

INFORMATICS PRACTICES

PROJECT: CLASS XII



PROJECTNAME: GOOGLE PLAY STORE APP ANALYSIS

CONCEPT USED: PANDAS AND MATPLOTLIB

SUBMITTED TO: MRS. PURTI MALHOTRA

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CERTIFICATE

This is to certify that the **Google Play Store Apps Analysis** Informatics Practices project is developed by **Kritika Tripathi** under my guidance in the session 2020-2021. The work done by her is original.

Teacher Name: Mrs. Purti Malhotra

Informatics Practices

Date:

ACKNOWLEDGMENT

I would like to express my sincere gratitude to my computer teacher Mrs. Purti Malhotra for her vital support, guidance, and encouragement without which this project would not come forth from my side, who helped me complete the project by giving ideas, thoughts and made this project easy and accurate. I wish to thank my parents for their undivided support and interest who inspired me and encouraged me to go my own way, without which I would be unable to complete my project.

REFERENCES

1. <https://www.kaggle.com/lava18/google-play-store-apps>
2. <https://www.geeksforgeeks.org>
3. <http://stackoverflow.com>
4. <https://www.androidcentral.com/google-play-store/home>
5. Class notes

INTRODUCTION

Google Play Store Apps Analysis

Google Play, which was originally born and referred to by Google as the Android Market, is Google's official store and portal for Android apps, games, and other content. There are millions of Apps available on this Android Market having a variety of categories, types, genres, and content ratings. All apps for Android phones are housed in the Google Play Store, and each app has its own web page where information about the app is available. Though the list of these applications is larger than imagined, this project is a short analysis of more than ten thousand apps in the play store.

The aim of the project is to inform the users about the variety of apps available on Play Store by various kinds of Data Manipulations along with their Visualisations.

To process this large amount is not something a human analyst can perform, so the need for data analysis models arise. This program introduces a special assistant, Anna, who will help the user throughout the analysis.

TECHNOLOGY USED

❖ Python 3.7.0

➤ PANDAS:

Pandas is a software library written for the Python programming language for data manipulation and analysis. In particular, it offers data structures and operations for manipulating numerical tables and time series.

To import: `import pandas as pd`

➤ MATPLOTLIB:

Matplotlib is a plotting library for the Python programming language and its numerical mathematics extension NumPy.

To import: `import matplotlib.pyplot as plt`

➤ NUMPY:

NumPy is a library for the Python programming language, adding support for large, multi-dimensional arrays and matrices, along with a large collection of high-level mathematical functions to operate on these arrays.

To import: `import numpy as np`

SOURCE CODE

```
import matplotlib.pyplot as plt
import pandas as pd
import numpy as np
import sys
df= pd.read_csv("googleplaystore.csv")
df['Reviews'] = pd.to_numeric(df['Reviews'])
df['Installs'] = pd.to_numeric(df['Installs'])
df['Rating'] = pd.to_numeric(df['Rating'])
#Data analysis:
def csv():
    print(df)
def count():
    #Number of apps in total
    counts = df["App"].count()
    print("There are ", str(counts)," in the analysis.")
def appinfo():
    #Printing Information of any user specified app
    row = input("Please enter the name of any App from the given to analyse it: ")
    print(df[df["App"]==row])
def col():
    field= str(input("Enter the name of the field you want me to display:"))
    field1=df[["App", field]].copy()
    print(field1)
    q=input("Do you want me to sort the values in this field for you? (Yes/No):\n")
    if q== "Yes":
        field2= field1.sort_values(by=field)
        print(field2)
    else:
        print("Okay! Thank you so much!")
def drop():
    print(df.columns)
    delete= eval(input("Enter the field(s) you want me to delete (in square brackets):\n"))
    df.drop(delete, axis=1)
    print(df)
    print(delete," Successfully deleted!")
def max():
    print("These are the columns\n", df.columns)
    field=eval(input("Enter the column names as list in square bracket"))
    print('Print the maximum values of the ',field,' columns')
    print(df[field].max())
```

```

print('Print the minimum values of the ', field, ' columns')
print(df[field].min())
def catmax():
    #Maximum Rating per Category
    print("The maximum ratings for each Category is:")
    print(pd.pivot_table(df, index=["Category"], values=["Rating"], aggfunc="max"))
    q=input("Do you want me to name the Apps with top Ratings? (Yes/No):\n")
    if q== 'Yes':
        print("Here are the apps with maximum rating per Category:")
        df1=df.drop(['Reviews', 'Size', 'Price', 'Genres', "Current Ver", 'Installs','Type',
                    'Content Rating','Android Ver'], axis=1)
        df2=df1.groupby(["Category"])
        df3=df2.apply(lambda x: x.sort_values(["Rating"], ascending=False)).reset_index(drop=True)
        df4=df3.groupby('Category').head(1)
        print(df4)
        cmap = plt.cm.tab10
        colors = cmap(np.arange(len(df)) % cmap.N)
        df4.plot.barh(x='Category', y='Rating', color=colors)
        plt.show()
    elif q=="No":
        print("Okay! Thank you so much!")
    else:
        print("Sorry! I'm unable to understand what you are trying to say.")
def field():
    #sorting according to a particular row
    field=input("Write any of the given fields to print the number of Apps according to it:\na. Category\n"
    "b. Installs\nc. Content Rating\nd. Type\ne. Android Ver\nf. Current Ver\ng. Genres\n"
    "h. Current Ver\n")
    print("The Field has the following distribution of Apps:")
    unique= df[field].unique()
    print(unique)
    print("There are ", len(unique)," ", field, "in total.")
    q=input("Do you want me to show you the app information for every distribution")
    df.set_index(field)
    if q=="Yes":
        a=str(input("For which Distribution?\n"))
        b= df[df[field] == a]
        print(b)
        num = pd.pivot_table(df, index=[field], values=["App"], aggfunc="count")
        num.plot.pie(y="App", figsize=(10, 5), labeldistance=None)
        plt.legend(prop={'size': 6}, ncol=2, bbox_to_anchor=(0.85, 1.025), loc="upper left")

```



```

plt.show()
else:
    print("Okay! Thank you so much!")
def maxmin():
    #Minimum/Maximum Rating/Reviews/ Installs
    field=str(input("Select a field from the given list:\n"
        "a. Reviews\n"
        "b. Rating\n"
        "c. Installs"))
    df1=df[["App","Reviews","Rating","Installs"]].copy()
    n=int(input("Enter the number of apps you want to be displayed:"))
    df1.sort_values(by=field, ascending=False)
    print("The app with maximum ", field, " is:")
    print(df1.head(n))
    print("The app with minimum ", field, " is:")
    print(df1.tail(n))
def agg():
    field=input("1. Category 2. Genres 3. Type 4. Content Rating\n "
        "Enter the name of the field from the above list:\n")
    perform=input("1. Installs 2. Rating 3. Reviews 4. Price\n"
        "Enter the name of the field from the above list whose mean you want to find:\n")
    df.groupby(field)
    print(pd.pivot_table(df, index=[field], values=[perform], aggfunc="mean"))
def reviews():
    reviews = df[['Category', 'Reviews']].copy()
    reviews['Reviews'] = pd.to_numeric(reviews['Reviews'])
    num = pd.pivot_table(df, index=["Category"], values=["Reviews"], aggfunc="sum")
    print(num)
    num.boxplot(color='blue', vert=0, notch=True)
    plt.show()
def price():
    price=df[["App","Price"]].copy()
    price["Price"]=pd.to_numeric(price["Price"])
    price.plot(color="blue")
    plt.title("Apps Pricing")
    plt.xlabel("No. Of Apps")
    plt.ylabel("Price")
    plt.show()
def andver():
    print("Play store has these many Android Version ranges:")
    print(df["Android Ver"].unique())
    version= str(input("Type your Android Version Range as per the above ranges:"))
    app=str(input("Enter the name of the app you want to use:"))
    b= df[df["App"]== app]
    if version in b.values:
        print("Yes! Your Android Version is up to date for ", app, '!')
    else:
        print("Sorry! The desired Android Version does not match.")
def hist():
    df.hist()
    plt.show()

```

```

#menu
print("_____")
print("      ", "Google Play Store Apps", "      ")
print("*****")
name = input("Please enter you name:")
print("Hello ", name, "! I'm your Analysis Assistant, Anna, here to help you with the analysis!")
print("Please choose and option from the given menu:\n"
      "1. Display the number of Apps in the Data Analysis\n"
      "2. Find any App's information from the dataset\n"
      "3. Display a particular field\n4. Drop field(s) from data set\n"
      "4. Show maximum/ minimum for a particular field\n"
      "5. Show maximum Ratings- Category wise\n"
      "6. Display the number of apps according to a particular field with details\n"
      "7. Display the App with Maximum and minimum Rating/ Reviews/ Installs\n"
      "8. Tell the mean number of Installs/ Ratings/ Reviews/ Price according to "
      "Category/ Genre/ Type/ Content Rating\n"
      "9. Calculate the sum of reviews for each Category\n"
      "10. Show the price distribution of all apps in dataset\n"
      "11. Check if I can run my favourite app on my Android phone"
      "12. Make a histogram for the dataset\n"
      "13. Display th whole CSV File\n"
      "14. Exit")
while True:
    ch=int(input("Enter your choice here(1/2/3/...:"))
    if ch==1:
        count()
    if ch==2:
        appinfo()
    if ch==3:
        col()
    if ch==4:
        drop()
    if ch==5:
        max()
    if ch==6:
        catmax()
    if ch==7:
        field()
    if ch==8:
        maxmin()
    if ch==9:
        agg()
    if ch==10:
        reviews()
    if ch==11:
        price()
    if ch==12:
        andver()
    if ch==13:
        hist()
    if ch==14:
        csv()
    if ch==15:
        print("Thank you so much! Have a great day!")

```

OUTPUT SCREEN

Functions performed:

1. Number of Apps in the Data Analysis
2. Find any App's information from the dataset
3. Drop field(s) from the dataset
4. Display a particular field
5. Maximum/ Minimum of a particular field
6. Maximum Ratings- Category wise (Bar Chart)
7. Number of apps according to a particular field (variety of Pie charts)
8. App with Maximum and minimum Rating/ Reviews/ Installs
9. Mean of particular fields
10. The sum of reviews for each Category (Box plot)
11. Price distribution of all apps in dataset\n (Line Plot)
12. Check if user can run a particular app in his/her Android Phone
13. Histogram of the whole dataset 14.Exit

```

E: \ KRITIKA > Python > IP PROJECT > Play store Apps.py
Play store Apps.py
145      "6. Show maximum Ratings- Category wise\n"
146      "7. Display the number of apps according to a particular field with details\n"

Run: Play store Apps
C:\Users\Administrator\PycharmProjects\untitled10\venv\Scripts\python.exe "E:/KRITIKA/Python/IP PROJECT/Play store Apps.py"

Google Play Store Apps
*****
Please enter you name:Kritika
Hello Kritika ! I'm your Analysis Assistant, Anna, here to help you with the analysis!
Please choose and option from the given menu:
1. Display the number of Apps in the Data Analysis
2. Find any App's information from the dataset
3. Display a particular field
4. Drop field(s) from data set
5. Show maximum/ minimum for a particular field
6. Show maximum Ratings- Category wise
7. Display the number of apps according to a particular field with details
8. Display the App with Maximum and minimum Rating/ Reviews/ Installs
9. Tell the mean number of Installs/ Ratings/ Reviews/ Price according to Category/ Genre/ Type/ Content Rating
10. Calculate the sum of reviews for each Category
11. Show the price distribution of all apps in dataset
12. Check if I can run my favourite app on my Android phone13. Make a histogram for the dataset
14. Exit
Enter your choice here(1/2/3/...:1
There are 10841 in the analysis.
Enter your choice here(1/2/3/...:3
Please enter the name of any App from the given to analyse it: Current Ver
Empty DataFrame
Columns: [App, Category, Rating, Reviews, Size, Installs, Type, Price, Content Rating, Genres, Current Ver, Android Ver]
Index: []
Enter your choice here(1/2/3/...:3
Enter the name of the field you want me to display:|
29:52 CRLF UTF-8 4 spaces Python 3.6 (untitled10)

```

```

E: \ KRITIKA > Python > IP PROJECT > Play store Apps.py
Play store Apps.py
Run: Play store Apps
Enter the name of the field you want me to display:current ver

App          Current Ver
0      Photo Editor & Candy Camera & Grid & ScrapBook    1.0.0
1      Coloring book moana                               2.0.0
2      U Launcher Lite - FREE Live Cool Themes, Hide ...  1.2.4
3      Sketch - Draw & Paint                               Varies with device
4      Pixel Draw - Number Art Coloring Book              1.1
...
10836    Sya9a Maroc - FR                                1.48
10837    Fr. Mike Schmitz Audio Teachings                 1
10838    Parkinson Exercices FR                           1
10839    The SCP Foundation DB fr nn5n                     Varies with device
10840    iHoroscope - 2018 Daily Horoscope & Astrology    Varies with device

[10841 rows x 2 columns]
Do you want me to sort the values in this field for you? (Yes/No):
Yes

App          Current Ver
9005    DW Contacts Wear                                  0.0.0.2
9669    Masha and the Bear- House Cleaning Games for G...  0.0.1
6926    SAP BW Tutorial                                    0.0.1
4657    Wi u Emulator                                     0.0.1
6840    Catholic La Bu Zo Kam                             0.0.1
...
3269    Sound Recorder: Recorder & Voice Changer Free    v7.0.9.1.0526.1_06_0704
3248    Calculator - free calculator, multi calculator...  v8.0.1.8.0629.1
4318    Daily K-Talk                                       v8[1.0.10]
4120    MHD F-Series                                       version 0.994
1553    Market Update Helper                              NaN

[10841 rows x 2 columns]
Enter your choice here(1/2/3/...:3
Index(['App', 'Category', 'Rating', 'Reviews', 'Size', 'Installs', 'Type',
      'Price', 'Content Rating', 'Genres', 'Current Ver', 'Android Ver'],

```

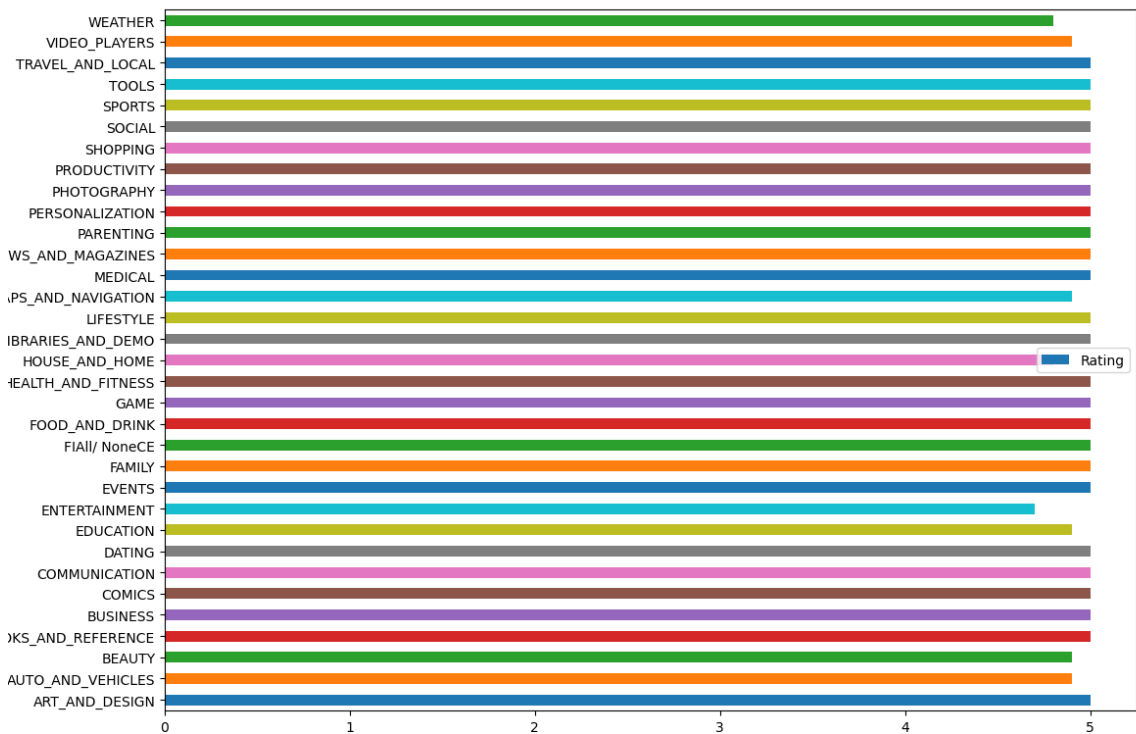
```
E: \ KRITIKA \ Python \ IP PROJECT \ Play store Apps.py Play store Apps
Play store Apps.py
Run: Play store Apps
Enter your choice here(1/2/3/...:
Index(['App', 'Category', 'Rating', 'Reviews', 'Size', 'Installs', 'Type',
      'Price', 'Content Rating', 'Genres', 'Current Ver', 'Android Ver'],
      dtype='object')
Enter the field(s) you want me to delete (in square brackets):
["Size", "Genres"]

App ... Android Ver
0 Photo Editor & Candy Camera & Grid & ScrapBook ... 4.0.3 and up
1 Coloring book moana ... 4.0.3 and up
2 U Launcher Lite - FREE Live Cool Themes, Hide ... 4.0.3 and up
3 Sketch - Draw & Paint ... 4.2 and up
4 Pixel Draw - Number Art Coloring Book ... 4.4 and up
... ...
10836 Sya9a Maroc - FR ... 4.1 and up
10837 Fr. Mike Schmitz Audio Teachings ... 4.1 and up
10838 Parkinson Exercices FR ... 2.2 and up
10839 The SCP Foundation DB fr nn5n ... All/ None
10840 iHoroscope - 2018 Daily Horoscope & Astrology ... All/ None

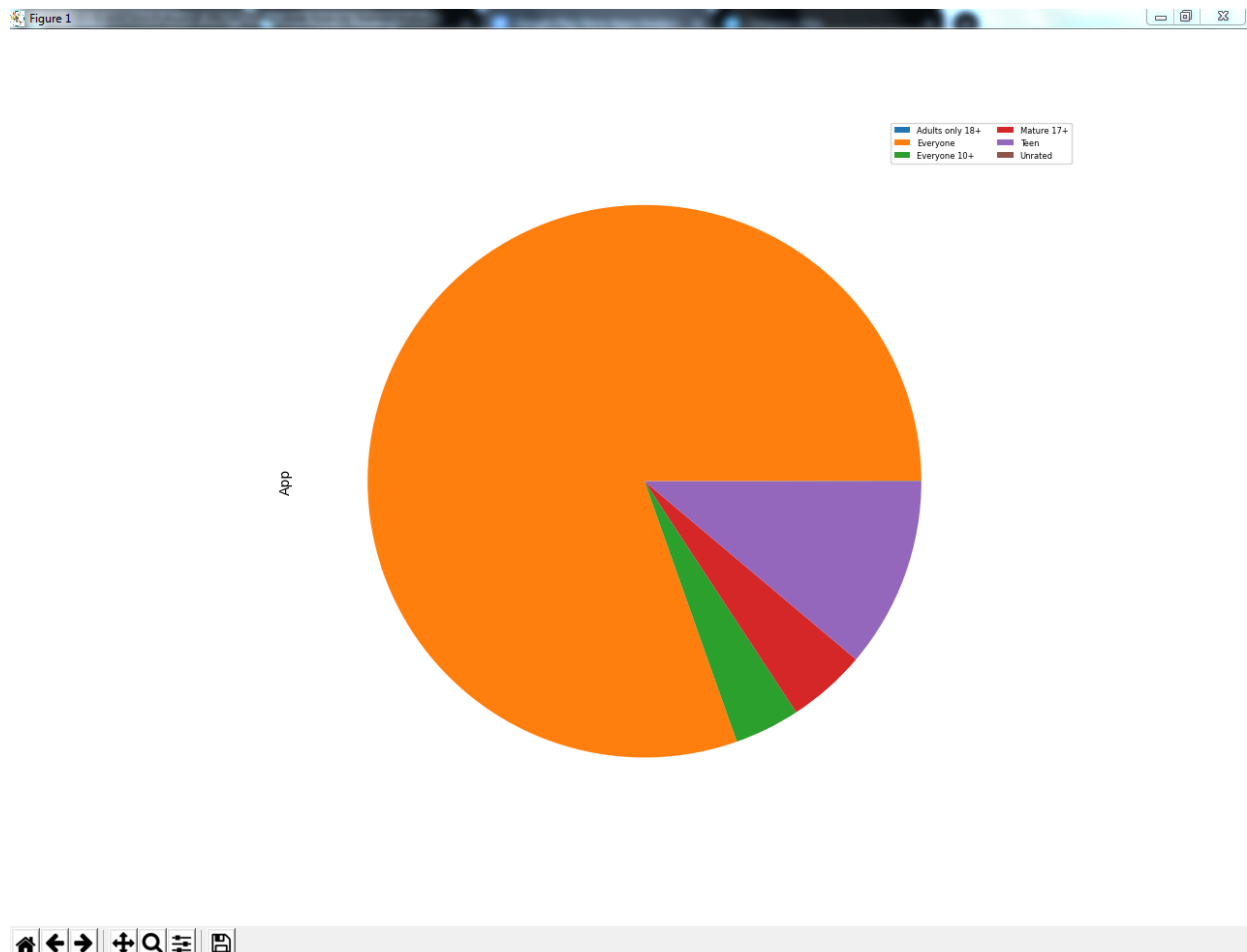
[10841 rows x 12 columns]
['Size', 'Genres'] Successfully deleted!
Enter your choice here(1/2/3/...:
These are the columns
Index(['App', 'Category', 'Rating', 'Reviews', 'Size', 'Installs', 'Type',
      'Price', 'Content Rating', 'Genres', 'Current Ver', 'Android Ver'],
      dtype='object')
Enter the column names as list in square bracket["Type"]
Print the maximum values of the ['Type'] columns
Type Paid
dtype: object
Print the minimum values of the ['Type'] columns
Type All/ None
dtype: object
Enter your choice here(1/2/3/...:
53:34 CRLF UTF-8 4 spaces Python 3.6 (untitled10)
```

```
E: \ KRITIKA \ Python \ IP PROJECT \ Play store Apps.py Play store Apps
Play store Apps.py
Run: Play store Apps
Enter your choice here(1/2/3/...:
The maximum ratings for each Category is:
Rating
Category
ART_AND_DESIGN 5.0
AUTO_AND_VEHICLES 4.9
BEAUTY 4.9
BOOKS_AND_REFERENCE 5.0
BUSINESS 5.0
COMICS 5.0
COMMUNICATION 5.0
DATING 5.0
EDUCATION 4.9
ENTERTAINMENT 4.7
EVENTS 5.0
FAMILY 5.0
FIAll/ NoneCE 5.0
FOOD_AND_DRINK 5.0
GAME 5.0
HEALTH_AND_FITNESS 5.0
HOUSE_AND_HOME 4.8
LIBRARIES_AND_DEMO 5.0
LIFESTYLE 5.0
MAPS_AND_NAVIGATION 4.9
MEDICAL 5.0
NEWS_AND_MAGAZINES 5.0
PARENTING 5.0
PERSONALIZATION 5.0
PHOTOGRAPHY 5.0
PRODUCTIVITY 5.0
SHOPPING 5.0
SOCIAL 5.0
SPORTS 5.0
TOOLS 5.0
129:1 CRLF UTF-8 4 spaces Python 3.6 (untitled10)
```

```
E:\KRITIKA\Python\IP PROJECT\Play store Apps.py
Run: Play store Apps.py
WEATHER 4.8
Do you want me to name the Apps with top Ratings? (Yes/No):
Yes
Here are the apps with maximum rating per Category:
App ... Rating
0 Spring flowers theme couleurs d t space ... 5.0
66 DMV Permit Practice Test 2018 Edition ... 4.9
151 ipsy: Makeup, Beauty, and Tips ... 4.9
204 Tozer Devotional -Series 1 ... 5.0
435 NEMA ei ... 5.0
895 Superheroes, Marvel, DC, Comics, TV, Movies News ... 5.0
955 Cb browser ... 5.0
1342 Speeding Joyride & Car Meet App ... 5.0
1576 Learn Japanese, Korean, Chinese Offline & Free ... 4.9
1732 Football Wallpapers 4K | Full HD Backgrounds ... 4.7
1881 Prosperity ... 5.0
1945 Fr. Mike Schmitz Audio Teachings ... 5.0
3917 BxPort - Bitcoin Bx (Thailand) ... 5.0
4283 Food-Aw - Order Food Online in Aruba ... 5.0
4410 CP Trivia ... 5.0
5554 CL Strength ... 5.0
5895 Viva Decora - Decoration, Photos, Architecture... ... 4.8
5983 Eternal life ... 5.0
6068 The Divine Feminine App: the DF App ... 5.0
6450 Tour BD (Bahir Dar Map) ... 4.9
6587 BP Journal - Blood Pressure Diary ... 5.0
7050 Noticias FC Barcelona ... 5.0
7333 DF Glue Board ... 5.0
7393 Wallpapers FN SCAR H ... 5.0
7785 Selfie With Champion AJ Style ... 5.0
8120 CJ'S TIRE AND AUTO INC. ... 5.0
8544 BL Flowers Digital ... 5.0
8804 UP EB Bill Payment & Details ... 5.0
9099 FK Dedinie BGD ... 5.0
```



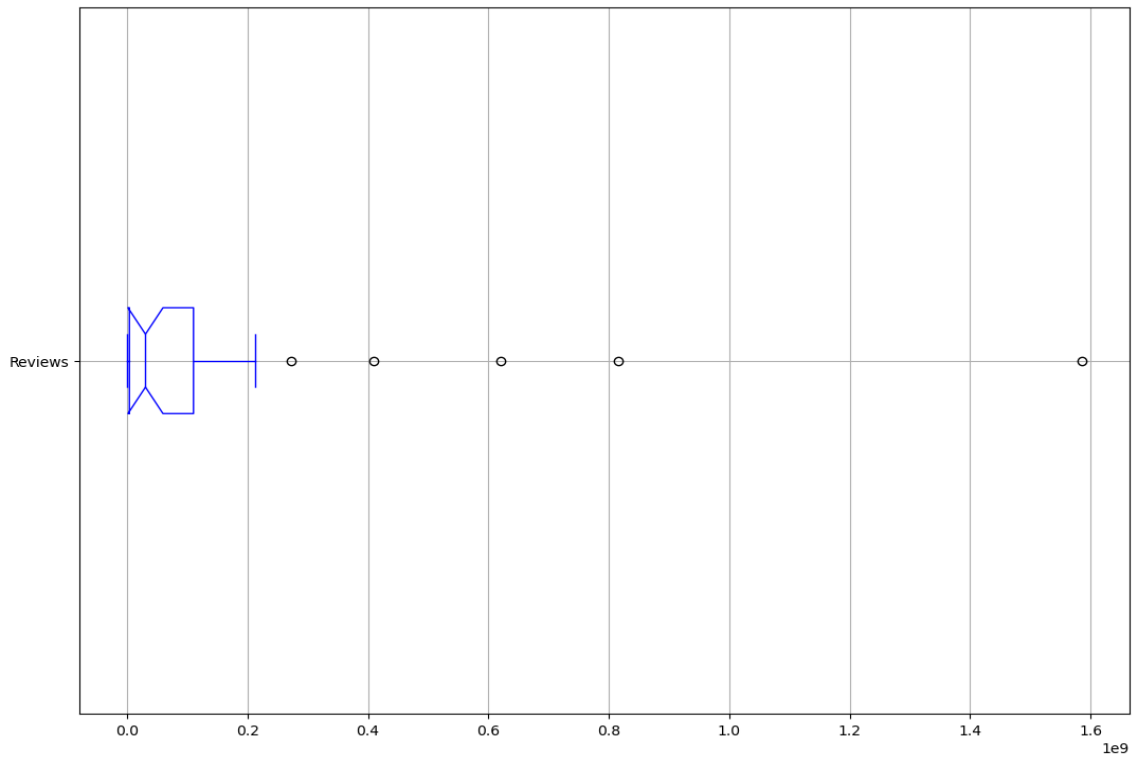
```
E: KRITIKA > Python > IP PROJECT > Play store Apps.py
Play store Apps.py
Run: Play store Apps
[33 rows x 3 columns]
Enter your choice here(1/2/3/...): 3
Write any of the given fields to print the number of Apps according to it:
a. Category
b. Installs
c. Content Rating
d. Type
e. Android Ver
f. Current Ver
g. Genres
h. Current Ver
Content Rating
The Field has the following distribution of Apps:
['Everyone' 'Teen' 'Everyone 10+' 'Mature 17+' 'Adults only 18+' 'Unrated']
There are 6 Content Rating in total.
Do you want me to show you the app information for every distribution? yes
For which Distribution? Teen
App ... Android Ver
3 Sketch - Draw & Paint ... 4.2 and up
12 Tattoo Name On My Photo Editor ... 4.1 and up
34 I Creative Idea ... 4.1 and up
72 Android Auto - Maps, Media, Messaging & Voice ... 5.0 and up
112 Selfie Camera Photo Editor & Filter & Sticker ... 4.0.3 and up
... ...
10804 Poker Pro.Fr ... 2.3 and up
10814 FR: My Secret Pets! ... 3.0 and up
10819 Fanfic-FR ... 4.1 and up
10820 Fr. Daoud Lamei ... 4.1 and up
10825 Naruto & Boruto FR ... 4.0 and up
[1208 rows x 12 columns]
```



```
E: > KRITIKA > Python > IP PROJECT > Play store Apps.py
Play store Apps.py
Run: Play store Apps
Enter your choice here(1/2/3/...:0
Select a field from the given list:
a. Reviews
b. Rating
c. Installsreviews
Enter the number of apps you want to be displayed:4
The app with maximum Reviews is:
App Reviews Rating Installs
0 Photo Editor & Candy Camera & Grid & ScrapBook 159 4.1 10000
1 Coloring book moana 967 3.9 500000
2 U Launcher Lite - FREE Live Cool Themes, Hide ... 87510 4.7 5000000
3 Sketch - Draw & Paint 215644 4.5 50000000
4 Pixel Draw - Number Art Coloring Book 967 4.3 100000
The app with minimum Reviews is:
App Reviews Rating Installs
10836 Sya9a Maroc - FR 38 4.5 5000
10837 Fr. Mike Schmitz Audio Teachings 4 5.0 100
10838 Parkinson Exercices FR 3 NaN 1000
10839 The SCP Foundation DB fr nn5n 114 4.5 1000
10840 iHoroscope - 2018 Daily Horoscope & Astrology 398307 4.5 10000000
Enter your choice here(1/2/3/...:0
1. Category 2. Genres 3. Type 4. Content Rating
Enter the name of the field from the above list:
Genres
1. Installs 2. Rating 3. Reviews 4. Price
Enter the name of the field from the above list whose mean you want to find:
Price
Price
Genres
Action 0.0
Action;Action & Adventure 0.0
Adventure 0.0
Adventure;Action & Adventure 0.0
Adventure;Brain Games 0.0
```

```
E: > KRITIKA > Python > IP PROJECT > Play store Apps.py
Play store Apps.py
Run: Play store Apps
Price
Genres
Action 0.0
Action;Action & Adventure 0.0
Adventure 0.0
Adventure;Action & Adventure 0.0
Adventure;Brain Games 0.0
...
Video Players & Editors 0.0
Video Players & Editors;Creativity 0.0
Video Players & Editors;Music & Video 0.0
Weather 0.0
Word 0.0

[119 rows x 1 columns]
Enter your choice here(1/2/3/...:10
Reviews
Category
ART_AND_DESIGN 1714459
AUTO_AND_VEHICLES 1163666
BEAUTY 396240
BOOKS_AND_REFERENCE 21959069
BUSINESS 13954552
COMICS 3383276
COMMUNICATION 815462260
DATING 7291278
EDUCATION 39595786
ENTERTAINMENT 59178154
EVENTS 161018
FAMILY 410226330
FIAll/ NoneCE 17550728
FOOD_AND_DRINK 8883330
GAME 1585422349
HEALTH_AND_FITNESS 37893743
```

```

E: > KRITIKA > Python > IP PROJECT > Play store Apps.py
Play store Apps.py
Run: Play store Apps
↑ AUTO_AND_VEHICLES 1163666
↓ BEAUTY 396240
BOOKS_AND_REFERENCE 21959069
BUSINESS 13954552
COMICS 3383276
COMMUNICATION 815462260
DATING 7291278
EDUCATION 39595786
ENTERTAINMENT 59178154
EVENTS 161018
FAMILY 410226330
FIALL/ NoneCE 17550728
FOOD_AND_DRINK 8883330
GAME 1585422349
HEALTH_AND_FITNESS 37893743
HOUSE_AND_HOME 3976385
LIBRARIES_AND_DEMO 1037118
LIFESTYLE 12882784
MAPS_AND_NAVIGATION 30659254
MEDICAL 1585975
NEWS_AND_MAGAZINES 54400863
PARENTING 958331
PERSONALIZATION 89346140
PHOTOGRAPHY 213516650
PRODUCTIVITY 114116975
SHOPPING 115041222
SOCIAL 621241422
SPORTS 70830169
TOOLS 273185044
TRAVEL_AND_LOCAL 62617919
VIDEO_PLAYERS 110380188
WEATHER 14604735
Enter your choice here(1/2/3/...:
318:1 CRLF UTF-8 4 spaces Python 3.6 (untitled10)

```

WEATHER 14004755

Enter your choice here(1/2/3/...:11

Enter your choice here(1/2/3/...:12

Play store has these many Android Version ranges:

['4.0.3 and up' '4.2 and up' '4.4 and up' '2.3 and up' '3.0 and up'
'4.1 and up' '4.0 and up' '2.3.3 and up' 'All/ None' '2.2 and up'
'5.0 and up' '6.0 and up' '1.6 and up' '1.5 and up' '2.1 and up'
'7.0 and up' '5.1 and up' '4.3 and up' '4.0.3 - 7.1.1' '2.0 and up'
'3.2 and up' '4.4W and up' '7.1 and up' '7.0 - 7.1.1' '8.0 and up'
'5.0 - 8.0' '3.1 and up' '2.0.1 and up' '4.1 - 7.1.1' '5.0 - 6.0'
'1.0 and up' '2.2 - 7.1.1' '5.0 - 7.1.1']

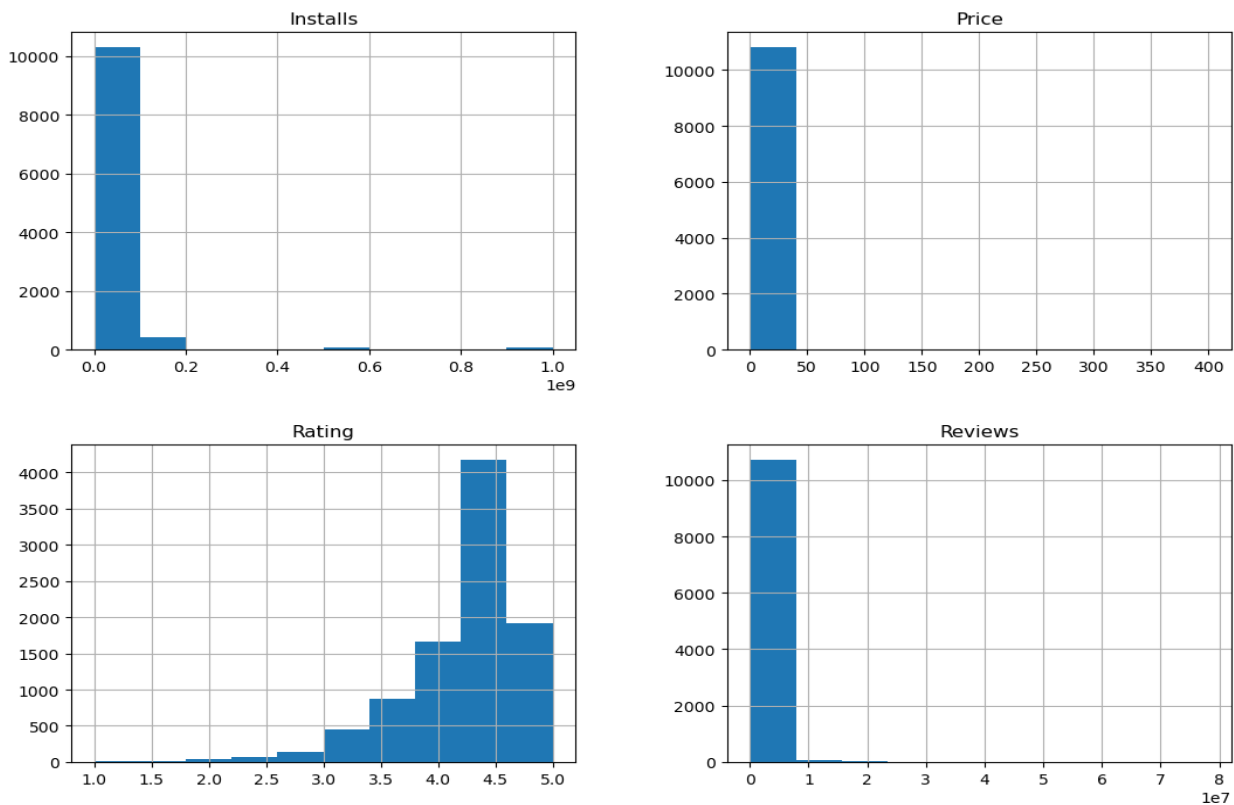
Type your Android Version Range as per the above ranges:3.2 and up

Enter the name of the app you want to use:Photo Compress 2.0 - Ad Free

Yes! Your Android Version is up to date for Photo Compress 2.0 - Ad Free !

Enter your choice here(1/2/3/...:13

Figure 1



```

Enter your choice here(1/2/3/...:14

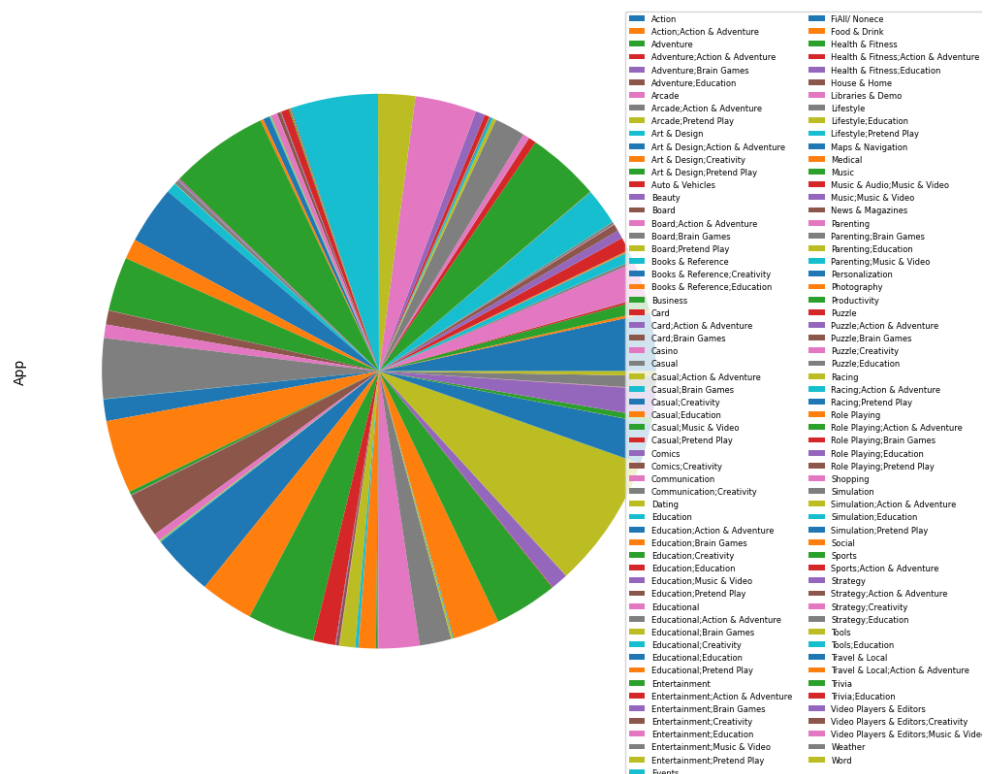
App ... Android Ver
0 Photo Editor & Candy Camera & Grid & ScrapBook ... 4.0.3 and up
1 Coloring book moana ... 4.0.3 and up
2 U Launcher Lite - FREE Live Cool Themes, Hide ... 4.0.3 and up
3 Sketch - Draw & Paint ... 4.2 and up
4 Pixel Draw - Number Art Coloring Book ... 4.4 and up
... ... ...
10836 Sya9a Maroc - FR ... 4.1 and up
10837 Fr. Mike Schmitz Audio Teachings ... 4.1 and up
10838 Parkinson Exercices FR ... 2.2 and up
10839 The SCP Foundation DB fr nn5n ... All/ None
10840 iHoroscope - 2018 Daily Horoscope & Astrology ... All/ None

[10841 rows x 12 columns]
Enter your choice here(1/2/3/...:15
Thank you so much! Have a great day!

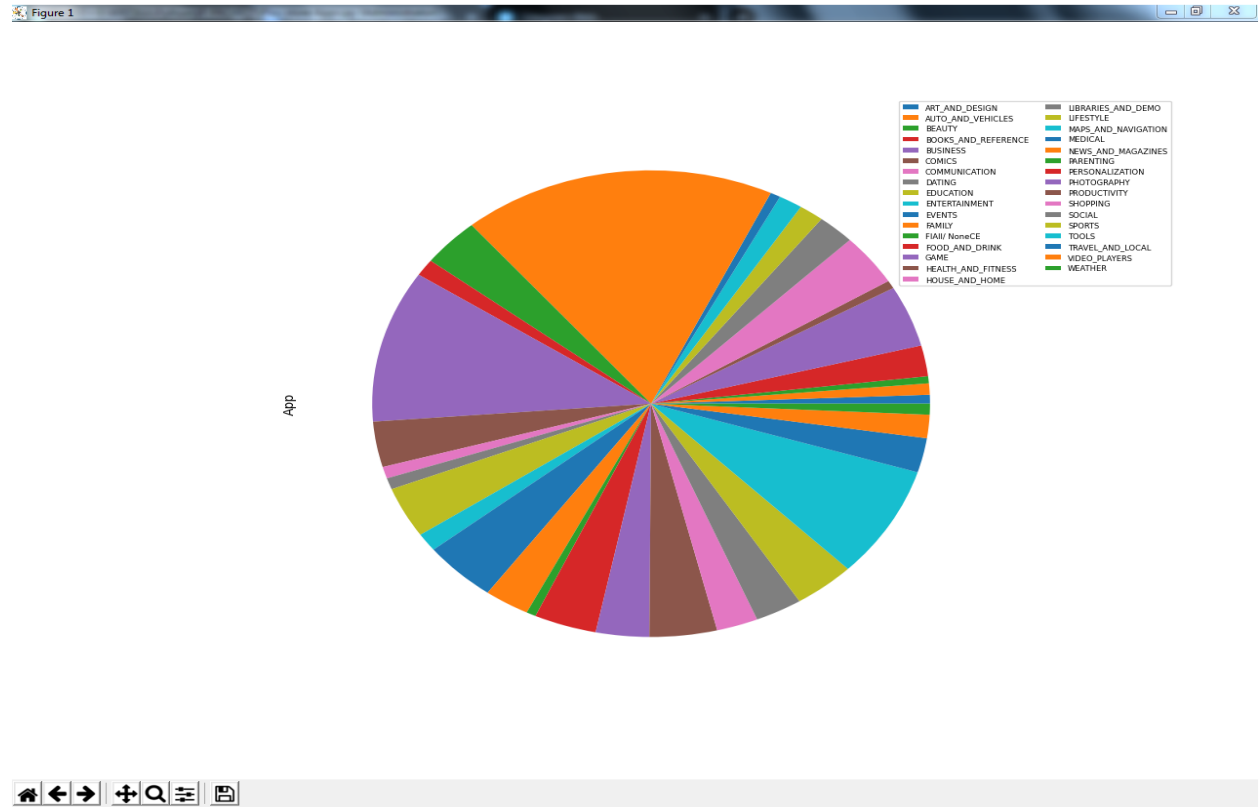
Process finished with exit code 0

```

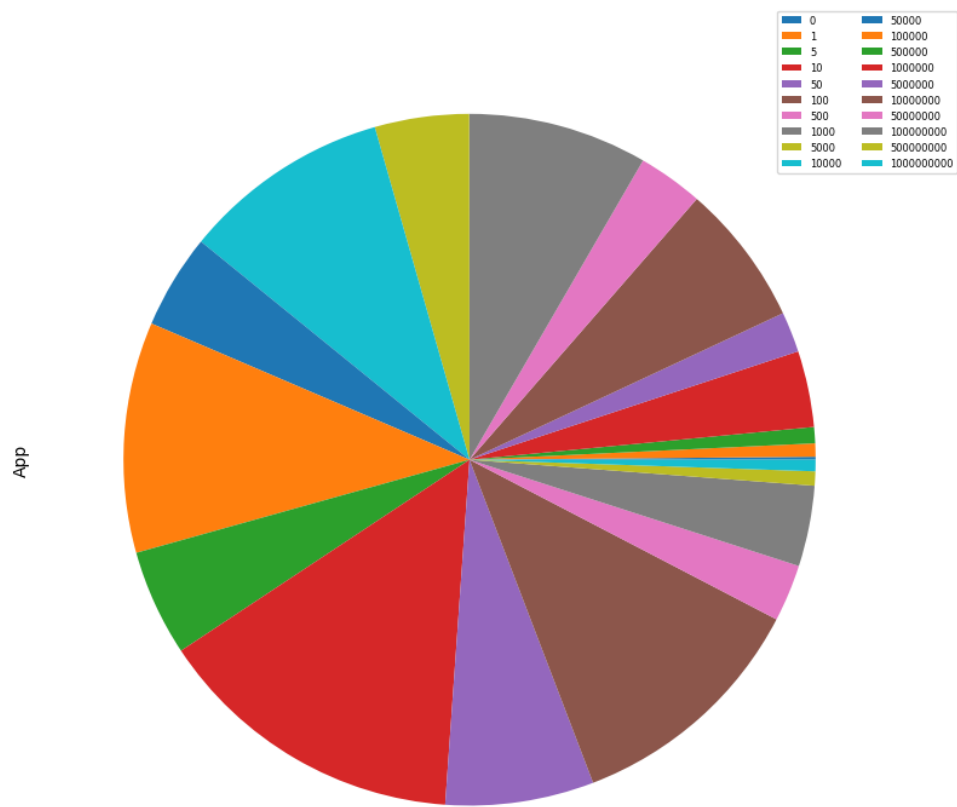
Figure 1



(Content Rating Distribution)



(Category distribution)



(Installs Distribution)

HARDWARE & SOFTWARE REQUIREMENTS

Hardware Requirement

Pentium 3/4/Core 2 Duo/Dual core/i3/i5/i7 With at least 256 MB
RAM 2 MB free space on Hard Disk Color Monitor/LCD

Operating System & Compiler

MS Windows Python with related libraries used of Data Analysis

- Pandas
- Matplotlib