/>
```

```
In [6]: # convert into html
```

```
soup=BeautifulSoup(r.content,'lxml')  
soup
```

Out[6]: <!DOCTYPE html>

```
<html lang="en"><head><link href="https://rukminim1.flixcart.com" rel="preconnect"/><link href="//static-assets-web.flixcart.com/www/linchpin/fk-cp-zion/css/app_modules.chunk.94b5e7.css" rel="stylesheet"/><link href="//static-assets-web.flixcart.com/www/linchpin/fk-cp-zion/css/app.chunk.dd97f3.css" rel="stylesheet"/><meta content="text/html; charset=utf-8" http-equiv="Content-type"/><meta content="IE=Edge" http-equiv="X-UA-Compatible"/><meta content="102988293558" property="fb:page_id"/><meta content="658873552,624500995,100000233612389" property="fb:admins"/><meta content="noodp" name="robots"/><link href="https://static-assets-web.flixcart.com/www/promos/new/20150528-140547-favicon-retina.ico" rel="shortcut icon"/><link href="/osdd.xml?v=2" rel="search" type="application/opensearchdescription+xml"/><meta content="website" property="og:type"/><meta content="Flipkart.com" name="og_site_name" property="og:site_name"/><link href="/apple-touch-icon-57x57.png" rel="apple-touch-icon" sizes="57x57"/><link href="/apple-touch-icon-72x72.png" rel="apple-touch-icon" sizes="72x72"/><link href="/apple-touch-icon-114x114.png" rel="apple-touch-icon" sizes="114x114"/><link href="/apple-touch-icon-144x144.png" rel="apple-touch-icon" sizes="144x144"/><link href="/apple-touch-icon-57x57.png" rel="apple-touch-icon"/><meta content="app" name="twitter:card"/><meta content="@flipkart" name="twitter:site"/><meta content="@flipkart" name="twitter:creator"/><meta content="Mobiles- Buy Products Online at Best Price in India - All Categories | Flipkart.com" name="twitter:title"/><meta content="Shop for electronics, apparels & more using our Flipkart app Free shipping & COD." name="twitter:description"/><meta content="in" name="twitter:app:country"/><meta content="Flipkart" name="al:ios:app_name"/><meta content="742044692" name="al:ios:app_store_id"/><meta content="Flipkart" name="twitter:app:name:iphone"/><meta content="742044692" name="twitter:app:id:iphone"/><meta content="http://dl.flipkart.com/dl/home?" name="twitter:app:url:iphone"/><meta content="Flipkart" name="twitter:app:name:iphone" value="742044692" /><meta content="https://www.flipkart.com" name="twitter:app:url:iphone" /><meta content="https://www.flipkart.com" name="twitter:app:uri:iphone" />
```

```
In [7]: print(soup.prettify())
```

```
<!DOCTYPE html>
<html lang="en">
  <head>
    <link href="https://rukminim1.flixcart.com" rel="preconnect"/>
    <link href="//static-assets-web.flixcart.com/www/linchpin/fk-cp-zion/css/app_modules.chunk.94b5e7.css" rel="stylesheet"/>
    <link href="//static-assets-web.flixcart.com/www/linchpin/fk-cp-zion/css/app.chunk.dd97f3.css" rel="stylesheet"/>
    <meta content="text/html; charset=utf-8" http-equiv="Content-type"/>
    <meta content="IE=Edge" http-equiv="X-UA-Compatible"/>
    <meta content="102988293558" property="fb:page_id"/>
    <meta content="658873552,624500995,100000233612389" property="fb:admins"/>
    <meta content="noodp" name="robots"/>
    <link href="https://static-assets-web.flixcart.com/www/promos/new/20150528-140547-favicon-retina.ico" rel="shortcut icon"/>
    <link href="/osdd.xml?v=2" rel="search" type="application/opensearchdescription+xml"/>
    <meta content="website" property="og:type"/>
    <meta content="Flipkart.com" name="og_site_name" property="og:site_name"/>
    <link href="/apple-touch-icon-57x57.png" rel="apple-touch-icon" sizes="57x57"/>
    <link href="/apple-touch-icon-72x72.png" rel="apple-touch-icon" sizes="72x72"/>
    <link href="/apple-touch-icon-144x144.png" rel="apple-touch-icon" sizes="144x144"/>
```

to display title

```
In [8]: soup.title.string
```

```
Out[8]: 'Mobiles- Buy Products Online at Best Price in India - All Categories | Flipkart.com'
```

division or a section in an HTML document

```
In [9]: # to check div  
soup.div
```

```
Out[9]: <div id="container"><div data-reactroot=""><div class="_1kfTjk"><div class="_1rH5Jn"><div class="_1TmfNK"></div><div class="_2Xfa2_"><div class="_3_C9Hx"><div class="_3qX0zy"><a href="/"></a><a class="_21ljIi" href="/plus">Explore<!-- --> <span class="_2FVHGh">Plus</span></a></div></div><div class="_1cmsER"><form action="/search" class="_2M8cLY header-form-search" method="GET"><div class="col-12-12 _2o09oE"><div class="_3005Xc"><input autocomplete="off" class="_3704LK" name="q" placeholder="Search for products, brands and more" title="Search for products, brands and more" type="text" value="mobiles"/></div><button class="L0Z3Pu" type="submit"><svg class="" height="20" viewbox="0 0 17 18" width="20" xmlns="http://www.w3.org/2000/svg"><g fill="#2874F1" fill-rule="evenodd"><path class="_34RNph" d="m11.618 9.897l14.225 4.212c.092.092.101.232.02.313l-1.465 1.46c-.081.081-.221.072-.314-.021-4.216-4.203"></path><path class="_34RNph" d="m6.486 10.901c-2.42 0-4.381-1.956-4.381-4.368 0-2.413 1.961-4.369 4.381-4.369 2.42 0 4.381 1.956 4.381 4.369 0 2.413-1.961 4.368-4.381 4.368m0-10.835c-3.582 0-6.486 2.895-6.486 6.467 0 3.572 2.904 6.467 6.486 6.467 3.582 0 6.486-2.895 6.486-6.467 0-3.572-2.904-6.467-6.486-6.467"></path></g></svg></button><input name="otracker" type="hidden" value="search"/><input name="otracker1" type="hidden" value="search"/><input name="marketplace" type="hidden" value="FLIPKART"/><input name="as-show" type="hidden" value="off"/><input name="as" type="hidden" value="off"/></div><ul class="col-12-12 _1MRYA1"></ul></div></form></div><div class="go_D0p _2errNR"><div class="_28p97w"><div class="_1psGvi _3BvnxG"><div><a class="_1_3w1N" href="/account/login?ret=/search%3Fq%3Dmobiles%26as%3Don%26as-show%3D0%26otracker%3DAS_Query_TrendingAutoSuggest_1_0_na_na_na%26otracker1%3DAS_Query_TrendingAutoSuggest_1_0_na_na_na%26as-pos%3D1%26as-type%3DTRENDING%26suggestionId%3Dmobiles%26requestId%3D621b6dee-2a97-40c5-a0a5-b28ed8c9c328">Login</a>
```

to display all hyperlink

```
In [10]: # show all the hyperlink  
soup.find_all('a')
```

```
Out[10]: [<a href="/"></a>,  
 <a class=" _21ljIi" href="/plus">Explore<!-- --> <span class=" _2FVH Gh">Plus</span></a>,  
 <a class=" _1_3w1N" href="/account/login?ret=/search%3Fq%3Dmobiles%26as%3Don%26as-show%3Don%26otracker%3DAS_Query_Tre  
ndingAutoSuggest_1_0_na_na_na%26otracker1%3DAS_Query_TrendingAutoSuggest_1_0_na_na_na%26as-pos%3D1%26as-type%3DTRENDI  
NG%26suggestionId%3Dmobiles%26requestId%3D621b6dee-2a97-40c5-a0a5-b28ed8c9c328">Login</a>,  
 <a class=" _3SkBxJ" href="/viewcart?otracker=Cart_Icon_Click"><svg class="V3C5b0" height="14" viewBox="0 0 16 16" wid  
th="14" xmlns="http://www.w3.org/2000/svg"><path class=" _1bS9ic" d="M15.32 2.405H4.887C3 2.405 2.46.805 2.46.805L2.25  
7.21C2.208.085 2.083 0 1.946 0H.336C.1 0-.064.24.024.461.644 1.945L3.11 9.767C.047.137.175.23.32.23h8.418L-.493 1.958  
H3.768L.002.003C-.017 0-.033-.003-.05-.003-1.06 0-1.92.86-1.92 1.92s.86 1.92 1.92 1.92c.99 0 1.805-.75 1.91-1.712L5.5  
5.076C.12.922.91 1.636 1.867 1.636 1.04 0 1.885-.844 1.885-1.885 0-.866-.584-1.593-1.38-1.814L2.423-8.832C.12-.433-.2  
06-.86-.655-.86" fill="#fff">/</path></svg><span>Cart</span></a>,  
 <a class=" _2qvBBJ _2Mji8F" href="/mobiles-accessories/pr?sid=tty&q=mobiles&otracker=categorytree" title="Mo  
biles & Accessories">Mobiles & Accessories</a>,  
 <a class=" _1jJQdf _2Mji8F" href="/mobiles/pr?sid=tty,4io&q=mobiles&otracker=categorytree" title="Mobiles">Mo  
biles</a>,  
 <a class=" _1nY1tt" href="/buying-guide/mobiles?sid=tty,4io&otracker=bg_from_browse_lhs" title="Buying Guide"><di  
v><span>Need help?</span></div><div class=" _1mVNvF"><span>Help me decide</span><svg class="ViewtL" height="27" viewbo  
x="0 0 16 27" y="0 0 16 27" style="vertical-align: middle; margin-right: 10px;"></svg><span>See more</span></div></a>]
```

to display all tables

```
In [11]: #to display all tables  
all_tables=soup.find_all('table')  
print(all_tables)
```

[]

to display result

```
In [12]: results = soup.find_all('a',{'class':'_1fQZEK'})  
len(results)
```

```
Out[12]: 24
```

```
In [13]: results
```

```
Out[13]: [<a class=" _1fQZEK" href="/samsung-galaxy-f12-sea-green-64-gb/p/item4d3582cd695fd?pid=MOBGF794YPQ9RAE&lid=LSTMOBG  
FG794YPQ9RAEGUPPTW&marketplace=FLIPKART&q=mobiles&store=tty%2F4io&srno=s_1_1&otracker=AS_Query_Tr  
enderingAutoSuggest_1_0_na_na_na&otracker1=AS_Query_TrendingAutoSuggest_1_0_na_na_na&fm=organic&iid=a87c1ff  
e-1e11-483b-a483-4506acda2f36.MOBGF794YPQ9RAE.SEARCH&ppt=None&ppn=None&ssid=5n6ovgu1og000000164269305372  
0&qH=eb4af0bf07c16429" rel="noopener noreferrer" target="_blank"><div class="MIXNux"><div class=" _2QcLo- "><div><d  
iv class="CXW8mj" style="height:200px; width:200px"></div></div><div class=" _3wLduG"><div class=" _3PzNI- "><span class="f3A4_V"><l  
abel class=" _2iDkf8"><input class=" _30VH1S" readonly="" type="checkbox"/><div class=" _24_Dny"></div></label></span><l  
abel class=" _6Up2sF"><span>Add to Compare</span></label></div><div class=" _2hVSre _3nq8ih"><div class=" _36FSn  
5"><svg class=" _110elc" height="16" viewBox="0 0 20 16" width="16" xmlns="http://www.w3.org/2000/svg"><path class="eX  
72wL" d="M8.695 16.682C4.06 12.382 1 9.536 1 6.065 1 3.219 3.178 1 5.95 1c1.566 0 3.069.746 4.05 1.915C10.981 1.745 1  
2.484 1 14.05 1 16.822 1 19 3.22 19 6.065c0 3.471-3.06 6.316-7.695 10.617L10 17.897l-1.305-1.215z" fill="#2874F0" fil  
l-rule="evenodd" opacity=".9" stroke="#FFF"/></svg></div></div><div class=" _3pLy-c row"><div class="col c  
ol-7-12"><div class=" _4rR01T">SAMSUNG Galaxy F12 (Sea Green, 64 GB)</div><div class="gUuXy- "><span class=" _1lRcqv" id  
="productRating_LSTMOBGF794YPQ9RAEGUPPTW_MOBGF794YPQ9RAE_"><div class=" _3LWZ1K">4.2</div></span><span class=" _2_R_DZ"><span>1,89,240 Ratings </sp  
an></span></span>
```

```
In [14]: # picking the 1st card from the complete list of cards  
item = results[0]
```

```
In [15]: item
```

```
Out[15]: <a class=" _1fQZEK" href="/samsung-galaxy-f12-sea-green-64-gb/p/item4d3582cd695fd?pid=MOBGFG794YPQ9RAE&lid=LSTM0BGF794YPQ9RAEGUPPTW&marketplace=FLIPKART&q=mobiles&store=tty%2F4io&srno=s_1_1&otracker=AS_Query_TrendingAutoSuggest_1_0_na_na_na&otracker1=AS_Query_TrendingAutoSuggest_1_0_na_na_na&fm=organic&iid=a87c1ffe-1e11-483b-a483-4506acda2f36.MOBGFG794YPQ9RAE.SEARCH&ppt=None&ppn=None&ssid=5n6ovgu1og000001642693053720&qH=eb4af0bf07c16429" rel="noopener noreferrer" target="_blank"><div class="MIXNux"><div class=" _2QcLo-><div><div class="C Xw8mj" style="height:200px;width:200px"></div></div><div class=" _3wLduG"><div class=" _3PzNI-><span class="f3A4_V"><label class=" _2iDkf8"><input class=" _30VH1S" readonly="" type="checkbox"/><div class=" _24_Dny"></div></label></span><label class=" _6Up2sF"><span>Add to Compare</span></label></div></div><div class=" _2hVSre _3nq8ih"><div class=" _36FSn5"><svg class=" _110elc" height="16" viewBox="0 0 20 16" width="16" xmlns="http://www.w3.org/2000/svg"><path class="eX72wL" d="M8.695 16.682C4.06 12.382 1 9.536 1 6.065 1 3.219 3.178 1 5.95 1c1.566 0 3.069.746 4.05 1.915C10.981 1.745 12.484 1 14.05 1 16.822 1 19 3.22 19 6.065c0 3.471-3.06 6.316-7.695 10.617L10 17.8971-1.305-1.215z" fill="#2874F0" fill-rule="evenodd" opacity=".9" stroke="#FFF"/></path></svg></div></div></div><div class=" _3pLy-c row"><div class="col col-7-12"><div class=" _4rR01T">SAMSUNG Galaxy F12 (Sea Green, 64 GB)</div><div class="gUuXy-><span class=" _1lRcqv" id="productRating_LSTM0BGF794YPQ9RAEGUPPTW_MOBGFG794YPQ9RAE_"><div class=" _3LWZ1K">4.2</div></span><span class=" _2_R_DZ"><span><span>1,89,240 Ratings </span><span class=" _13vcMD">&lt;/span><span> 15,027 Reviews</span></span></div><div class="fMghEO"><ul class=" _1xgFaf"><li class="rgWa7D">4 GB RAM | 6 4 GB ROM | Expandable Upto 512 GB</li><li class="rgWa7D">16.55 cm (6.515 inch) HD+ Display</li><li class="rgWa7D">48MP + 5MP + 2MP + 2MP | 8MP Front Camera</li><li class="rgWa7D">6000 mAh Lithium-ion Battery</li><li class="rgWa7D">Exynos 850 Processor</li><li class="rgWa7D">1 Year Warranty Provided by the Manufacturer from Date of Purchase</li></ul></div><div class="col col-5-12 nLI3QM"><div class=" _3tbKJL"><div class=" _25b18c"><div class=" _30jeq3 _1_WHN1">₹9,499</div><div class=" _3I9_wc _27UcVY">₹<!-- -->12,999</div><div class=" _3Ay6Sb"><span>26% off</span></div></div><div class=" _13J9qT"></div></div></a>
```

```
In [16]: # Extracting the model of the phone from the 1st card
model = item.find('div',{'class':'_4rR01T'}).text
model
```

```
Out[16]: 'SAMSUNG Galaxy F12 (Sea Green, 64 GB)'
```

```
In [17]: # Extracting Stars from 1st card
star = item.find('div',{'class':'_3LWZ1K'}).text
star
```

```
Out[17]: '4.2'
```

```
In [19]: # Extracting Number of Ratings from 1st card
num_ratings = item.find('span',{'class':'_2_R_DZ'}).text.replace('\xa0&\xa0'," ; ")[0:item.find('span',{'class':'_2_R_DZ'})]
```

```
Out[19]: '1,89,240 Ratings'
```

```
In [20]: # Extracting Number of Reviews from 1st card
reviews = item.find('span',{'class':'_2_R_DZ'}).text.replace('\xa0&\xa0'," ; ")[item.find('span',{'class':'_2_R_DZ'})+1:]
```

```
Out[20]: '15,027 Reviews'
```

```
In [21]: # Extracting RAM from the 1st card
ram = item.find('li',{'class':'rgWa7D'}).text[0:item.find('li',{'class':'rgWa7D'}).text.find('|')]
```

```
Out[21]: '4 GB RAM '
```

```
In [23]: # Extracting Storage/ROM from 1st card
storage = item.find('li',{'class':'rgWa7D'}).text[item.find('li',{'class':'rgWa7D'}).text.find('|')+1:][0:11].strip()
```

```
Out[23]: '64 GB ROM'
```

```
In [24]: # Extracting the display option from the 1st card
display = item.find_all('li')[1].text.strip()
display
```

```
Out[24]: '16.55 cm (6.515 inch) HD+ Display'
```

```
In [25]: # Extracting camera options from the 1st card
camera = item.find_all('li')[2].text.strip()
camera
```

```
Out[25]: '48MP + 5MP + 2MP + 2MP | 8MP Front Camera'
```

```
In [26]: # Extracting the battery option from the 1st card
battery = item.find_all('li')[3].text
battery
```

```
Out[26]: '6000 mAh Lithium-ion Battery'
```

```
In [27]: #price of product
```

```
prices=soup.findAll('div',{'class':'_30jeq3 _1_WHN1'})  
prices
```

```
Out[27]: [<div class="_30jeq3 _1_WHN1">₹9,499</div>,<div class="_30jeq3 _1_WHN1">₹12,499</div>,<div class="_30jeq3 _1_WHN1">₹11,499</div>,<div class="_30jeq3 _1_WHN1">₹7,499</div>,<div class="_30jeq3 _1_WHN1">₹7,499</div>,<div class="_30jeq3 _1_WHN1">₹11,499</div>,<div class="_30jeq3 _1_WHN1">₹12,499</div>,<div class="_30jeq3 _1_WHN1">₹9,499</div>,<div class="_30jeq3 _1_WHN1">₹8,999</div>,<div class="_30jeq3 _1_WHN1">₹8,999</div>,<div class="_30jeq3 _1_WHN1">₹10,499</div>,<div class="_30jeq3 _1_WHN1">₹10,499</div>,<div class="_30jeq3 _1_WHN1">₹9,499</div>,<div class="_30jeq3 _1_WHN1">₹7,499</div>,<div class="_30jeq3 _1_WHN1">₹9,499</div>,<div class="_30jeq3 _1_WHN1">₹7,499</div>,<div class="_30jeq3 _1_WHN1">₹11,999</div>,<div class="_30jeq3 _1_WHN1">₹8,999</div>,<div class="_30jeq3 _1_WHN1">₹8,999</div>,<div class="_30jeq3 _1_WHN1">₹13,999</div>,<div class="_30jeq3 _1_WHN1">₹28,999</div>,<div class="_30jeq3 _1_WHN1">₹8,990</div>,<div class="_30jeq3 _1_WHN1">₹7,990</div>,<div class="_30jeq3 _1_WHN1">₹10,499</div>]
```

```
In [28]: def extract_phone_model_info(item):

    # Extracting the model of the phone from the 1st card
    model = item.find('div',{'class':'_4rR01T'}).text
    # Extracting Stars from 1st card
    star = item.find('div',{'class':'_3LWZlK'}).text
    # Extracting Number of Ratings from 1st card
    num_ratings = item.find('span',{'class':'_2_R_DZ'}).text.replace('\xa0&\xa0'," ; ")[0:item.find('span',{'class':'_2_R_DZ'})]
    # Extracting Number of Reviews from 1st card
    reviews = item.find('span',{'class':'_2_R_DZ'}).text.replace('\xa0&\xa0'," ; ")[item.find('span',{'class':'_2_R_DZ'})]
    # Extracting RAM from the 1st card
    ram = item.find('li',{'class':'rgWa7D'}).text[0:item.find('li',{'class':'rgWa7D'}).text.find('|')]
    # Extracting Storage/ROM from 1st card
    storage = item.find('li',{'class':'rgWa7D'}).text[item.find('li',{'class':'rgWa7D'}).text.find('|')+1:][0:10].strip()

    # Extracting the display option from the 1st card
    display = item.find_all('li')[1].text.strip()
    # Extracting camera options from the 1st card
    camera = item.find_all('li')[2].text.strip()
    # Extracting the battery option from the 1st card
    battery = item.find_all('li')[3].text

    result = (model,star,num_ratings,reviews,ram,storage,display,camera,battery)
    return result
```

```
In [29]: # Now putting all the information from all the cards/phone models and putting them into a List
records_list = []
results = soup.find_all('a',{'class':'_1fQZEK'})
for item in results:
    records_list.append(extract_phone_model_info(item))
```

```
In [30]: records_list
```

```
Out[30]: [('SAMSUNG Galaxy F12 (Sea Green, 64 GB)',  
           '4.2',  
           '1,89,240 Ratings',  
           '15,027 Reviews',  
           '4 GB RAM ',  
           '64 GB ROM',  
           '16.55 cm (6.515 inch) HD+ Display',  
           '48MP + 5MP + 2MP + 2MP | 8MP Front Camera',  
           '6000 mAh Lithium-ion Battery'),  
          ('realme Narzo 50A (Oxygen Green, 128 GB)',  
           '4.4',  
           '1,75,810 Ratings',  
           '10,901 Reviews',  
           '4 GB RAM ',  
           '128 GB RO',  
           '16.51 cm (6.5 inch) HD+ Display',  
           '50MP + 2MP + 2MP | 8MP Front Camera',  
           '6000 mAh Battery'),  
          ('realme Narzo 50A (Oxygen Blue, 64 GB)',  
           '4.4',  
           '1,75,810 Ratings',  
           '10,901 Reviews',  
           '4 GB RAM ',  
           '64 GB RO',  
           '16.51 cm (6.5 inch) HD+ Display',  
           '50MP + 2MP + 2MP | 8MP Front Camera',  
           '6000 mAh Battery')]
```

```
In [31]: data=pd.DataFrame(records_list,columns=['model','star',"num_ratings"  
,"reviews",'ram',"storage","display","camera","battery"])
```

In [32]: data

Out[32]:

	model	star	num_ratings	reviews	ram	storage	display	camera	battery
0	SAMSUNG Galaxy F12 (Sea Green, 64 GB)	4.2	1,89,240 Ratings	15,027 Reviews	4 GB RAM	64 GB ROM	16.55 cm (6.515 inch) HD+ Display	48MP + 5MP + 2MP + 2MP 8MP Front Camera	6000 mAh Lithium-ion Battery
1	realme Narzo 50A (Oxygen Green, 128 GB)	4.4	1,75,810 Ratings	10,901 Reviews	4 GB RAM	128 GB RO	16.51 cm (6.5 inch) HD+ Display	50MP + 2MP + 2MP 8MP Front Camera	6000 mAh Battery
2	realme Narzo 50A (Oxygen Blue, 64 GB)	4.4	1,75,810 Ratings	10,901 Reviews	4 GB RAM	64 GB ROM	16.51 cm (6.5 inch) HD+ Display	50MP + 2MP + 2MP 8MP Front Camera	6000 mAh Battery
3	realme Narzo 50i (Mint Green, 32 GB)	4.5	37,384 Ratings	1,548 Reviews	2 GB RAM	32 GB ROM	16.51 cm (6.5 inch) Display	8MP Rear Camera 5MP Front Camera	5000 mAh Battery
4	realme Narzo 50i (Carbon Black, 32 GB)	4.5	37,384 Ratings	1,548 Reviews	2 GB RAM	32 GB ROM	16.51 cm (6.5 inch) Display	8MP Rear Camera 5MP Front Camera	5000 mAh Battery
5	realme Narzo 50A (Oxygen Green, 64 GB)	4.4	1,75,810 Ratings	10,901 Reviews	4 GB RAM	64 GB ROM	16.51 cm (6.5 inch) HD+ Display	50MP + 2MP + 2MP 8MP Front Camera	6000 mAh Battery
6	realme Narzo 50A (Oxygen Blue, 128 GB)	4.4	1,75,810 Ratings	10,901 Reviews	4 GB RAM	128 GB RO	16.51 cm (6.5 inch) HD+ Display	50MP + 2MP + 2MP 8MP Front Camera	6000 mAh Battery
7	realme C21Y (Cross Blue, 32 GB)	4.6	35,185 Ratings	1,093 Reviews	3 GB RAM	32 GB ROM	16.51 cm (6.5 inch) HD+ Display	13MP + 2MP + 2MP 5MP Front Camera	5000 mAh Battery
8	realme Narzo 50i (Carbon Black, 64 GB)	4.3	23,145 Ratings	1,188 Reviews	4 GB RAM	64 GB ROM	16.51 cm (6.5 inch) Display	8MP Rear Camera 5MP Front Camera	5000 mAh Battery
9	realme Narzo 50i (Mint Green, 64 GB)	4.3	23,145 Ratings	1,188 Reviews	4 GB RAM	64 GB ROM	16.51 cm (6.5 inch) Display	8MP Rear Camera 5MP Front Camera	5000 mAh Battery
10	realme C21Y (Cross Blue, 64 GB)	4.5	1,99,309 Ratings	7,539 Reviews	4 GB RAM	64 GB ROM	16.51 cm (6.5 inch) HD+ Display	13MP + 2MP + 2MP 5MP Front Camera	5000 mAh Battery
11	realme C21Y (Cross Black, 64 GB)	4.5	1,99,309 Ratings	7,539 Reviews	4 GB RAM	64 GB ROM	16.51 cm (6.5 inch) HD+ Display	13MP + 2MP + 2MP 5MP Front Camera	5000 mAh Battery
12	SAMSUNG Galaxy F12 (Celestial Black, 64 GB)	4.2	1,89,240 Ratings	15,027 Reviews	4 GB RAM	64 GB ROM	16.55 cm (6.515 inch) HD+ Display	48MP + 5MP + 2MP + 2MP 8MP Front Camera	6000 mAh Lithium-ion Battery
13	realme C11 2021 (Cool Grey, 32 GB)	4.4	1,41,838 Ratings	6,563 Reviews	2 GB RAM	32 GB ROM	16.51 cm (6.5 inch) HD+ Display	8MP Rear Camera 5MP Front Camera	5000 mAh Battery
14	realme C21Y (Cross Black, 32 GB)	4.6	35,185 Ratings	1,093 Reviews	3 GB RAM	32 GB ROM	16.51 cm (6.5 inch) HD+ Display	13MP + 2MP + 2MP 5MP Front Camera	5000 mAh Battery

		model	star	num_ratings	reviews	ram	storage	display	camera	battery
15	realme C11 2021 (Cool Blue, 32 GB)	4.4	1,41,838 Ratings	6,563 Reviews	2 GB RAM	32 GB ROM	16.51 cm (6.5 inch) HD+ Display	8MP Rear Camera 5MP Front Camera	5000 mAh Battery	
16	realme C25Y (Metal Grey, 128 GB)	4.5	88,605 Ratings	3,391 Reviews	4 GB RAM	128 GB RO	16.51 cm (6.5 inch) HD+ Display	50MP + 2MP + 2MP 8MP Front Camera	5000 mAh Battery	
17	realme C11 2021 (Cool Blue, 64 GB)	4.3	1,26,120 Ratings	7,049 Reviews	4 GB RAM	64 GB ROM	16.51 cm (6.5 inch) HD+ Display	8MP Rear Camera 5MP Front Camera	5000 mAh Battery	
18	realme C11 2021 (Cool Grey, 64 GB)	4.3	1,26,120 Ratings	7,049 Reviews	4 GB RAM	64 GB ROM	16.51 cm (6.5 inch) HD+ Display	8MP Rear Camera 5MP Front Camera	5000 mAh Battery	
19	realme 8i (Space Black, 64 GB)	4.5	1,11,346 Ratings	6,702 Reviews	4 GB RAM	64 GB ROM	16.76 cm (6.6 inch) Full HD+ Display	50MP + 2MP + 2MP 16MP Front Camera	5000 mAh Battery	
20	APPLE iPhone SE (Black, 64 GB)	4.5	1,38,271 Ratings	11,139 Reviews	64 GB RO	64 GB ROM	11.94 cm (4.7 inch) Retina HD Display	12MP Rear Camera 7MP Front Camera	A13 Bionic Chip with 3rd Gen Neural Engine Pro...	
21	OPPO A12 (Blue, 64 GB)	4.4	59,502 Ratings	2,656 Reviews	4 GB RAM	64 GB ROM	15.8 cm (6.22 inch) HD+ Display	13MP + 2MP 5MP Front Camera	4230 mAh Battery	
22	OPPO A12 (Black, 32 GB)	4.4	66,657 Ratings	4,096 Reviews	3 GB RAM	32 GB ROM	15.8 cm (6.22 inch) HD+ Display	13MP + 2MP 5MP Front Camera	4230 mAh Battery	
23	SAMSUNG Galaxy F12 (Sky Blue, 128 GB)	4.2	1,89,240 Ratings	15,027 Reviews	4 GB RAM	128 GB RO	16.55 cm (6.515 inch) HD+ Display	48MP + 5MP + 2MP + 2MP 8MP Front Camera	6000 mAh Lithium-ion Battery	

In [33]: `#to add price column in dataset
data['price'] = prices`

In [35]: data

Out[35]:

	model	star	num_ratings	reviews	ram	storage	display	camera	battery	price
0	SAMSUNG Galaxy F12 (Sea Green, 64 GB)	4.2	1,89,240 Ratings	15,027 Reviews	4 GB RAM	64 GB ROM	16.55 cm (6.515 inch) HD+ Display	48MP + 5MP + 2MP + 2MP 8MP Front Camera	6000 mAh Lithium-ion Battery	[₹9,499]
1	realme Narzo 50A (Oxygen Green, 128 GB)	4.4	1,75,810 Ratings	10,901 Reviews	4 GB RAM	128 GB RO	16.51 cm (6.5 inch) HD+ Display	50MP + 2MP + 2MP 8MP Front Camera	6000 mAh Battery	[₹12,499]
2	realme Narzo 50A (Oxygen Blue, 64 GB)	4.4	1,75,810 Ratings	10,901 Reviews	4 GB RAM	64 GB ROM	16.51 cm (6.5 inch) HD+ Display	50MP + 2MP + 2MP 8MP Front Camera	6000 mAh Battery	[₹11,499]
3	realme Narzo 50i (Mint Green, 32 GB)	4.5	37,384 Ratings	1,548 Reviews	2 GB RAM	32 GB ROM	16.51 cm (6.5 inch) Display	8MP Rear Camera 5MP Front Camera	5000 mAh Battery	[₹7,499]
4	realme Narzo 50i (Carbon Black, 32 GB)	4.5	37,384 Ratings	1,548 Reviews	2 GB RAM	32 GB ROM	16.51 cm (6.5 inch) Display	8MP Rear Camera 5MP Front Camera	5000 mAh Battery	[₹7,499]
5	realme Narzo 50A (Oxygen Green, 64 GB)	4.4	1,75,810 Ratings	10,901 Reviews	4 GB RAM	64 GB ROM	16.51 cm (6.5 inch) HD+ Display	50MP + 2MP + 2MP 8MP Front Camera	6000 mAh Battery	[₹11,499]
6	realme Narzo 50A (Oxygen Blue, 128 GB)	4.4	1,75,810 Ratings	10,901 Reviews	4 GB RAM	128 GB RO	16.51 cm (6.5 inch) HD+ Display	50MP + 2MP + 2MP 8MP Front Camera	6000 mAh Battery	[₹12,499]
7	realme C21Y (Cross Blue, 32 GB)	4.6	35,185 Ratings	1,093 Reviews	3 GB RAM	32 GB ROM	16.51 cm (6.5 inch) HD+ Display	13MP + 2MP + 2MP 5MP Front Camera	5000 mAh Battery	[₹9,499]
8	realme Narzo 50i (Carbon Black, 64 GB)	4.3	23,145 Ratings	1,188 Reviews	4 GB RAM	64 GB ROM	16.51 cm (6.5 inch) Display	8MP Rear Camera 5MP Front Camera	5000 mAh Battery	[₹8,999]
9	realme Narzo 50i (Mint Green, 64 GB)	4.3	23,145 Ratings	1,188 Reviews	4 GB RAM	64 GB ROM	16.51 cm (6.5 inch) Display	8MP Rear Camera 5MP Front Camera	5000 mAh Battery	[₹8,999]
10	realme C21Y (Cross Blue, 64 GB)	4.5	1,99,309 Ratings	7,539 Reviews	4 GB RAM	64 GB ROM	16.51 cm (6.5 inch) HD+ Display	13MP + 2MP + 2MP 5MP Front Camera	5000 mAh Battery	[₹10,499]

		model	star	num_ratings	reviews	ram	storage	display	camera	battery	price
11		realme C21Y (Cross Black, 64 GB)	4.5	1,99,309 Ratings	7,539 Reviews	4 GB RAM	64 GB ROM	16.51 cm (6.5 inch) HD+ Display	13MP + 2MP + 2MP 5MP Front Camera	5000 mAh Battery	[₹10,499]
12		SAMSUNG Galaxy F12 (Celestial Black, 64 GB)	4.2	1,89,240 Ratings	15,027 Reviews	4 GB RAM	64 GB ROM	16.55 cm (6.515 inch) HD+ Display	48MP + 5MP + 2MP + 2MP 8MP Front Camera	6000 mAh Lithium-ion Battery	[₹9,499]
13		realme C11 2021 (Cool Grey, 32 GB)	4.4	1,41,838 Ratings	6,563 Reviews	2 GB RAM	32 GB ROM	16.51 cm (6.5 inch) HD+ Display	8MP Rear Camera 5MP Front Camera	5000 mAh Battery	[₹7,499]
14		realme C21Y (Cross Black, 32 GB)	4.6	35,185 Ratings	1,093 Reviews	3 GB RAM	32 GB ROM	16.51 cm (6.5 inch) HD+ Display	13MP + 2MP + 2MP 5MP Front Camera	5000 mAh Battery	[₹9,499]
15		realme C11 2021 (Cool Blue, 32 GB)	4.4	1,41,838 Ratings	6,563 Reviews	2 GB RAM	32 GB ROM	16.51 cm (6.5 inch) HD+ Display	8MP Rear Camera 5MP Front Camera	5000 mAh Battery	[₹7,499]
16		realme C25Y (Metal Grey, 128 GB)	4.5	88,605 Ratings	3,391 Reviews	4 GB RAM	128 GB RO	16.51 cm (6.5 inch) HD+ Display	50MP + 2MP + 2MP 8MP Front Camera	5000 mAh Battery	[₹11,999]
17		realme C11 2021 (Cool Blue, 64 GB)	4.3	1,26,120 Ratings	7,049 Reviews	4 GB RAM	64 GB ROM	16.51 cm (6.5 inch) HD+ Display	8MP Rear Camera 5MP Front Camera	5000 mAh Battery	[₹8,999]
18		realme C11 2021 (Cool Grey, 64 GB)	4.3	1,26,120 Ratings	7,049 Reviews	4 GB RAM	64 GB ROM	16.51 cm (6.5 inch) HD+ Display	8MP Rear Camera 5MP Front Camera	5000 mAh Battery	[₹8,999]
19		realme 8i (Space Black, 64 GB)	4.5	1,11,346 Ratings	6,702 Reviews	4 GB RAM	64 GB ROM	16.76 cm (6.6 inch) Full HD+ Display	50MP + 2MP + 2MP 16MP Front Camera	5000 mAh Battery	[₹13,999]
20		APPLE iPhone SE (Black, 64 GB)	4.5	1,38,271 Ratings	11,139 Reviews	64 GB RO	64 GB ROM	11.94 cm (4.7 inch) Retina HD Display	12MP Rear Camera 7MP Front Camera	A13 Bionic Chip with 3rd Gen Neural Engine Pro...	[₹28,999]
21		OPPO A12 (Blue, 64 GB)	4.4	59,502 Ratings	2,656 Reviews	4 GB RAM	64 GB ROM	15.8 cm (6.22 inch) HD+ Display	13MP + 2MP 5MP Front Camera	4230 mAh Battery	[₹8,990]
22		OPPO A12 (Black, 32 GB)	4.4	66,657 Ratings	4,096 Reviews	3 GB RAM	32 GB ROM	15.8 cm (6.22 inch) HD+ Display	13MP + 2MP 5MP Front Camera	4230 mAh Battery	[₹7,990]

	model	star	num_ratings	reviews	ram	storage	display	camera	battery	price
23	SAMSUNG Galaxy F12 (Sky Blue, 128 GB)	4.2	1,89,240 Ratings	15,027 Reviews	4 GB RAM	128 GB RO	16.55 cm (6.515 inch) HD+ Display	48MP + 5MP + 2MP + 2MP 8MP Front Camera	6000 mAh Lithium-ion Battery	[₹10,499]

Storing Raw data in CSV Format

```
In [36]: data.to_csv('Scrapped_Data.csv')
```

to display top 5 data from dataframe

```
In [101]: data.head()
```

	model	star	num_ratings	reviews	ram	storage	display	camera	battery	price
0	realme Narzo 50i (Mint Green, 32 GB)	4.5	37,384 Ratings	1,548 Reviews	2 GB RAM	32 GB ROM	16.51 cm (6.5 inch) Display	8MP Rear Camera 5MP Front Camera	5000 mAh Battery	[₹7,499]
1	realme Narzo 50i (Carbon Black, 32 GB)	4.5	37,384 Ratings	1,548 Reviews	2 GB RAM	32 GB ROM	16.51 cm (6.5 inch) Display	8MP Rear Camera 5MP Front Camera	5000 mAh Battery	[₹7,499]
2	realme Narzo 50A (Oxygen Blue, 128 GB)	4.4	1,75,810 Ratings	10,901 Reviews	4 GB RAM	128 GB RO	16.51 cm (6.5 inch) HD+ Display	50MP + 2MP + 2MP 8MP Front Camera	6000 mAh Battery	[₹12,499]
3	realme Narzo 50A (Oxygen Green, 64 GB)	4.4	1,75,810 Ratings	10,901 Reviews	4 GB RAM	64 GB ROM	16.51 cm (6.5 inch) HD+ Display	50MP + 2MP + 2MP 8MP Front Camera	6000 mAh Battery	[₹11,499]
4	realme Narzo 50A (Oxygen Blue, 64 GB)	4.4	1,75,810 Ratings	10,901 Reviews	4 GB RAM	64 GB ROM	16.51 cm (6.5 inch) HD+ Display	50MP + 2MP + 2MP 8MP Front Camera	6000 mAh Battery	[₹11,499]

to display bottom 5 data from dataframe

```
In [102]: data.tail()
```

Out[102]:

		model	star	num_ratings	reviews	ram	storage	display	camera	battery	price
19		REDMI 9i Sport (Metallic Blue, 64 GB)	4.4	31,750 Ratings	1,589 Reviews	4 GB RAM	64 GB ROM	16.59 cm (6.53 inch) HD+ Display	13MP Rear Camera 5MP Front Camera	5000 mAh Li-Polymer Battery	[₹8,499]
20		REDMI 9i Sport (Coral Green, 64 GB)	4.4	31,750 Ratings	1,589 Reviews	4 GB RAM	64 GB ROM	16.59 cm (6.53 inch) HD+ Display	13MP Rear Camera 5MP Front Camera	5000 mAh Li-Polymer Battery	[₹8,499]
21		REDMI 9i (Sea Blue, 64 GB)	4.3	5,35,796 Ratings	31,710 Reviews	4 GB RAM	64 GB ROM	16.59 cm (6.53 inch) HD+ Display	13MP Rear Camera 5MP Front Camera	5000 mAh Lithium Polymer Battery	[₹8,499]
22		OPPO A12 (Flowing Silver, 64 GB)	4.4	59,502 Ratings	2,656 Reviews	4 GB RAM	64 GB ROM	15.8 cm (6.22 inch) HD+ Display	13MP + 2MP 5MP Front Camera	4230 mAh Battery	[₹8,990]
23		OPPO A12 (Black, 32 GB)	4.4	66,657 Ratings	4,096 Reviews	3 GB RAM	32 GB ROM	15.8 cm (6.22 inch) HD+ Display	13MP + 2MP 5MP Front Camera	4230 mAh Battery	[₹7,990]

to check row and column

```
In [103]: data.shape
```

Out[103]: (24, 10)

To display columns

```
In [104]: data.columns
```

Out[104]: Index(['model', 'star', 'num_ratings', 'reviews', 'ram', 'storage', 'display',
'camera', 'battery', 'price'],
dtype='object')

To check null value

In [105]: `data.isnull()`

to print sum of null value

```
In [106]: # print the sum of null value  
data.isnull().sum()
```

```
Out[106]: model      0  
star        0  
num_ratings 0  
reviews     0  
ram         0  
storage     0  
display     0  
camera      0  
battery     0  
price       0  
dtype: int64
```

to display the information of DataSet

```
In [107]: data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 24 entries, 0 to 23
Data columns (total 10 columns):
 #   Column      Non-Null Count  Dtype  
--- 
 0   model       24 non-null    object  
 1   star        24 non-null    object  
 2   num_ratings 24 non-null    object  
 3   reviews     24 non-null    object  
 4   ram         24 non-null    object  
 5   storage     24 non-null    object  
 6   display     24 non-null    object  
 7   camera      24 non-null    object  
 8   battery     24 non-null    object  
 9   price       24 non-null    object  
dtypes: object(10)
memory usage: 2.0+ KB
```

to display data :- ram, storage, display, camera, battery, and price groupby model

In [122]: `#to display data groupby model`

```
top_10 = data.groupby('model')[['ram','storage','display','camera','battery','price']].sum().reset_index()
top_10.head(10)
```

Out[122]:

	model	ram	storage	display	camera	battery	price
0	OPPO A12 (Black, 32 GB)	3 GB RAM	32 GB ROM	15.8 cm (6.22 inch) HD+ Display	13MP + 2MP 5MP Front Camera	4230 mAh Battery	[₹7,990]
1	OPPO A12 (Flowing Silver, 64 GB)	4 GB RAM	64 GB ROM	15.8 cm (6.22 inch) HD+ Display	13MP + 2MP 5MP Front Camera	4230 mAh Battery	[₹8,990]
2	REDMI 9i (Sea Blue, 64 GB)	4 GB RAM	64 GB ROM	16.59 cm (6.53 inch) HD+ Display	13MP Rear Camera 5MP Front Camera	5000 mAh Lithium Polymer Battery	[₹8,499]
3	REDMI 9i Sport (Coral Green, 64 GB)	4 GB RAM	64 GB ROM	16.59 cm (6.53 inch) HD+ Display	13MP Rear Camera 5MP Front Camera	5000 mAh Li-Polymer Battery	[₹8,499]
4	REDMI 9i Sport (Metallic Blue, 64 GB)	4 GB RAM	64 GB ROM	16.59 cm (6.53 inch) HD+ Display	13MP Rear Camera 5MP Front Camera	5000 mAh Li-Polymer Battery	[₹8,499]
5	SAMSUNG Galaxy F12 (Celestial Black, 64 GB)	4 GB RAM	64 GB ROM	16.55 cm (6.515 inch) HD+ Display	48MP + 5MP + 2MP + 2MP 8MP Front Camera	6000 mAh Lithium-ion Battery	[₹9,499]
6	SAMSUNG Galaxy F12 (Sky Blue, 128 GB)	4 GB RAM	128 GB RO	16.55 cm (6.515 inch) HD+ Display	48MP + 5MP + 2MP + 2MP 8MP Front Camera	6000 mAh Lithium-ion Battery	[₹10,499]
7	realme 8i (Space Black, 64 GB)	4 GB RAM	64 GB ROM	16.76 cm (6.6 inch) Full HD+ Display	50MP + 2MP + 2MP 16MP Front Camera	5000 mAh Battery	[₹13,999]
8	realme C11 2021 (Cool Blue, 32 GB)	2 GB RAM	32 GB ROM	16.51 cm (6.5 inch) HD+ Display	8MP Rear Camera 5MP Front Camera	5000 mAh Battery	[₹7,499]
9	realme C11 2021 (Cool Blue, 64 GB)	4 GB RAM	64 GB ROM	16.51 cm (6.5 inch) HD+ Display	8MP Rear Camera 5MP Front Camera	5000 mAh Battery	[₹8,999]

to display data :- star, reviews, num_ratings groupby model

```
In [123]: top_10 = data.groupby('model')[['star','reviews','num_ratings']].sum().reset_index()
top_10.head(10)
```

Out[123]:

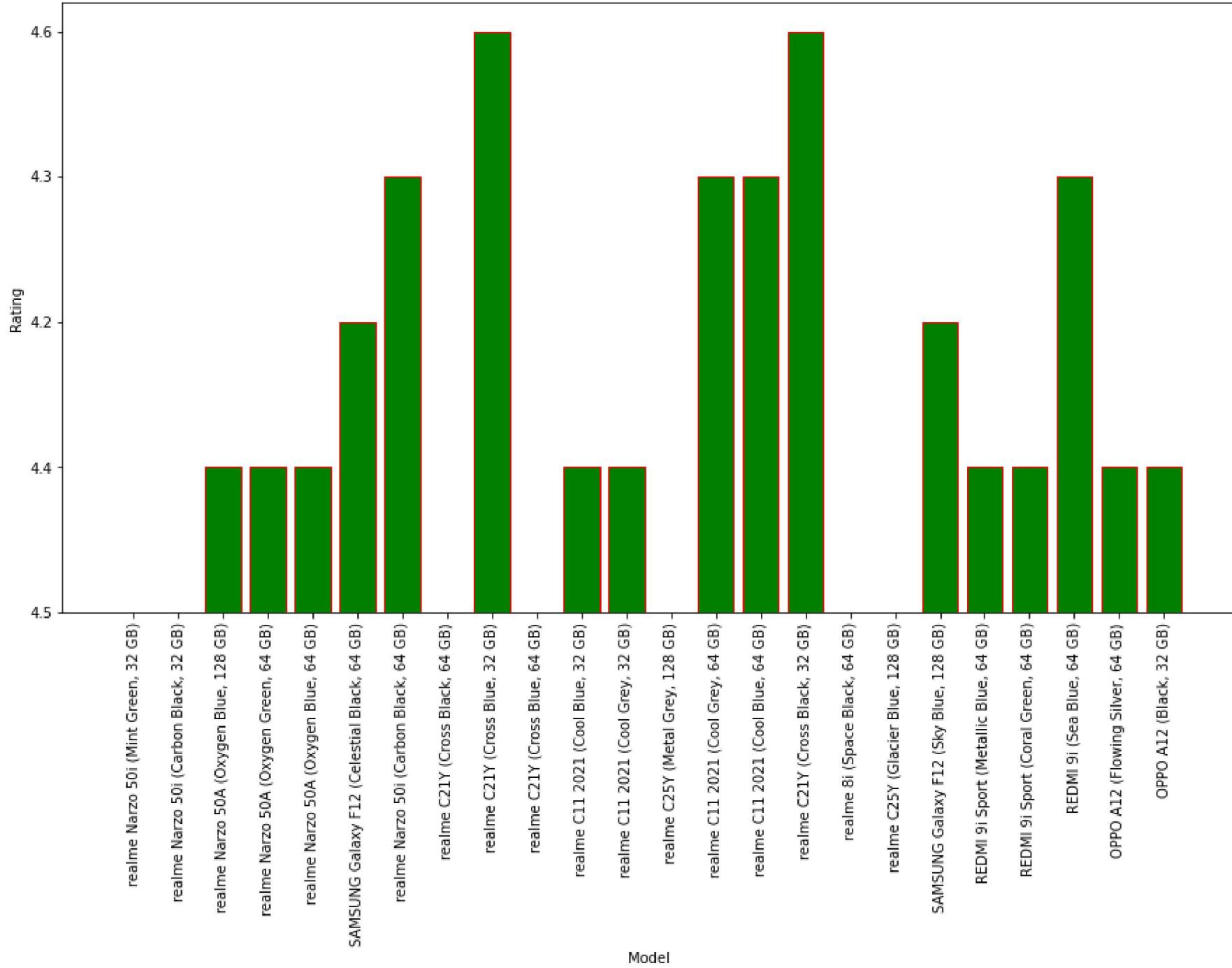
	model	star	reviews	num_ratings
0	OPPO A12 (Black, 32 GB)	4.4	4,096 Reviews	66,657 Ratings
1	OPPO A12 (Flowing Silver, 64 GB)	4.4	2,656 Reviews	59,502 Ratings
2	REDMI 9i (Sea Blue, 64 GB)	4.3	31,710 Reviews	5,35,796 Ratings
3	REDMI 9i Sport (Coral Green, 64 GB)	4.4	1,589 Reviews	31,750 Ratings
4	REDMI 9i Sport (Metallic Blue, 64 GB)	4.4	1,589 Reviews	31,750 Ratings
5	SAMSUNG Galaxy F12 (Celestial Black, 64 GB)	4.2	15,027 Reviews	1,89,240 Ratings
6	SAMSUNG Galaxy F12 (Sky Blue, 128 GB)	4.2	15,027 Reviews	1,89,240 Ratings
7	realme 8i (Space Black, 64 GB)	4.5	6,702 Reviews	1,11,346 Ratings
8	realme C11 2021 (Cool Blue, 32 GB)	4.4	6,563 Reviews	1,41,838 Ratings
9	realme C11 2021 (Cool Blue, 64 GB)	4.3	7,049 Reviews	1,26,120 Ratings

In []:

Data Visualization

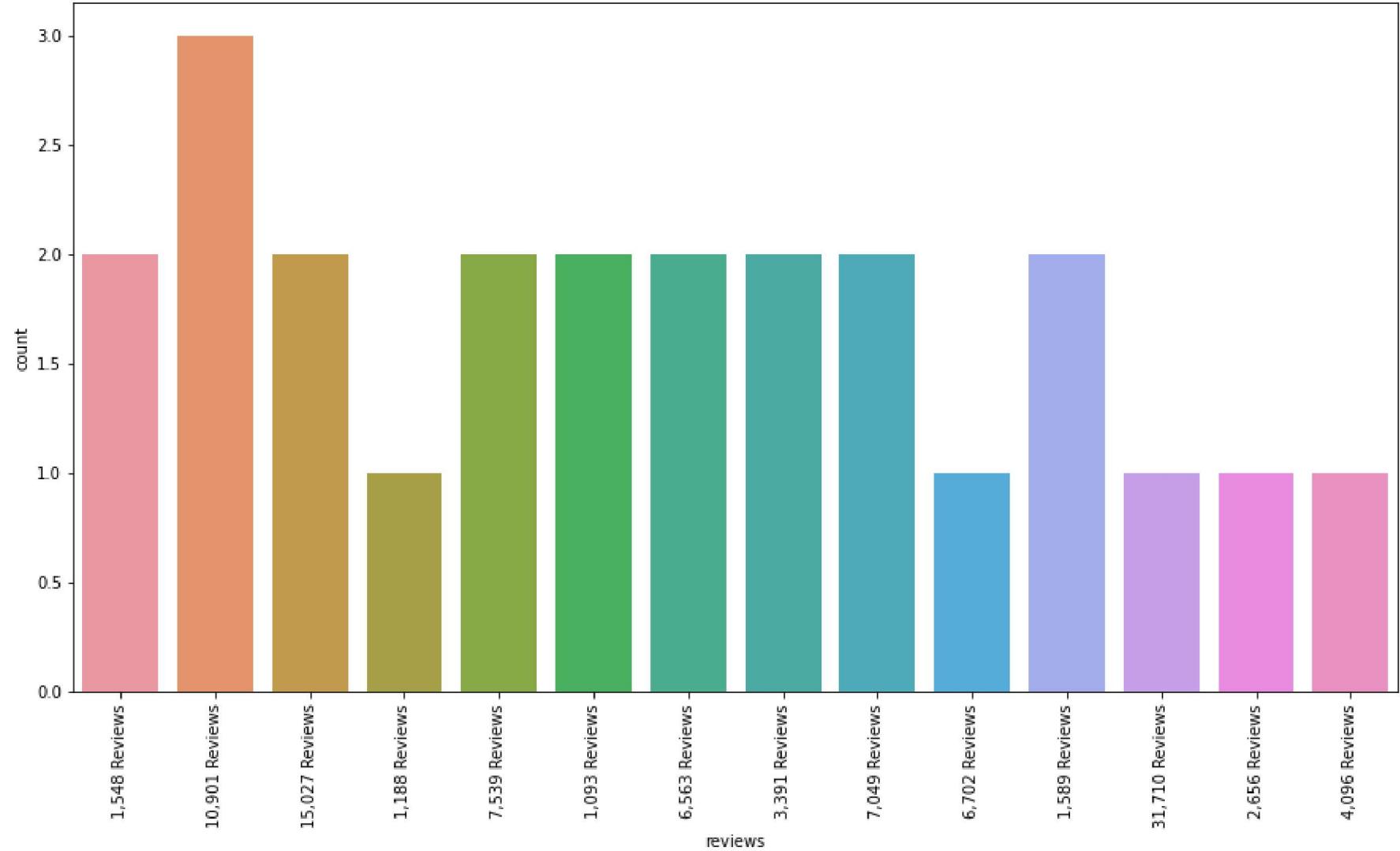
Plotting a bar chart to rating all brands

```
In [180]: import matplotlib.pyplot as plt
plt.figure(figsize=(15,8))
plt.bar(data['model'], data['star'], color='green', edgecolor='red')
plt.xlabel("Model")
plt.ylabel("Rating")
plt.xticks(rotation=90)
plt.show()
```



count plot for reviews of all brands

```
In [174]: plt.figure(figsize=(15,8))
ax = sns.countplot(x='reviews', data=data)
ax
plt.xticks(rotation=90)
plt.show()
```



top 10 mobiles

```
In [311]: d.price = [x.strip(',') for x in d.price]
```

```
In [305]: ndata=pd.DataFrame(data.iloc[:,[0]]).head(10)
```

```
In [306]: ndata
```

Out[306]:

	model
0	realme Narzo 50i (Mint Green, 32 GB)
1	realme Narzo 50i (Carbon Black, 32 GB)
2	realme Narzo 50A (Oxygen Blue, 128 GB)
3	realme Narzo 50A (Oxygen Green, 64 GB)
4	realme Narzo 50A (Oxygen Blue, 64 GB)
5	SAMSUNG Galaxy F12 (Celestial Black, 64 GB)
6	realme Narzo 50i (Carbon Black, 64 GB)
7	realme C21Y (Cross Black, 64 GB)
8	realme C21Y (Cross Blue, 32 GB)
9	realme C21Y (Cross Blue, 64 GB)

```
In [313]: d1=d.head(10)  
d1
```

```
Out[313]:    price
```

	price
0	7,499
1	7,499
2	12,499
3	11,499
4	11,499
5	9,499
6	8,999
7	10,499
8	9,499
9	10,499

```
In [309]: result = pd.concat([ndata, d1], axis=1, join='inner')
result
```

```
Out[309]:
```

	model	price
0	realme Narzo 50i (Mint Green, 32 GB)	7,499
1	realme Narzo 50i (Carbon Black, 32 GB)	7,499
2	realme Narzo 50A (Oxygen Blue, 128 GB)	12,499
3	realme Narzo 50A (Oxygen Green, 64 GB)	11,499
4	realme Narzo 50A (Oxygen Blue, 64 GB)	11,499
5	SAMSUNG Galaxy F12 (Celestial Black, 64 GB)	9,499
6	realme Narzo 50i (Carbon Black, 64 GB)	8,999
7	realme C21Y (Cross Black, 64 GB)	10,499
8	realme C21Y (Cross Blue, 32 GB)	9,499
9	realme C21Y (Cross Blue, 64 GB)	10,499

```
In [ ]:
```

Conclusion

By analyzing the product model, star, num_ratings, reviews, ram, storage, display, camera, battery, price using text mining we gathered most appeared positive words using the word clouds. We can conclude that text mining gains insights. This technique provides an opportunity to improve the overall customer experience.

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In [ ]:
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