```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import string
from wordcloud import WordCloud


df = pd.read_csv('/content/Reviews.csv')


df.head(10)
```

	Id	ProductId	UserId	ProfileName	HelpfulnessNumerator	HelpfulnessDenominator	Score	Time	Summary	
0	1	B001E4KFG0	A3SGXH7AUHU8GW	delmartian	1	1	5	1303862400	Good Quality Dog Food	s
1	2	B00813GRG4	A1D87F6ZCVE5NK	dll pa	0	0	1	1346976000	Not as Advertised	la
2	3	B000LQOCH0	ABXLMWJIXXAIN	Natalia Corres "Natalia Corres"	1	1	4	1219017600	"Delight" says it all	c
3	4	B000UA0QIQ	A395BORC6FGVXV	Karl	3	3	2	1307923200	Cough Medicine	i
4	5	B006K2ZZ7K	A1UQRSCLF8GW1T	Michael D. Bigham "M. Wassir"	0	0	5	1350777600	Great taffy	
5	6	B006K2ZZ7K	ADT0SRK1MGOEU	Twoapennything	0	0	4	1342051200	Nice Taffy	
6	7	B006K2ZZ7K	A1SP2KVKFXXRU1	David C.	0	0	5	1340150400	Great! Just as good as	

```
print(df.shape)
print(df.isnull().values.any())
df.dropna(axis = 0 , inplace = True)
print(df.shape)
```

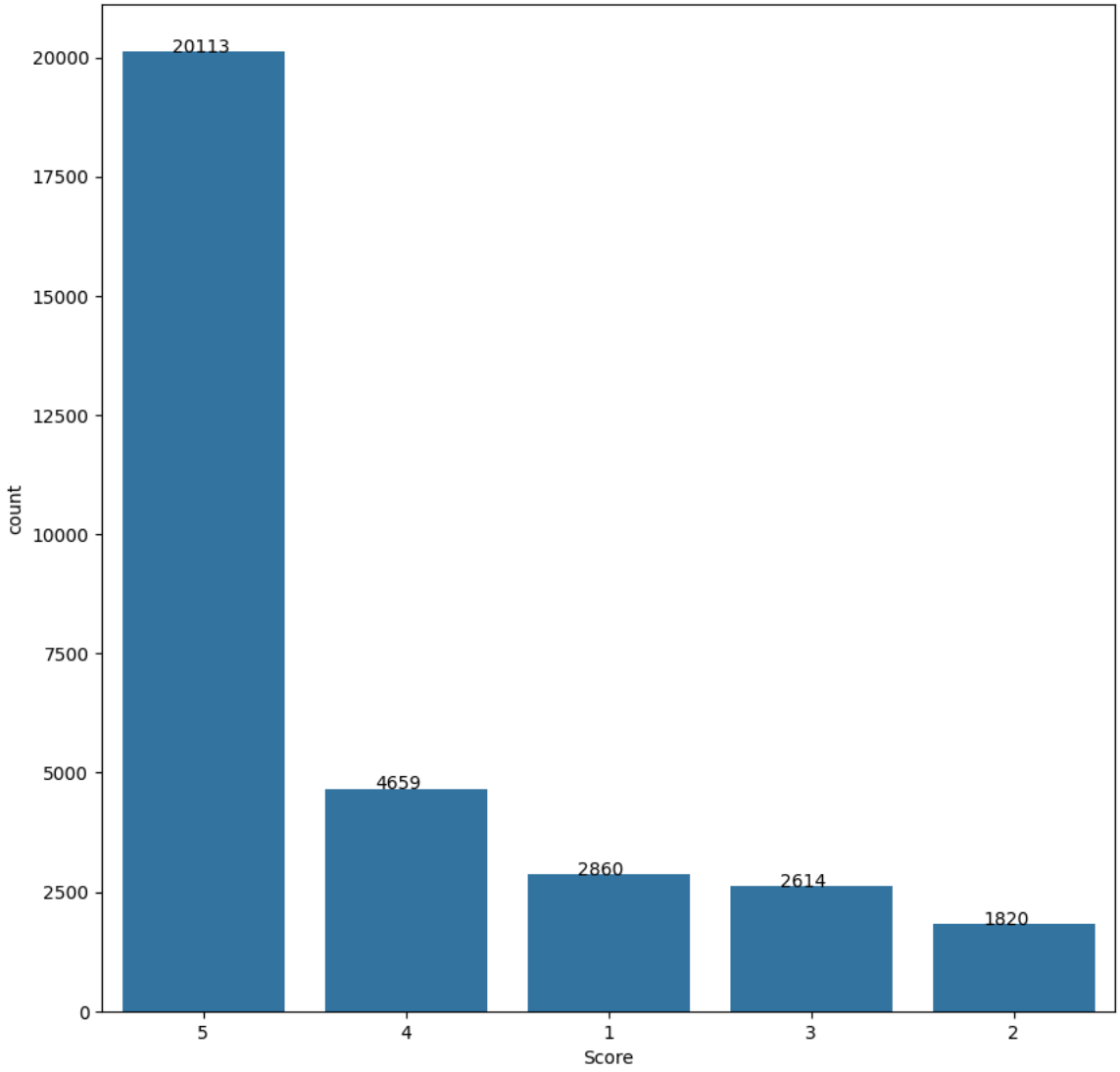
```
(34192, 10)
True
(34188, 10)
```

```
df.drop_duplicates(subset=['Score','Text'],keep='first',inplace=True)
print(df.shape)
df.head(10)
```

```
(32066, 10)
```

	Id	ProductId	UserId	ProfileName	HelpfulnessNumerator	HelpfulnessDenominator	Score	Time	Summary	
0	1	B001E4KFG0	A3SGXH7AUHU8GW	delmartian	1	1	5	1303862400	Good Quality Dog Food	s
1	2	B00813GRG4	A1D87F6ZCVE5NK	dll pa	0	0	1	1346976000	Not as Advertised	la
2	3	B000LQOCH0	ABXLMWJIXXAIN	Natalia Corres "Natalia Corres"	1	1	4	1219017600	"Delight" says it all	c
3	4	B000UA0QIQ	A395BORC6FGVXV	Karl	3	3	2	1307923200	Cough Medicine	i
4	5	B006K2ZZ7K	A1UQRSCLF8GW1T	Michael D. Bigham "M. Wassir"	0	0	5	1350777600	Great taffy	
5	6	B006K2ZZ7K	ADT0SRK1MGOEU	Twoapennything	0	0	4	1342051200	Nice Taffy	
6	7	B006K2ZZ7K	A1SP2KVKFXXRU1	David C.	0	0	5	1340150400	Great! Just as good as	

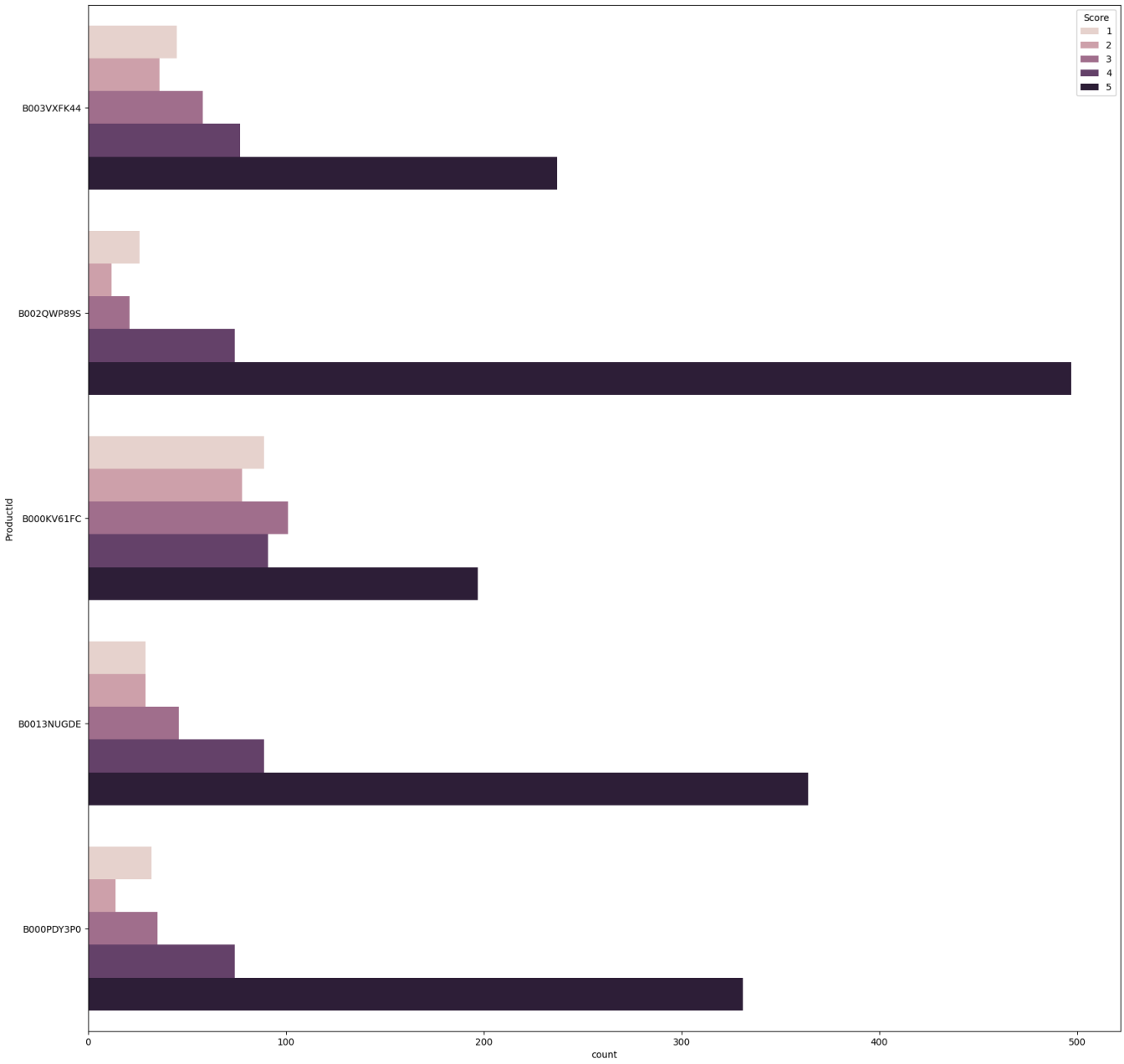
```
plt.figure(figsize=(10,10))
ax = sns.countplot(x=df["Score"],  data=df, order = df["Score"].value_counts().index )
for p, label in zip(ax.patches, df["Score"].value_counts()):
    ax.annotate(label, (p.get_x()+0.25, p.get_height()+0.5))
```




```
df.groupby('ProductId').count()
df_products = df.groupby('ProductId').filter(lambda x: len(x) >= 400)
df_product_groups = df_products.groupby('ProductId')
#Count of products and groups
print(len(df_products))
print(len(df_product_groups))
```

```
2682
5
```

```
plt.figure(figsize=(20,20))
sns.countplot(y="ProductId",  hue="Score", data=df_products);
```




```
df.groupby('UserId').count()
df_users = df.groupby('UserId').filter(lambda x: len(x) >= 100)
df_userGroup = df_users.groupby('UserId')
print("Number of Users:"+ str(len(df_userGroup)))
df_products = df_users.groupby('ProductId')
print("Number of products:"+ str(len(df_products)))
```

```
Number of Users:0
Number of products:0
```

```
from nltk.tokenize import word_tokenize
from nltk.tokenize import sent_tokenize
from nltk.stem import WordNetLemmatizer
from nltk.corpus import stopwords
```

```
def remove_Stopwords(text ):
    stop_words = set(stopwords.words('english'))
    words = word_tokenize( text.lower() )
    sentence = [w for w in words if not w in stop_words]
    return " ".join(sentence)

def lemmatize_text(text):
    wordlist=[]
    lemmatizer = WordNetLemmatizer()
    sentences=sent_tokenize(text)
    for sentence in sentences:
        words=word_tokenize(sentence)
        for word in words:
            wordlist.append(lemmatizer.lemmatize(word))
    return ' '.join(wordlist)
def clean_text(text ):
    delete_dict = {sp_character: '' for sp_character in string.punctuation}
    delete_dict[' '] = ' '
    table = str.maketrans(delete_dict)
    text1 = text.translate(table)
    textArr= text1.split()
    text2 = ' '.join([w for w in textArr])

    return text2.lower()


mask = (df["Score"] == 1) | (df["Score"] == 2)
df_rating1 = df[mask]
mask = (df["Score"]==4) | (df["Score"]==5) | (df["Score"]==3)
df_rating2 = df[mask]
print(len(df_rating1))
print(len(df_rating2))
```

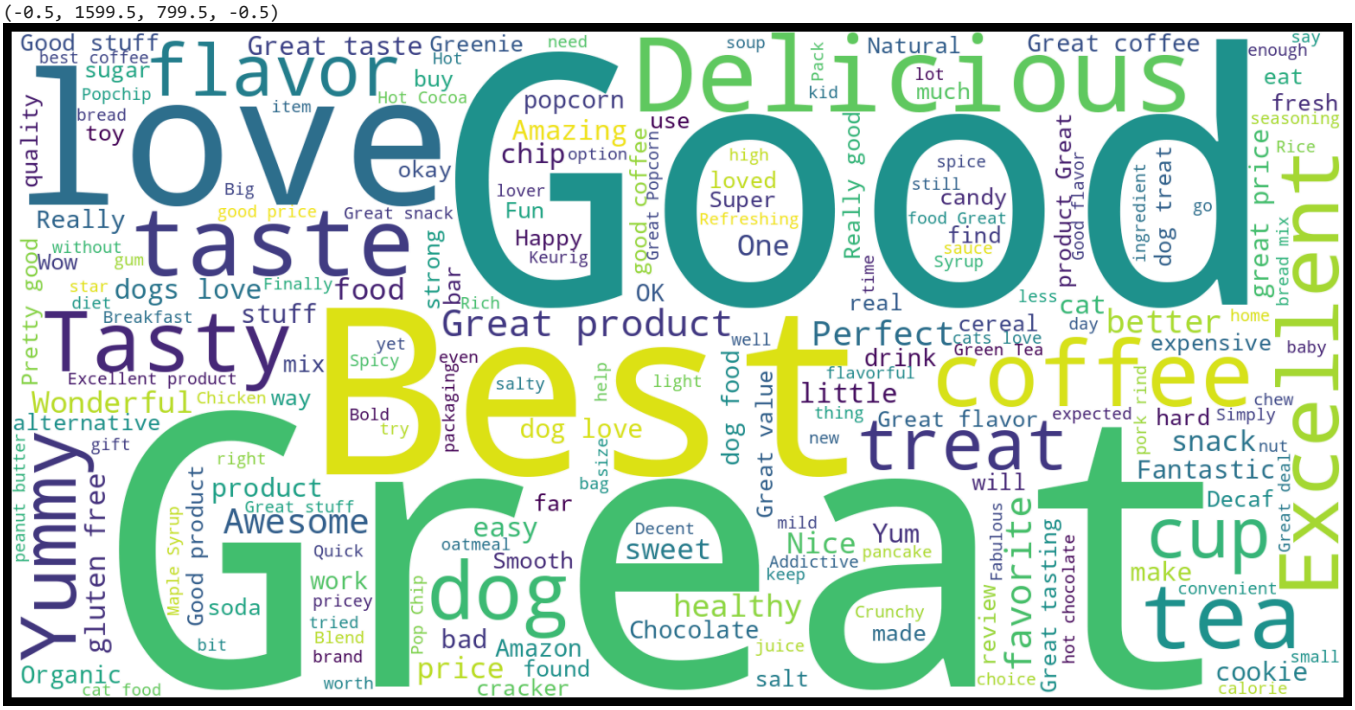
```
4680
27386
```

```
wordcloud = WordCloud(background_color="white",width=1600, height=800).generate(' '.join(df_rating1['Summary'].tolist()))
plt.figure( figsize=(20,10), facecolor='k')
plt.imshow(wordcloud)
```

```
<matplotlib.image.AxesImage at 0x7d3bb20644f0>
```


```
wordcloud = WordCloud(background_color="white",width=1600, height=800).generate(' '.join(df_rating2['Summary'].tolist()))
plt.figure( figsize=(20,10), facecolor='k')
plt.imshow(wordcloud)
plt.axis("off")
```

```
(-0.5, 1599.5, 799.5, -0.5)
```




```
import spacy
nlp=spacy.load('en_core_web_sm')
from spacy import displacy
doc=nlp(u'The blue pen was over the oval table.')


displacy.render(doc, style='dep')
```