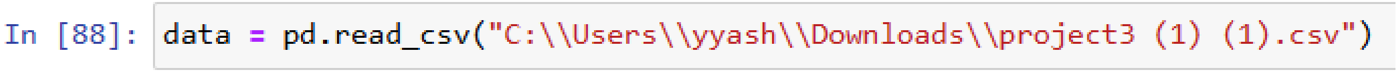
Coding Challenge

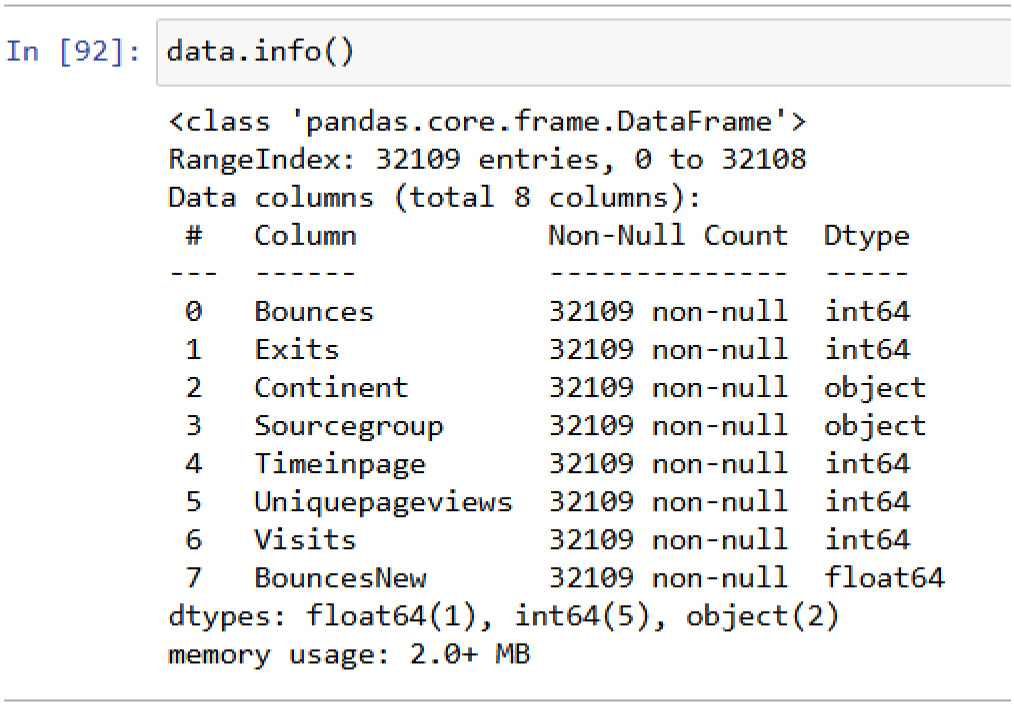
Task 1 - The team wants to analyse each variable of the data collected through data summarization to get a basic understanding of the dataset and to prepare for further analysis.

Firstly reading the CSV file.

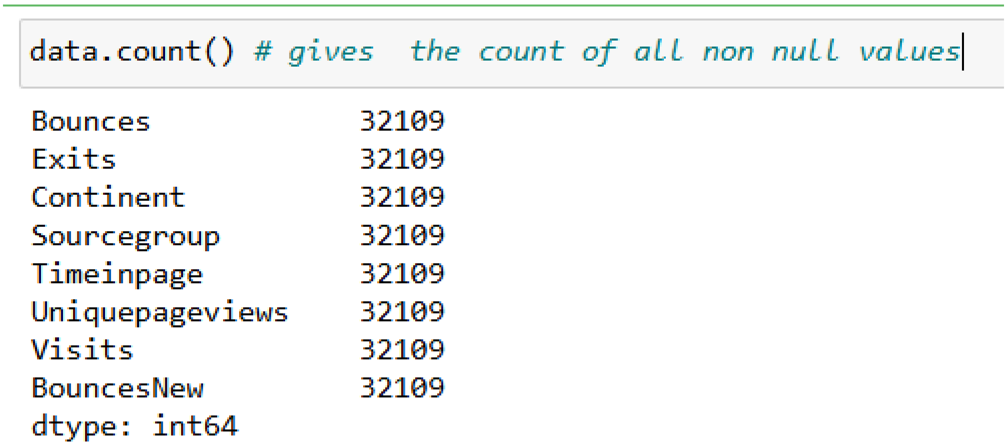


```
In [88]: data = pd.read_csv("C:\\Users\\yyash\\Downloads\\project3 (1) (1).csv")
```

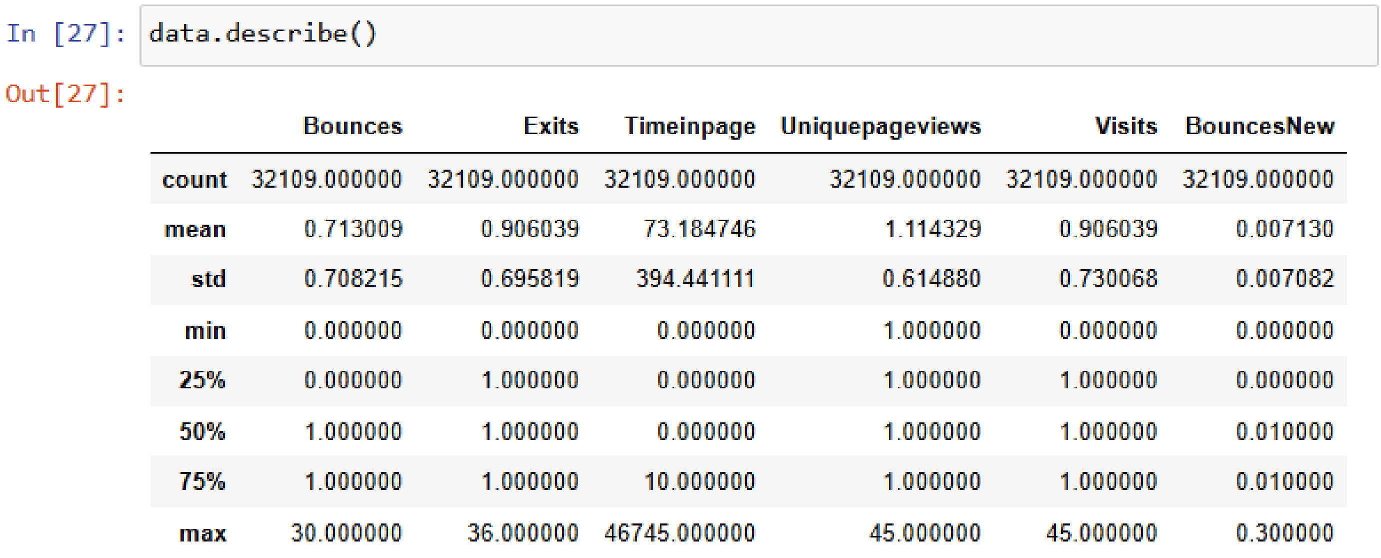
Analysing means to get information about the data present in the table, so to get it we run certain commands in python.



```
In [92]: data.info()

         <class 'pandas.core.frame.DataFrame'>
         RangeIndex: 32109 entries, 0 to 32108
         Data columns (total 8 columns):
          #   Column           Non-Null Count  Dtype  
         ---  ------           --------------  -----  
          0   Bounces          32109 non-null  int64  
          1   Exits            32109 non-null  int64  
          2   Continent        32109 non-null  object 
          3   Sourcegroup      32109 non-null  object 
          4   Timeinpage       32109 non-null  int64  
          5   Uniquepageviews  32109 non-null  int64  
          6   Visits           32109 non-null  int64  
          7   BouncesNew       32109 non-null  float64
         dtypes: float64(1), int64(5), object(2)
         memory usage: 2.0+ MB
```



```
data.count() # gives  the count of all non null values

Bounces            32109
Exits              32109
Continent          32109
Sourcegroup        32109
Timeinpage         32109
Uniquepageviews    32109
Visits             32109
BouncesNew         32109
dtype: int64
```



```
In [27]: data.describe()
```

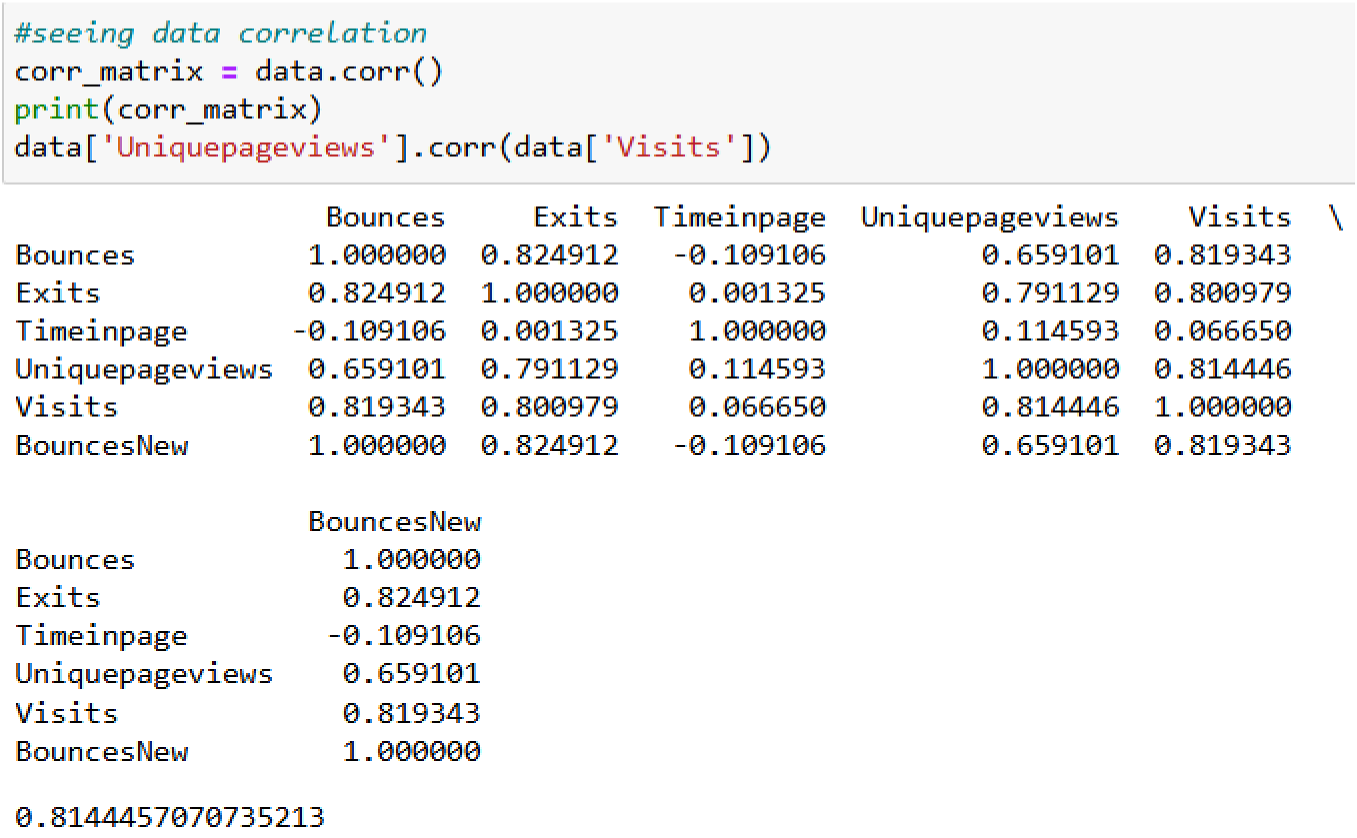
Out[27]:

	Bounces	Exits	Timeinpage	Uniquepageviews	Visits	BouncesNew
count	32109.000000	32109.000000	32109.000000	32109.000000	32109.000000	32109.000000
mean	0.713009	0.906039	73.184746	1.114329	0.906039	0.007130
std	0.708215	0.695819	394.441111	0.614880	0.730068	0.007082
min	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000
25%	0.000000	1.000000	0.000000	1.000000	1.000000	0.000000
50%	1.000000	1.000000	0.000000	1.000000	1.000000	0.010000
75%	1.000000	1.000000	10.000000	1.000000	1.000000	0.010000
max	30.000000	36.000000	46745.000000	45.000000	45.000000	0.300000

TASK 2 –

As mentioned earlier, a unique page view represents the number of sessions during which that page was viewed one or more times. A visit counts all instances, no matter how many times the same visitor may have been to your site. So the team needs to know whether the unique page view value depends on visits.

So, here we to see what is the relation between two columns are they related or not, and if yes then to what extent.



```
#seeing data correlation
corr_matrix = data.corr()
print(corr_matrix)
data['Uniquepageviews'].corr(data['Visits'])
```

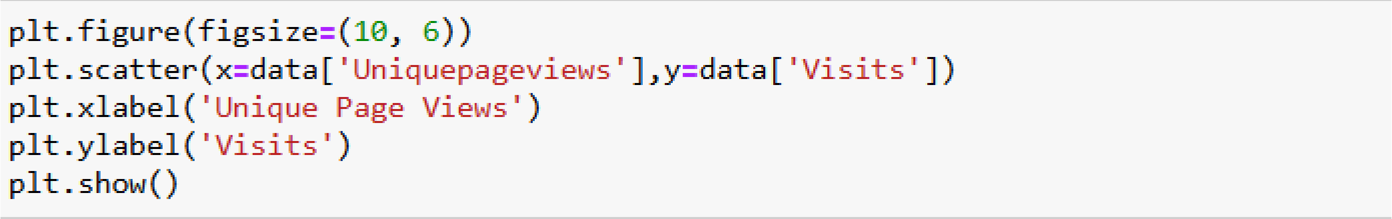
```
                  Bounces     Exits  Timeinpage  Uniquepageviews    Visits  \
Bounces          1.000000  0.824912   -0.109106         0.659101  0.819343
Exits            0.824912  1.000000    0.001325         0.791129  0.800979
Timeinpage      -0.109106  0.001325    1.000000         0.114593  0.066650
Uniquepageviews  0.659101  0.791129    0.114593         1.000000  0.814446
Visits           0.819343  0.800979    0.066650         0.814446  1.000000
BouncesNew       1.000000  0.824912   -0.109106         0.659101  0.819343

                 BouncesNew
Bounces            1.000000
Exits              0.824912
Timeinpage        -0.109106
Uniquepageviews    0.659101
Visits             0.819343
BouncesNew         1.000000

0.8144457070735213
```

We can see that the correlation between the 2 columns comes as .81.

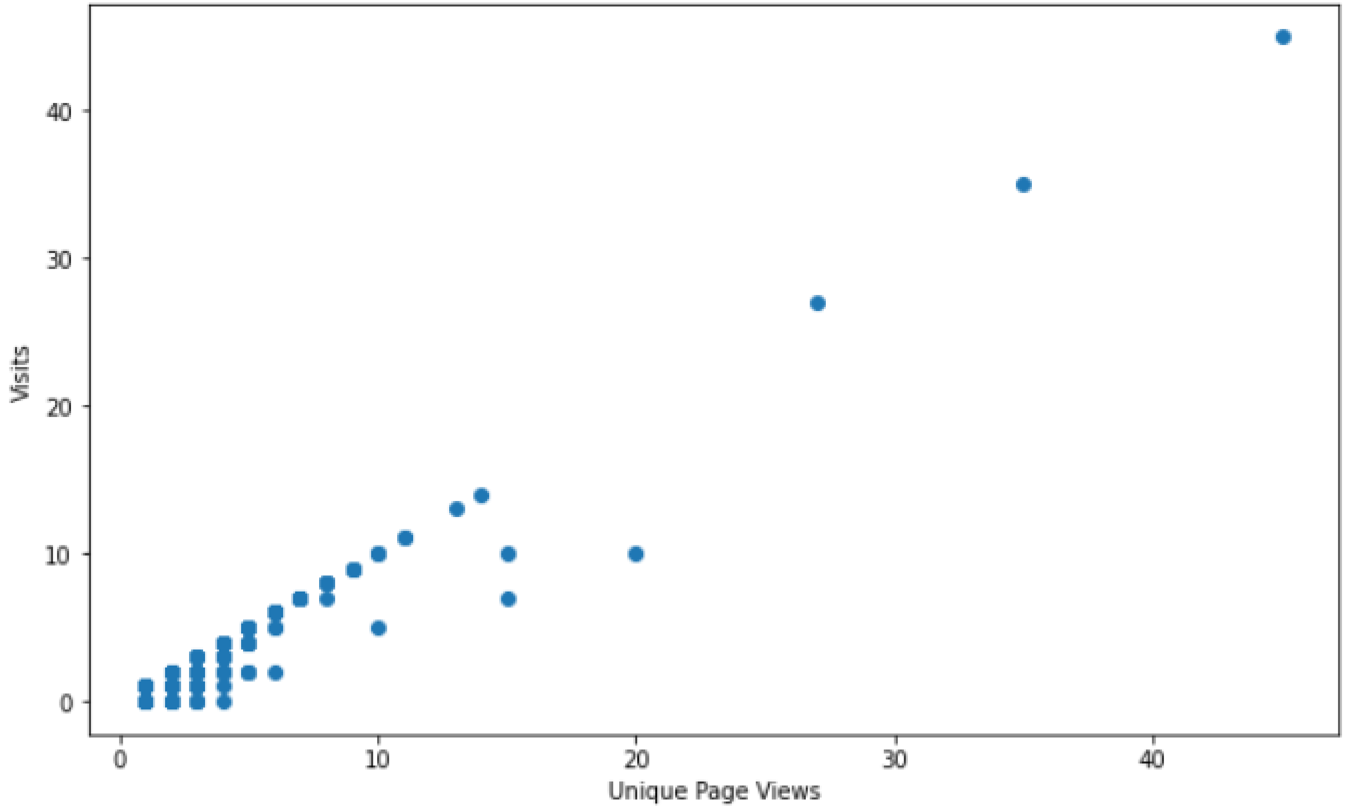
That is very high, which means that Unique Page Views is highly dependent on the Visits (linearly) on the site.

So more the Visits more will be the Unique Page Views.

VISUALLY



```
plt.figure(figsize=(10, 6))
plt.scatter(x=data['Uniquepageviews'],y=data['Visits'])
plt.xlabel('Unique Page Views')
plt.ylabel('Visits')
plt.show()
```

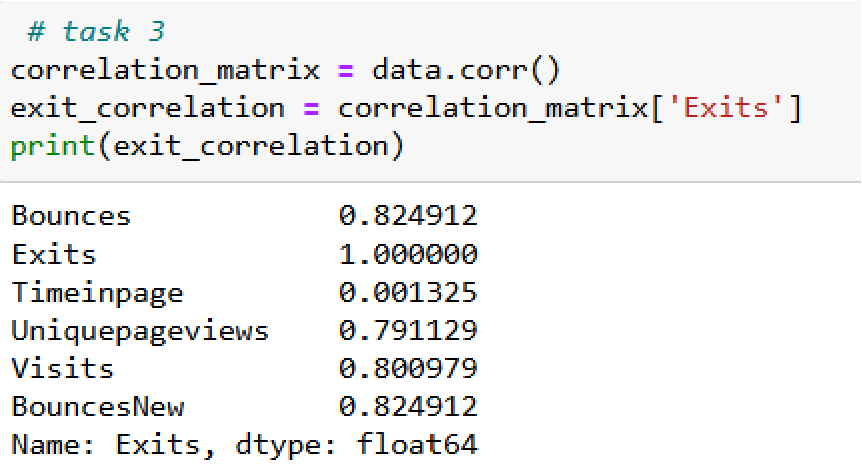


Clearly showing us a liner growth and dependency.

Task 3 –

Find out the probable factors from the dataset, which could affect the exits. Exit Page Analysis is usually required to get an idea about why a user leaves the website for a session and moves on to another one. Please keep in mind that exits should not be confused with bounces.

Now here we have to see and find the correlation between Exits column and every other column.



```
 # task 3
correlation_matrix = data.corr()
exit_correlation = correlation_matrix['Exits']
print(exit_correlation)
```

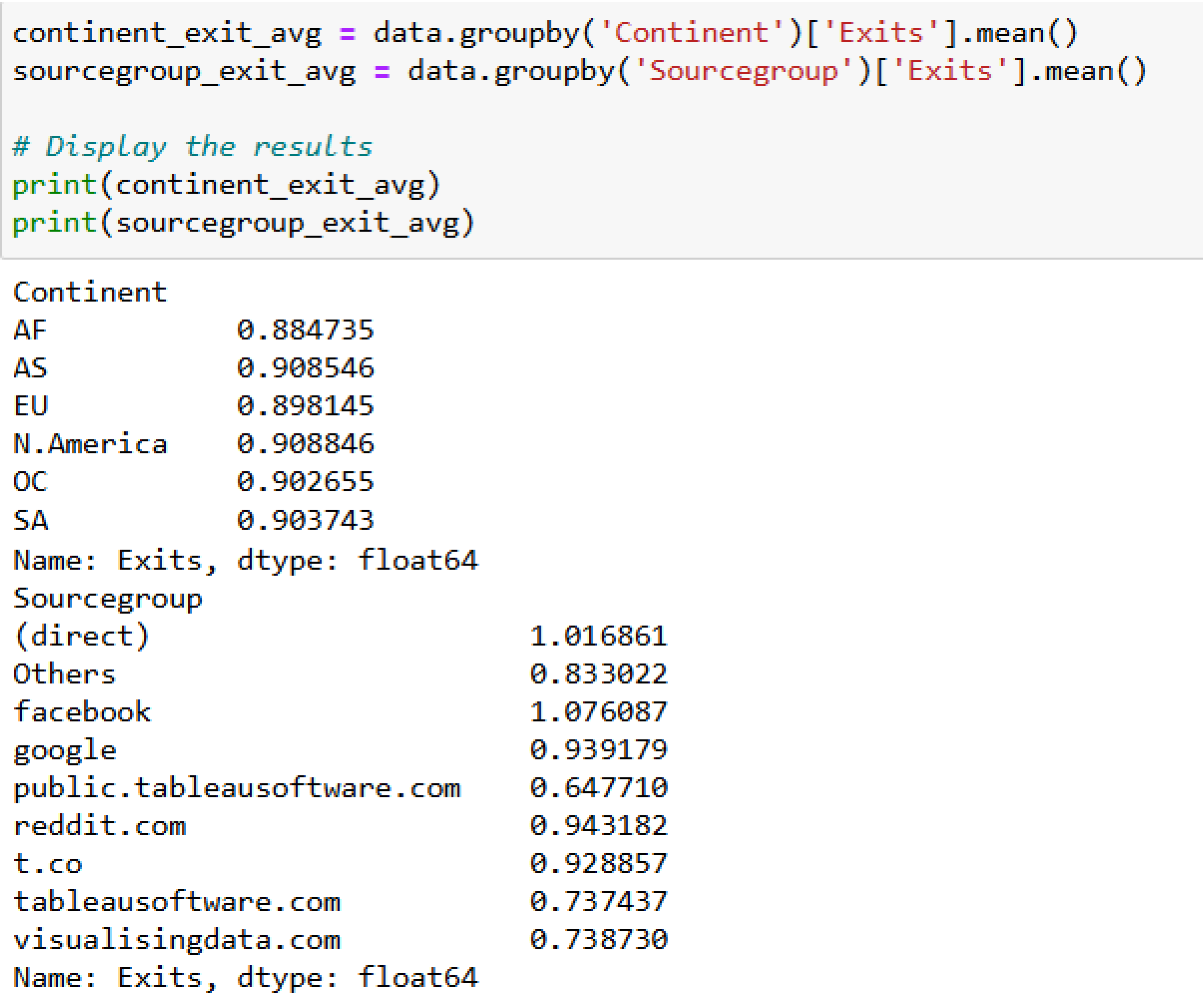
```
Bounces            0.824912
Exits              1.000000
Timeinpage         0.001325
Uniquepageviews    0.791129
Visits             0.800979
BouncesNew         0.824912
Name: Exits, dtype: float64
```

Here is the relation of Exits to every other column in the dataset.

It shows a very high correlation with Bounces, Unique Page Views , Visits, which means it is highly affected by all these factors directly.

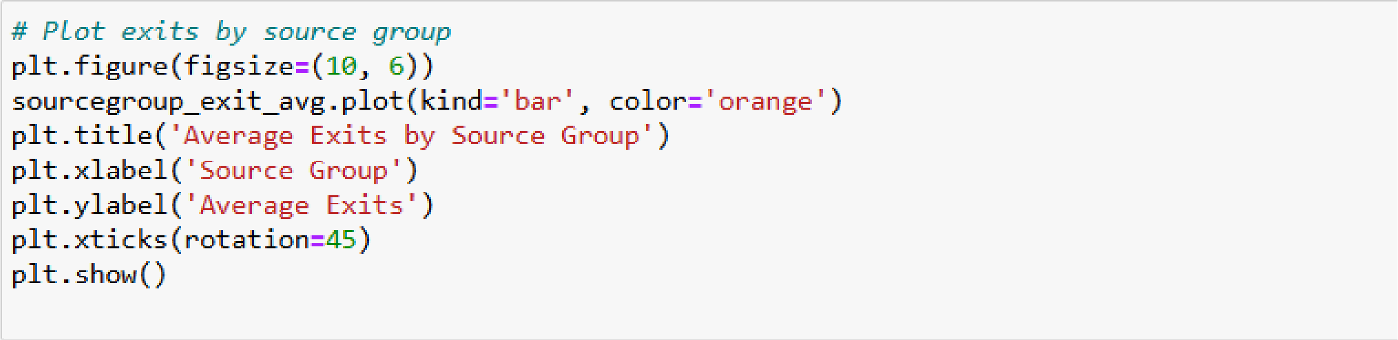
And as the correlation is almost 0 with Time in page so it means it has 0 affect or relation with Exits.

Now we can also see the relation of how exits varies across Continents and Across the sources.

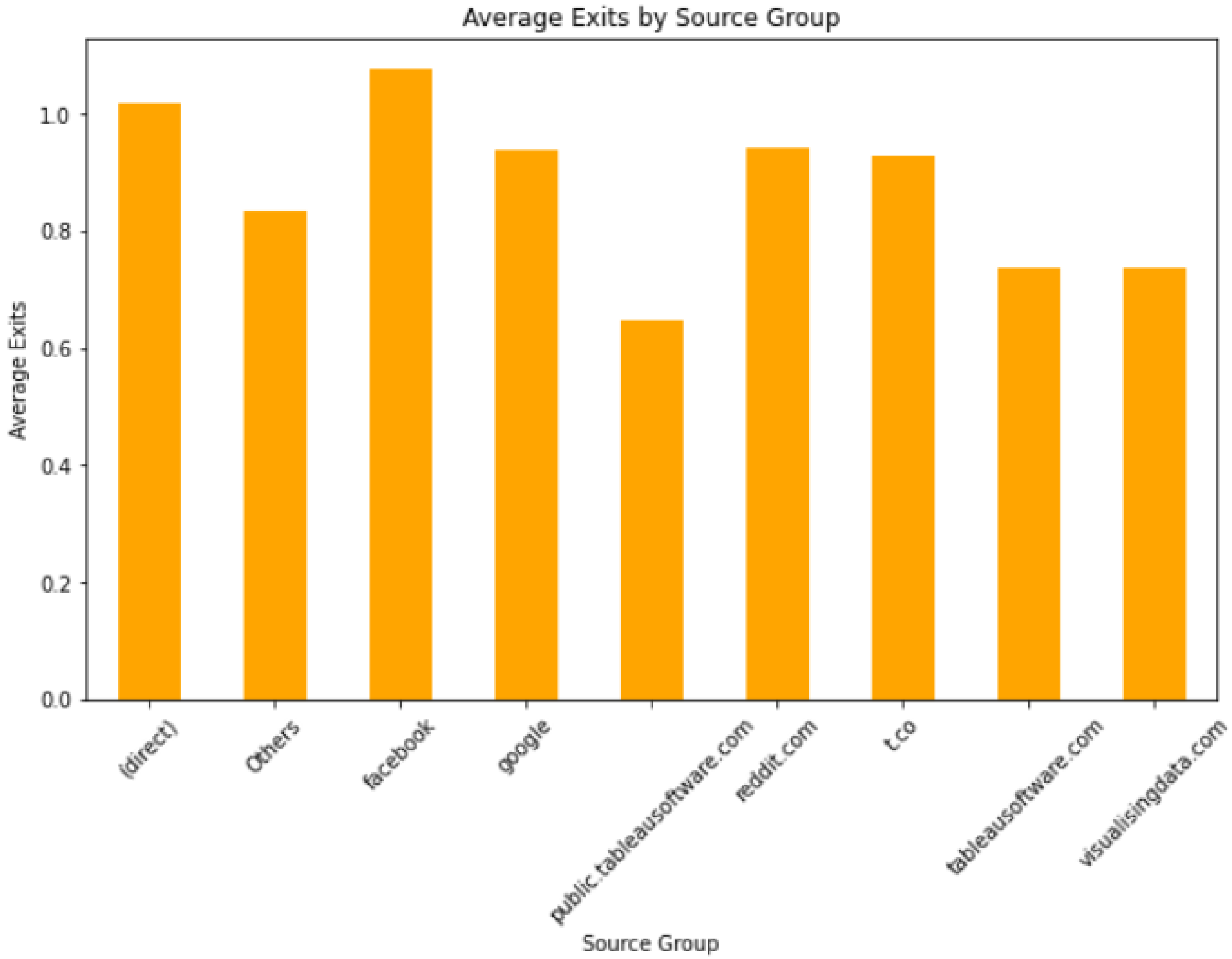


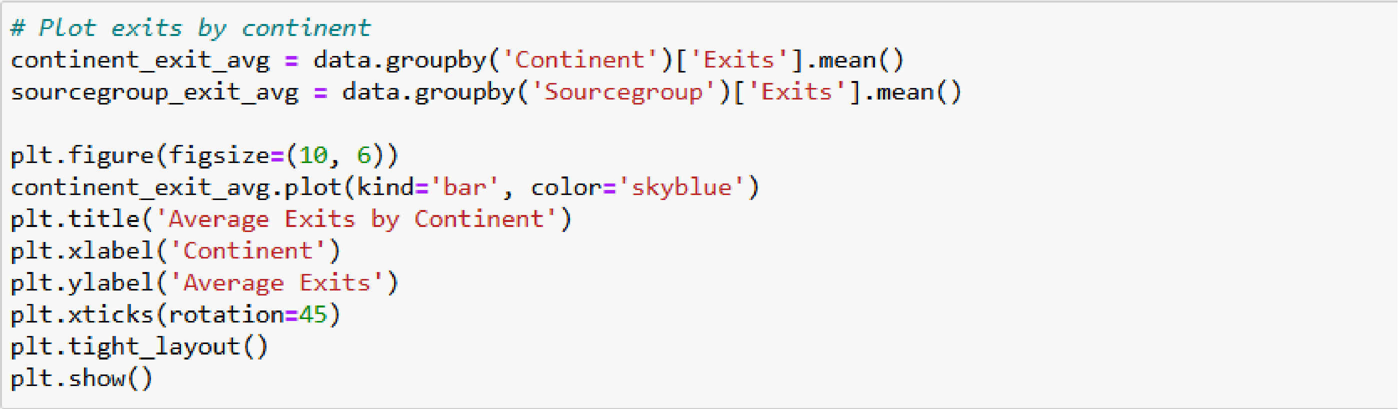
```
continent_exit_avg = data.groupby('Continent')['Exits'].mean()
sourcegroup_exit_avg = data.groupby('Sourcegroup')['Exits'].mean()

# Display the results
print(continent_exit_avg)
print(sourcegroup_exit_avg)
```

```
Continent
AF           0.884735
AS           0.908546
EU           0.898145
N.America    0.908846
OC           0.902655
SA           0.903743
Name: Exits, dtype: float64
Sourcegroup
(direct)                      1.016861
Others                        0.833022
facebook                      1.076087
google                        0.939179
public.tableausoftware.com    0.647710
reddit.com                    0.943182
t.co                          0.928857
tableausoftware.com           0.737437
visualisingdata.com           0.738730
Name: Exits, dtype: float64
```

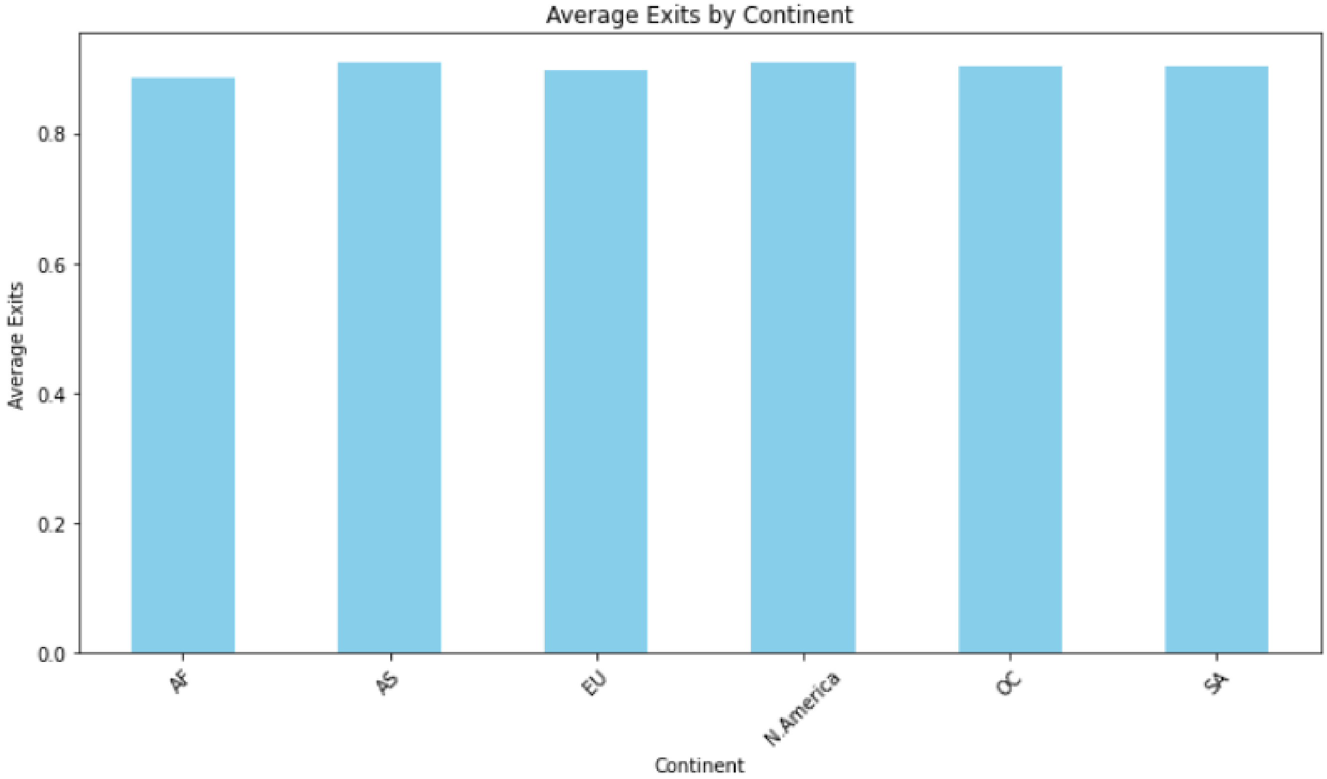


```
# Plot exits by source group
plt.figure(figsize=(10, 6))
sourcegroup_exit_avg.plot(kind='bar', color='orange')
plt.title('Average Exits by Source Group')
plt.xlabel('Source Group')
plt.ylabel('Average Exits')
plt.xticks(rotation=45)
plt.show()
```



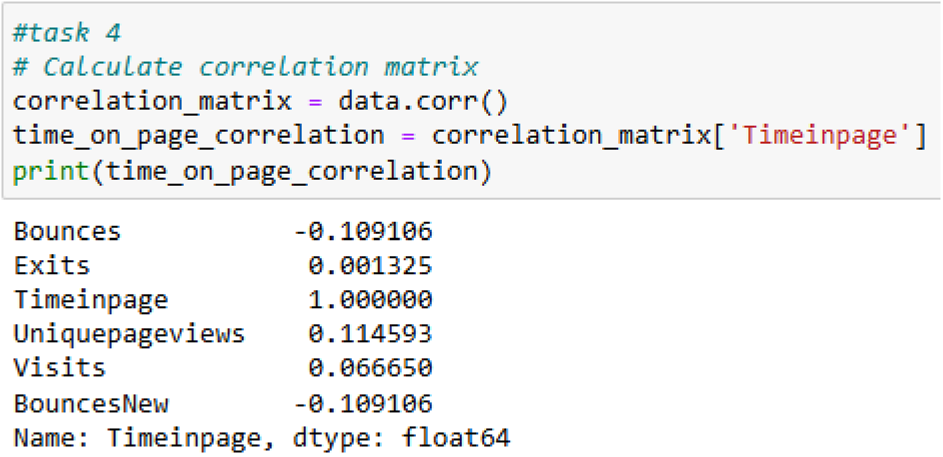


```
# Plot exits by continent
continent_exit_avg = data.groupby('Continent')['Exits'].mean()
sourcegroup_exit_avg = data.groupby('Sourcegroup')['Exits'].mean()

plt.figure(figsize=(10, 6))
continent_exit_avg.plot(kind='bar', color='skyblue')
plt.title('Average Exits by Continent')
plt.xlabel('Continent')
plt.ylabel('Average Exits')
plt.xticks(rotation=45)
plt.tight_layout()
plt.show()
```



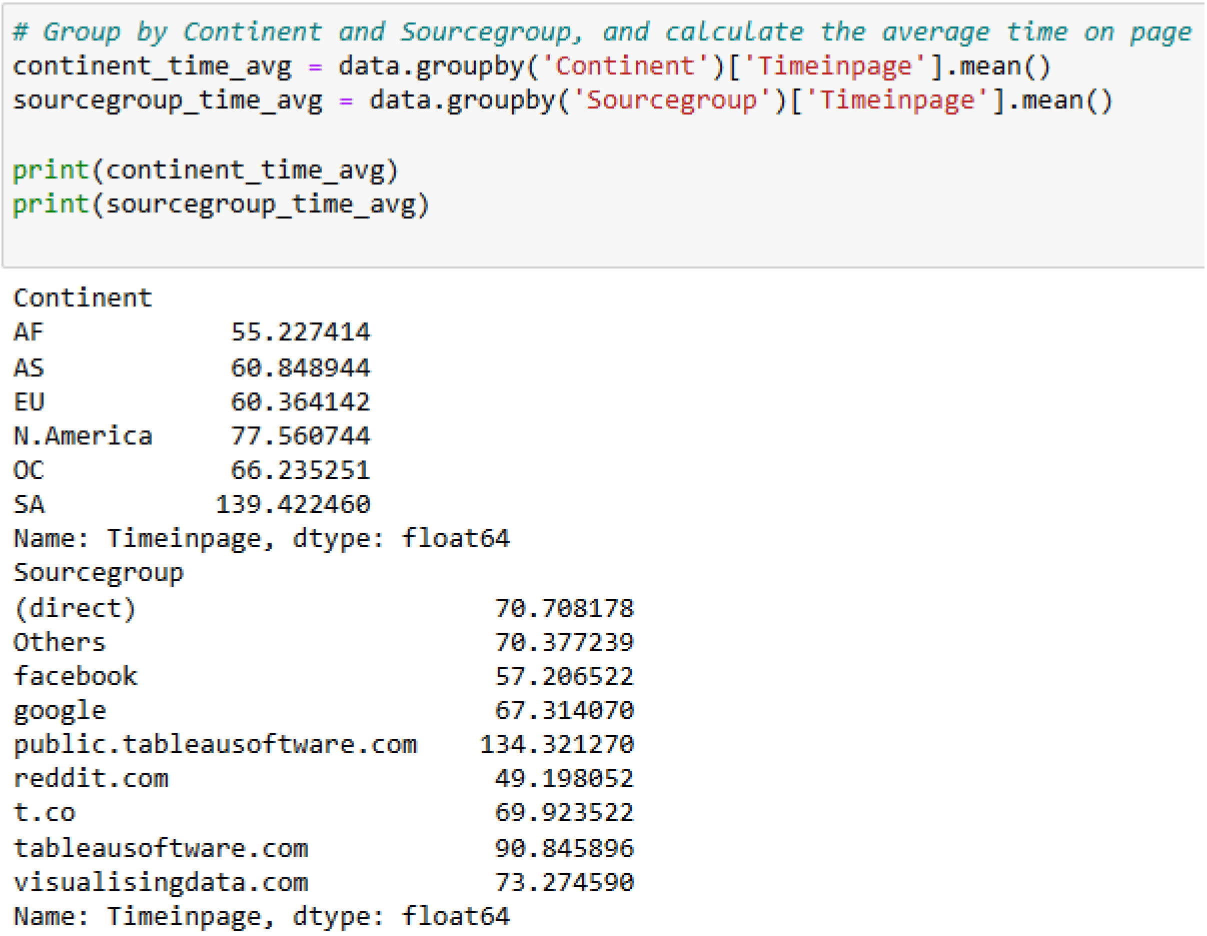
Task 4

Every site wants to increase the time on page for a visitor. This increases the chances of the visitor understanding the site content better and hence there are more chances of a transaction taking place. Find the variables which possibly have an effect on the time on page.



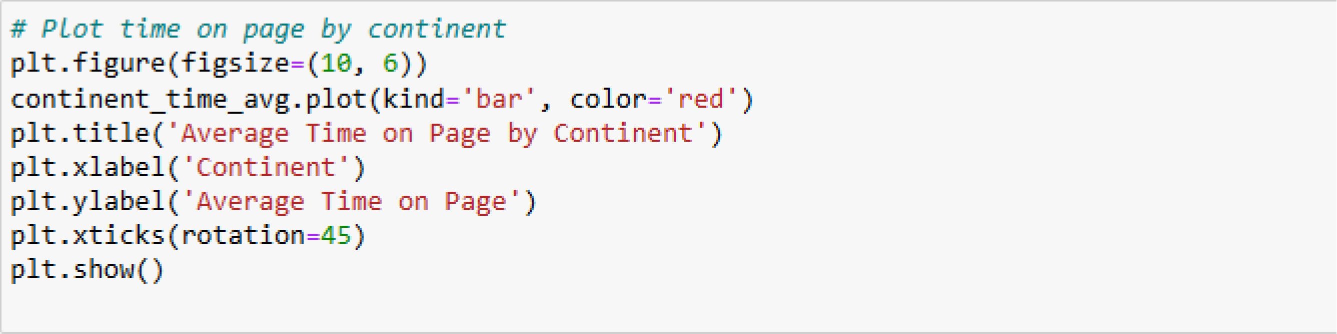
```
#task 4
# Calculate correlation matrix
correlation_matrix = data.corr()
time_on_page_correlation = correlation_matrix['Timeinpage']
print(time_on_page_correlation)
```

```
Bounces           -0.109106
Exits              0.001325
Timeinpage         1.000000
Uniquepageviews    0.114593
Visits             0.066650
BouncesNew        -0.109106
Name: Timeinpage, dtype: float64
```

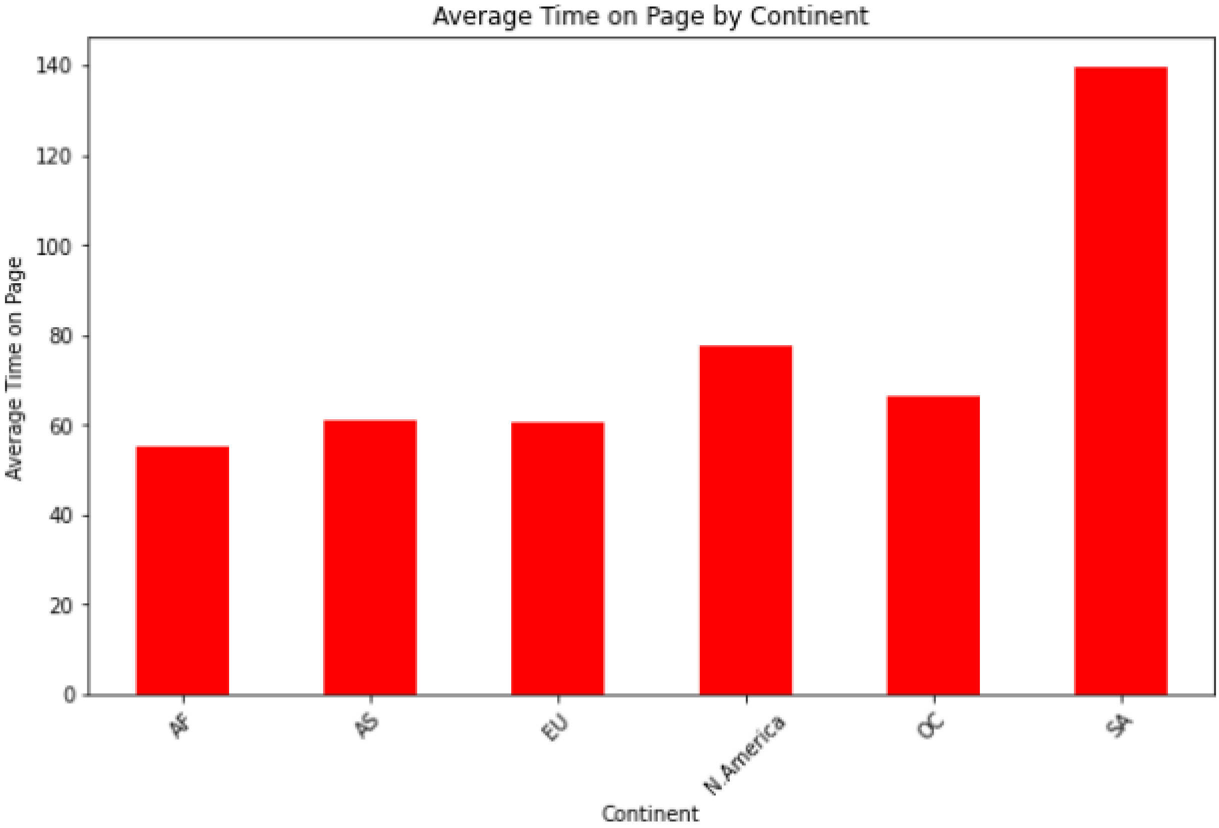


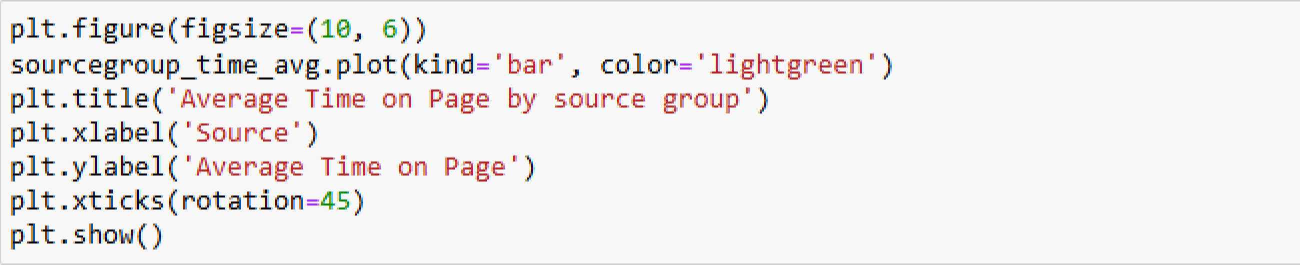
```
# Group by Continent and Sourcegroup, and calculate the average time on page
continent_time_avg = data.groupby('Continent')['Timeinpage'].mean()
sourcegroup_time_avg = data.groupby('Sourcegroup')['Timeinpage'].mean()

print(continent_time_avg)
print(sourcegroup_time_avg)
```

```
Continent
AF             55.227414
AS             60.848944
EU             60.364142
N.America      77.560744
OC             66.235251
SA            139.422460
Name: Timeinpage, dtype: float64
Sourcegroup
(direct)                      70.708178
Others                        70.377239
facebook                      57.206522
google                        67.314070
public.tableausoftware.com   134.321270
reddit.com                    49.198052
t.co                          69.923522
tableausoftware.com           90.845896
visualisingdata.com           73.274590
Name: Timeinpage, dtype: float64
```

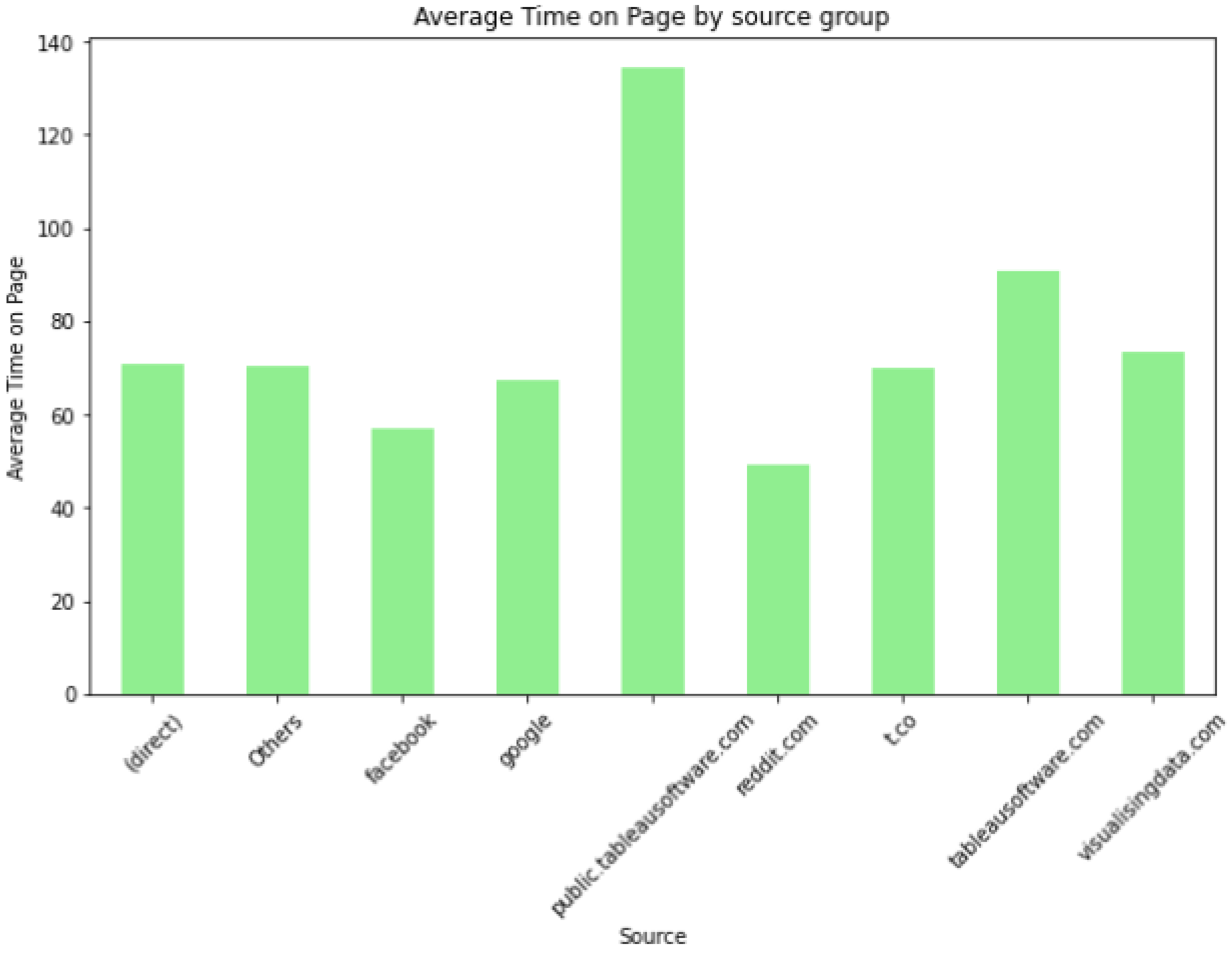


```
# Plot time on page by continent
plt.figure(figsize=(10, 6))
continent_time_avg.plot(kind='bar', color='red')
plt.title('Average Time on Page by Continent')
plt.xlabel('Continent')
plt.ylabel('Average Time on Page')
plt.xticks(rotation=45)
plt.show()
```



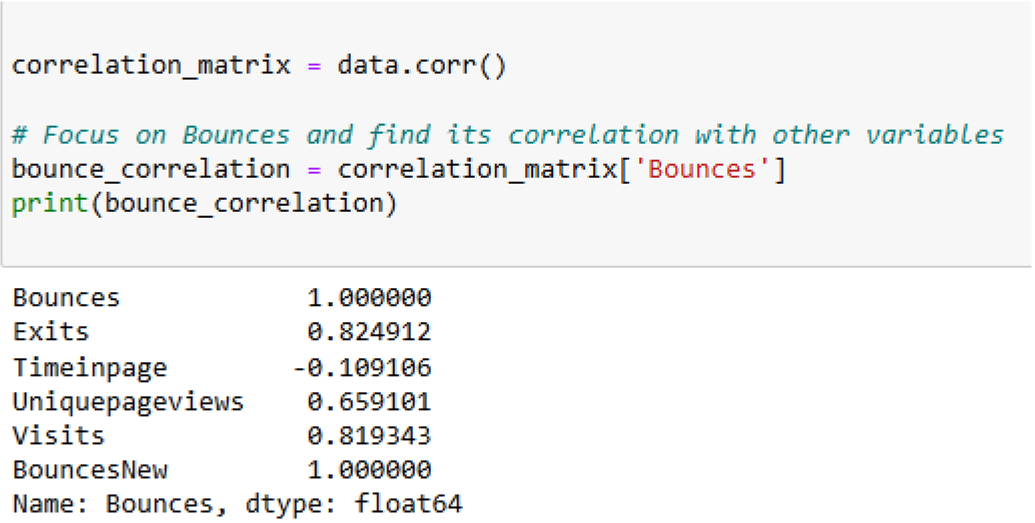


```python
plt.figure(figsize=(10, 6))
sourcegroup_time_avg.plot(kind='bar', color='lightgreen')
plt.title('Average Time on Page by source group')
plt.xlabel('Source')
plt.ylabel('Average Time on Page')
plt.xticks(rotation=45)
plt.show()
```



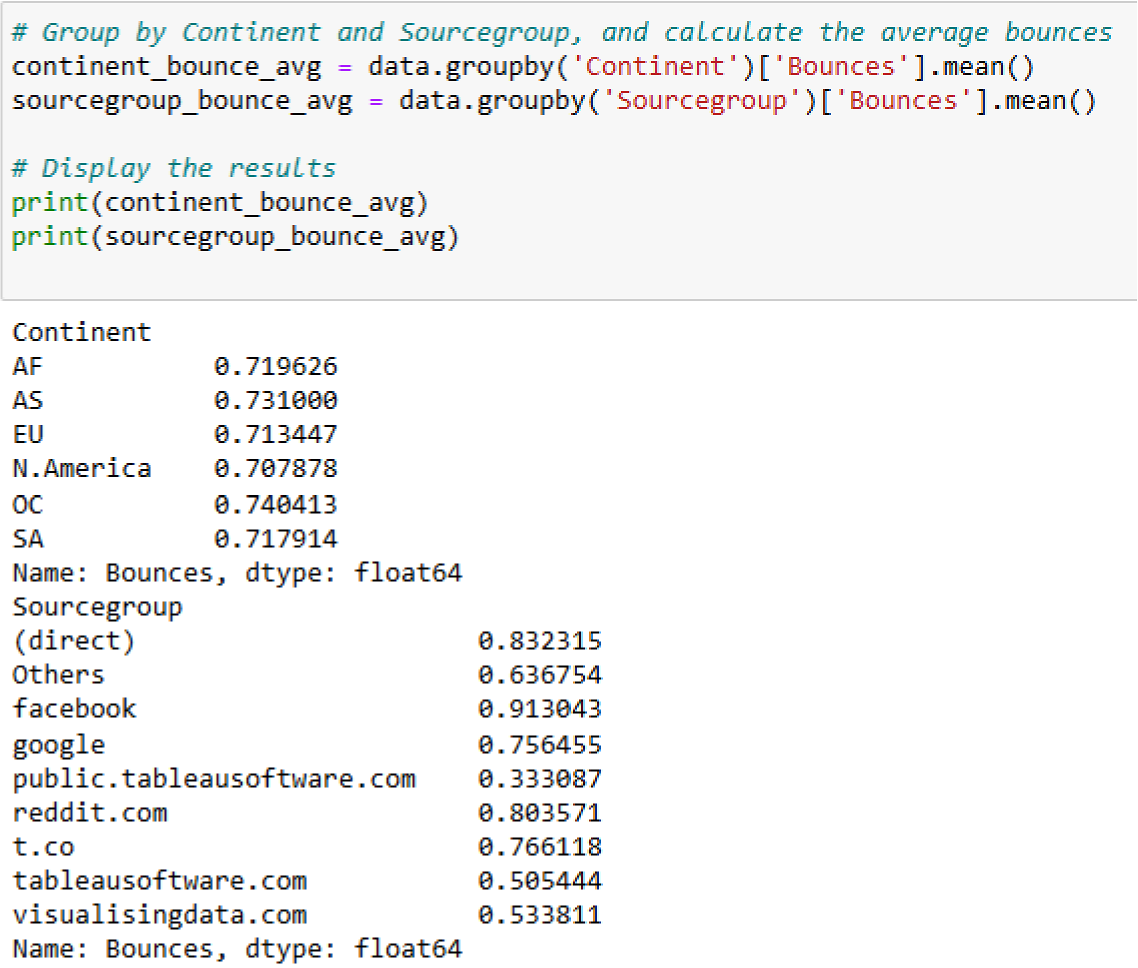
Task 5

A high bounce rate is a cause of alarm for websites which depend on visitor engagement. Help the team in determining the factors that are impacting the bounce.



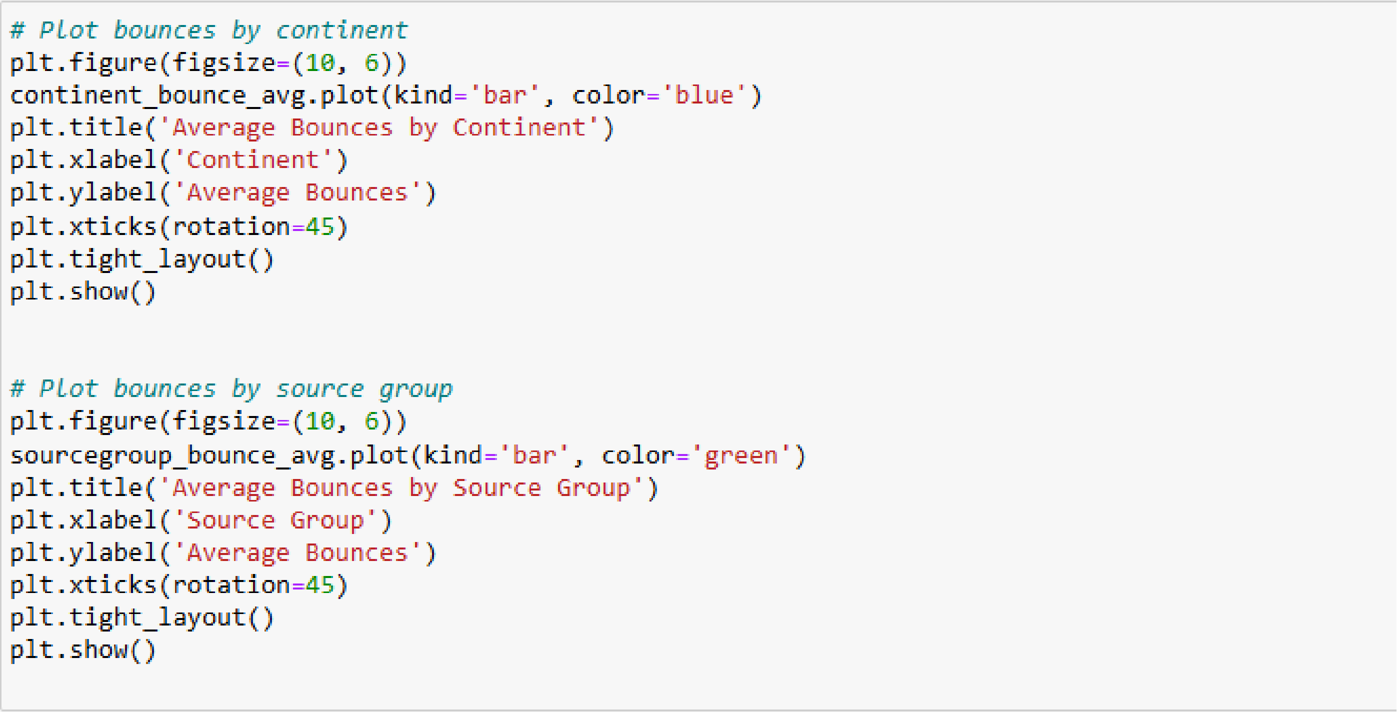
```
correlation_matrix = data.corr()

# Focus on Bounces and find its correlation with other variables
bounce_correlation = correlation_matrix['Bounces']
print(bounce_correlation)
```

```
Bounces            1.000000
Exits              0.824912
Timeinpage        -0.109106
Uniquepageviews    0.659101
Visits             0.819343
BouncesNew         1.000000
Name: Bounces, dtype: float64
```

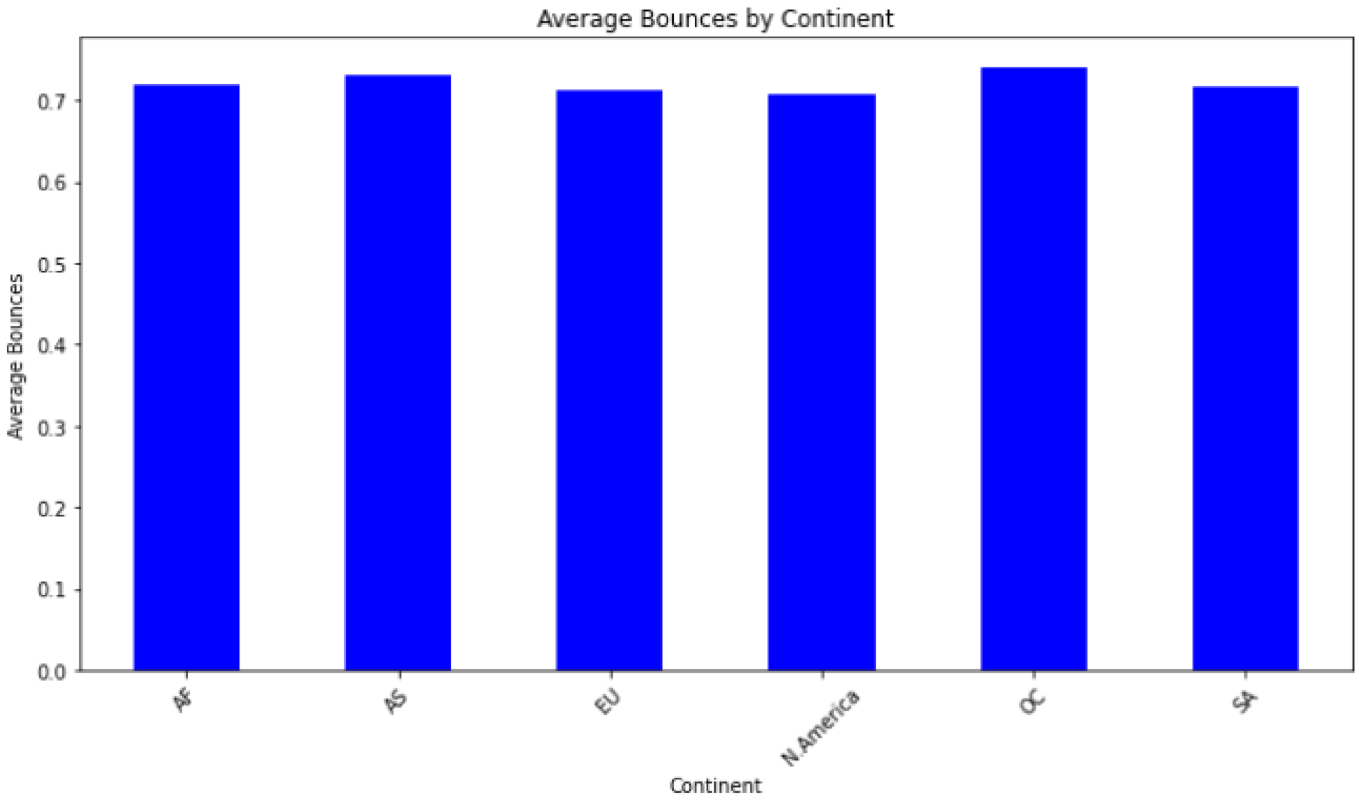


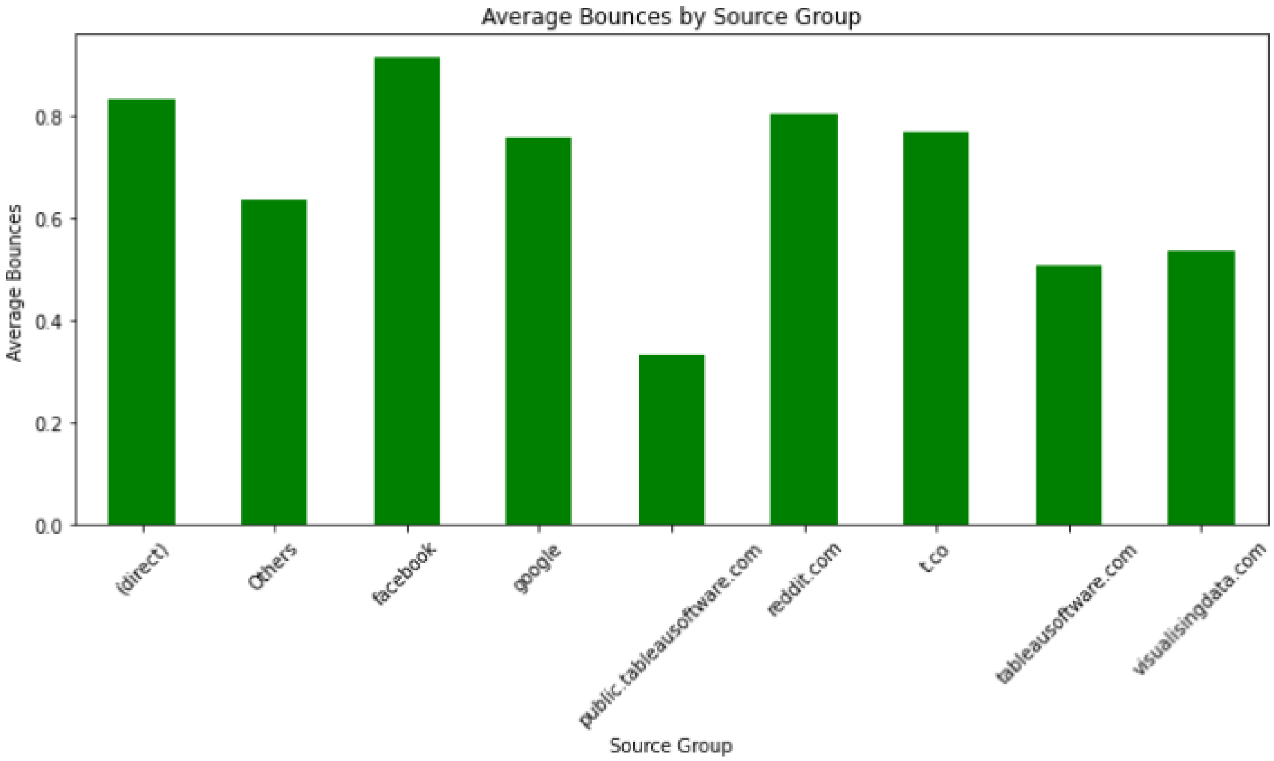
```
# Group by Continent and Sourcegroup, and calculate the average bounces
continent_bounce_avg = data.groupby('Continent')['Bounces'].mean()
sourcegroup_bounce_avg = data.groupby('Sourcegroup')['Bounces'].mean()

# Display the results
print(continent_bounce_avg)
print(sourcegroup_bounce_avg)
```

```
Continent
AF           0.719626
AS           0.731000
EU           0.713447
N.America    0.707878
OC           0.740413
SA           0.717914
Name: Bounces, dtype: float64
Sourcegroup
(direct)                     0.832315
Others                       0.636754
facebook                     0.913043
google                       0.756455
public.tableausoftware.com   0.333087
reddit.com                   0.803571
t.co                         0.766118
tableausoftware.com          0.505444
visualisingdata.com          0.533811
Name: Bounces, dtype: float64
```



```
# Plot bounces by continent
plt.figure(figsize=(10, 6))
continent_bounce_avg.plot(kind='bar', color='blue')
plt.title('Average Bounces by Continent')
plt.xlabel('Continent')
plt.ylabel('Average Bounces')
plt.xticks(rotation=45)
plt.tight_layout()
plt.show()


# Plot bounces by source group
plt.figure(figsize=(10, 6))
sourcegroup_bounce_avg.plot(kind='bar', color='green')
plt.title('Average Bounces by Source Group')
plt.xlabel('Source Group')
plt.ylabel('Average Bounces')
plt.xticks(rotation=45)
plt.tight_layout()
plt.show()
```




Average Bounces by Source Group
Average Bounces
0.0
0.2
0.4
0.6
0.8
(direct)
Others
facebook
google
public.tableausoftware.com
reddit.com
t.co
tableausoftware.com
visualisingdata.com
Source Group