Profitable App Profiles

Background: Client company creates Android and iOS mobile apps. They only build apps that are free to download and install. Main source of revenue comes from in-app ads. Therefore, client company seeks to have as many users as possible use thier apps.

What type of apps are likely to attract the most users?

In [1]:

```
opened_file = open('AppleStore.csv')
from csv import reader
read_file = reader(opened_file)
apps_data = list(read_file)

opened_file = open('googleplaystore.csv')
from csv import reader
read_file = reader(opened_file)
google_data = list(read_file)


def explore_data(dataset, start, end, rows_and_columns=False):
    dataset_slice = dataset[start:end]
    for row in dataset_slice:
        print(row)
        print('\n') # adds a new (empty) line after each row

    if rows_and_columns:
        print('Number of rows:', len(dataset))
        print('Number of columns:', len(dataset[0]))

print("Result of explore_data function for Apps_data")

explore_data(apps_data, 0, 5)

print("Result of explore_data function for google_data ")

print(explore_data(google_data, 0, 5))
```

Result of explore_data function for Apps_data
['id', 'track_name', 'size_bytes', 'currency', 'price', 'rating_count_tot', 'rating_count_ver', 'user_rating', 'user_rating_ver', 'ver', 'cont_rating', 'prime_genre', 'sup_devices.num', 'ipadSc_urls.num', 'lang.num', 'vpp_lic']

['284882215', 'Facebook', '389879808', 'USD', '0.0', '2974676', '212', '3.5', '3.5', '95.0', '4+', 'Social Networking', '37', '1', '29', '1']

['389801252', 'Instagram', '113954816', 'USD', '0.0', '2161558', '1289', '4.5', '4.0', '10.23', '12+', 'Photo & Video', '37', '0', '29', '1']

['529479190', 'Clash of Clans', '116476928', 'USD', '0.0', '2130805', '579', '4.5', '4.5', '9.24.12', '9+', 'Games', '38', '5', '18', '1']

['420009108', 'Temple Run', '65921024', 'USD', '0.0', '1724546', '3842', '4.5', '4.0', '1.6.2', '9+', 'Games', '40', '5', '1', '1']

Result of explore_data function for google_data
['App', 'Category', 'Rating', 'Reviews', 'Size', 'Installs', 'Type', 'Price', 'Content Rating', 'Genres', 'Last Updated', 'Current Ver', 'Android Ver']

['Photo Editor & Candy Camera & Grid & ScrapBook', 'ART_AND_DESIGN', '4.1', '159', '19M', '10,000+', 'Free', '0', 'Everyone', 'Art & Design', 'January 7, 2018', '1.0.0', '4.0.3 and up']

['Coloring book moana', 'ART_AND_DESIGN', '3.9', '967', '14M', '500,000+', 'Free', '0', 'Everyone', 'Art & Design;Pretend Play', 'January 15, 2018', '2.0.0', '4.0.3 and up']

['U Launcher Lite – FREE Live Cool Themes, Hide Apps', 'ART_AND_DESIGN', '4.7', '87510', '8.7M', '5,000,000+', 'Free', '0', 'Everyone', 'Art & Design', 'August 1, 2018', '1.2.4', '4.0.3 and up']

['Sketch - Draw & Paint', 'ART_AND_DESIGN', '4.5', '215644', '25M', '50,000,000+', 'Free', '0', 'Teen', 'Art & Design', 'June 8, 2018', 'Varies with device', '4.2 and up']

None

In [2]:
```
#data cleaning - There is a row with a missing value.
#I'm printing the length of the row with index number 10473.
#I'm also printing the length of the header row to compare lengths.

print(len(google_data[10473]))
print(len(google_data[0]))
```

```
12
13
```

In [3]:
```
#I'm deleting row 10473
del google_data[10473]
```

In [4]:
```
# I'm going to check for duplicates in the Google play dataset (google_data)

duplicate_apps_google_data = []
unique_apps_google_data = []

for app in google_data[1:]:
    name = app[0]
    if name in unique_apps_google_data:
        duplicate_apps_google_data.append(name)
    else:
        unique_apps_google_data.append(name)
print('Number of duplicate apps:' , len(duplicate_apps_google_data))
print('\n')
print('Examples of duplicate apps:', duplicate_apps_google_data[:10])
```

```
Number of duplicate apps: 1181


Examples of duplicate apps: ['Quick PDF Scanner + OCR FREE', 'Box', 'Google M
y Business', 'ZOOM Cloud Meetings', 'join.me - Simple Meetings', 'Box', 'Zene
fits', 'Google Ads', 'Google My Business', 'Slack']
```

Now I'll check for duplicates in the apps_data data set.

In [5]:
```
duplicate_apps_apps_data = []
unique_apps_apps_data = []

for app in apps_data[1:]:
    name = app[0]
    if name in unique_apps_apps_data:
        duplicate_apps_apps_data.append(name)
    else:
        unique_apps_apps_data.append(name)
print('Number of duplicate apps:' , len(duplicate_apps_apps_data))
print('\n')
print('Examples of duplicate apps:', duplicate_apps_apps_data[:10])
```

```
Number of duplicate apps: 0


Examples of duplicate apps: []
```

In [6]:
```
#Lets look at one of the duplicates in google_data

for app in google_data[1:]:
    name = app[0]
    if name == 'Slack':
        print(app)
```

```
['Slack', 'BUSINESS', '4.4', '51507', 'Varies with device', '5,000,000+', 'Fr
ee', '0', 'Everyone', 'Business', 'August 2, 2018', 'Varies with device', 'Va
ries with device']
['Slack', 'BUSINESS', '4.4', '51507', 'Varies with device', '5,000,000+', 'Fr
ee', '0', 'Everyone', 'Business', 'August 2, 2018', 'Varies with device', 'Va
ries with device']
['Slack', 'BUSINESS', '4.4', '51510', 'Varies with device', '5,000,000+', 'Fr
ee', '0', 'Everyone', 'Business', 'August 2, 2018', 'Varies with device', 'Va
ries with device']
```

You can see that the 4th element differs in the duplicate rows. The 4th element(index = 3) in the app's row refers to the amount of reviews. I'm going to keep the entries with the highest amount of reviews because these entries seem to be the most up to date.

Now, I'll start the process of seperating the duplicate data from the unique data. In the cell below, I have written code that will place the name and number of reviews of the unique data into a dictionary. First, I'll create an empty dictionary named reviews_max. Then I'll create a loop through google_data (not including the header row), that takes the app name and the number of reviews. If the name is already in the reviews_max dictionary and has a higher amount of reviews, then the number of reviews will be updated. If that condition wasn't met, then if the app's name is not in reviews_max then, the name of the app and the number of reviews will be added to reviews_max.

In [7]:
```
reviews_max = {}

for app in google_data[1:]:
    name = app[0]
    n_reviews = float(app[3])
    if name in reviews_max and reviews_max[name] < n_reviews :
        reviews_max[name] = n_reviews
    elif name not in reviews_max:
        reviews_max[name] = n_reviews
```

In [8]:
```
google_data_clean = []
already_added = []

for app in google_data[1:]:
    name = app[0]
    n_reviews = float(app[3])

    if n_reviews == reviews_max[name] and name not in already_added:
        google_data_clean.append(app)
        already_added.append(name)

print(google_data_clean[0:6])
```

```
[['Photo Editor & Candy Camera & Grid & ScrapBook', 'ART_AND_DESIGN', '4.1',
'159', '19M', '10,000+', 'Free', '0', 'Everyone', 'Art & Design', 'January 7,
2018', '1.0.0', '4.0.3 and up'], ['U Launcher Lite – FREE Live Cool Themes, H
ide Apps', 'ART_AND_DESIGN', '4.7', '87510', '8.7M', '5,000,000+', 'Free',
'0', 'Everyone', 'Art & Design', 'August 1, 2018', '1.2.4', '4.0.3 and up'],
['Sketch - Draw & Paint', 'ART_AND_DESIGN', '4.5', '215644', '25M', '50,000,0
00+', 'Free', '0', 'Teen', 'Art & Design', 'June 8, 2018', 'Varies with devic
e', '4.2 and up'], ['Pixel Draw - Number Art Coloring Book', 'ART_AND_DESIG
N', '4.3', '967', '2.8M', '100,000+', 'Free', '0', 'Everyone', 'Art & Design;
Creativity', 'June 20, 2018', '1.1', '4.4 and up'], ['Paper flowers instructi
ons', 'ART_AND_DESIGN', '4.4', '167', '5.6M', '50,000+', 'Free', '0', 'Everyo
ne', 'Art & Design', 'March 26, 2017', '1.0', '2.3 and up'], ['Smoke Effect P
hoto Maker - Smoke Editor', 'ART_AND_DESIGN', '3.8', '178', '19M', '50,000+',
'Free', '0', 'Everyone', 'Art & Design', 'April 26, 2018', '1.1', '4.0.3 and
up']]
```

In [9]:
```
print(len(already_added))
```

```
9659
```

In the next cell, I'll be removing any non--English apps from both datasets, `google_data_clean` and `apps_data`. Some app names are in different languages some are in English but have characters that fall out of the ASCII range of 0-127, like the TM trademark symbol. First, I'm going to define a new object called `is_english` to detect strings with more than 3 special characters (defined as having ASCII greater than 127).

In [10]:
```
def is_english(string):
    non_ascii = 0

    for character in string:
        if ord(character) > 127:
            non_ascii += 1

    if non_ascii > 3:
        return False
    else:
        return True
#Checking to make sure is_english works
print(is_english('Docs To Go™ Free Office Suite'))
print(is_english('Instachat 😜'))
```

```
True
True
```

In the following cell, for each app whose name has no more than 3 special characters, that app's data get put into the new data set `google_data_english` .

In [11]:
```
google_data_english = []

for app in google_data_clean:
    name = app[0]
    if is_english(name):
        google_data_english.append(app)


#Let's look at the new google_data_english

explore_data(google_data_english, 0, 4, True)
```

```
['Photo Editor & Candy Camera & Grid & ScrapBook', 'ART_AND_DESIGN', '4.1',
'159', '19M', '10,000+', 'Free', '0', 'Everyone', 'Art & Design', 'January 7,
2018', '1.0.0', '4.0.3 and up']


['U Launcher Lite – FREE Live Cool Themes, Hide Apps', 'ART_AND_DESIGN', '4.
7', '87510', '8.7M', '5,000,000+', 'Free', '0', 'Everyone', 'Art & Design',
'August 1, 2018', '1.2.4', '4.0.3 and up']


['Sketch - Draw & Paint', 'ART_AND_DESIGN', '4.5', '215644', '25M', '50,000,0
00+', 'Free', '0', 'Teen', 'Art & Design', 'June 8, 2018', 'Varies with devic
e', '4.2 and up']


['Pixel Draw - Number Art Coloring Book', 'ART_AND_DESIGN', '4.3', '967', '2.
8M', '100,000+', 'Free', '0', 'Everyone', 'Art & Design;Creativity', 'June 2
0, 2018', '1.1', '4.4 and up']


Number of rows: 9614
Number of columns: 13
```

In [12]:
```
apps_data_english = []

for app in apps_data[1:]:
    name = app[1]
    if is_english(name):
        apps_data_english.append(app)


#Let's look at the new apps_data_english

explore_data(apps_data_english, 0, 4, True)
```

```
['284882215', 'Facebook', '389879808', 'USD', '0.0', '2974676', '212', '3.5',
'3.5', '95.0', '4+', 'Social Networking', '37', '1', '29', '1']


['389801252', 'Instagram', '113954816', 'USD', '0.0', '2161558', '1289', '4.
5', '4.0', '10.23', '12+', 'Photo & Video', '37', '0', '29', '1']


['529479190', 'Clash of Clans', '116476928', 'USD', '0.0', '2130805', '579',
'4.5', '4.5', '9.24.12', '9+', 'Games', '38', '5', '18', '1']


['420009108', 'Temple Run', '65921024', 'USD', '0.0', '1724546', '3842', '4.
5', '4.0', '1.6.2', '9+', 'Games', '40', '5', '1', '1']


Number of rows: 6183
Number of columns: 16
```

Our client company only makes free to play games, so before conducting analysis, I'm also going to run a for loop to seperate all of the free apps into a new data set called `google_data_free` .

In [13]:
```
google_data_free = []

for app in google_data_english:
    price = app[7]
    if price == '0':
        google_data_free.append(app)
```

In [14]:
```
# Checking the length of google_data_ free to see how many free apps our in th
e set
print(len(google_data_free))
```

```
8864
```

I'll do the same for the Apple dataset.

In [15]:
```
apps_data_free = []

for app in apps_data_english:
    price = app[4]
    if price == '0.0':
        apps_data_free.append(app)

print(len(apps_data_free))
```

```
3222
```

In the cell below, I defined the function, `freq_table` in order to make a frequency table.

In [16]:
```
def freq_table(data_set, index):
    table ={}
    total = 0
    for row in data_set:
        total += 1
        value = row[index]
        if value in table:
            table[value] += 1
        else:
            table[value] = 1
    return table
```

The following function `display_table` creates a frequency table and then makes converts it into a tuple. Converting the table into a tuple allows for the `sorted()` function to be used.

In [17]:
```
def display_table(dataset, index):
    table = freq_table(dataset, index)
    table_display = []
    for key in table:
        key_val_as_tuple = (table[key], key)
        table_display.append(key_val_as_tuple)

    table_sorted = sorted(table_display, reverse = True)
    for entry in table_sorted:
        print(entry[1], ':', entry[0])
```

In [18]:
```
print("App store's Prime Genre Frequency table")
print( )
display_table(apps_data_free, 11)

print("Google Apps's Category Frequency Table")
display_table(google_data_free, 1)
print( )
print("Google Apps's Genres Frequency Table" )
display_table(google_data_free, 9)
```

App store's Prime Genre Frequency table

Games : 1874
Entertainment : 254
Photo & Video : 160
Education : 118
Social Networking : 106
Shopping : 84
Utilities : 81
Sports : 69
Music : 66
Health & Fitness : 65
Productivity : 56
Lifestyle : 51
News : 43
Travel : 40
Finance : 36
Weather : 28
Food & Drink : 26
Reference : 18
Business : 17
Book : 14
Navigation : 6
Medical : 6
Catalogs : 4
Google Apps's Category Frequency Table
FAMILY : 1676
GAME : 862
TOOLS : 750
BUSINESS : 407
LIFESTYLE : 346
PRODUCTIVITY : 345
FINANCE : 328
MEDICAL : 313
SPORTS : 301
PERSONALIZATION : 294
COMMUNICATION : 287
HEALTH_AND_FITNESS : 273
PHOTOGRAPHY : 261
NEWS_AND_MAGAZINES : 248
SOCIAL : 236
TRAVEL_AND_LOCAL : 207
SHOPPING : 199
BOOKS_AND_REFERENCE : 190
DATING : 165
VIDEO_PLAYERS : 159
MAPS_AND_NAVIGATION : 124
FOOD_AND_DRINK : 110
EDUCATION : 103
ENTERTAINMENT : 85
LIBRARIES_AND_DEMO : 83
AUTO_AND_VEHICLES : 82
HOUSE_AND_HOME : 73
WEATHER : 71
EVENTS : 63
PARENTING : 58
ART_AND_DESIGN : 57

COMICS : 55
BEAUTY : 53

Google Apps's Genres Frequency Table
Tools : 749
Entertainment : 538
Education : 474
Business : 407
Productivity : 345
Lifestyle : 345
Finance : 328
Medical : 313
Sports : 307
Personalization : 294
Communication : 287
Action : 275
Health & Fitness : 273
Photography : 261
News & Magazines : 248
Social : 236
Travel & Local : 206
Shopping : 199
Books & Reference : 190
Simulation : 181
Dating : 165
Arcade : 164
Video Players & Editors : 157
Casual : 156
Maps & Navigation : 124
Food & Drink : 110
Puzzle : 100
Racing : 88
Role Playing : 83
Libraries & Demo : 83
Auto & Vehicles : 82
Strategy : 81
House & Home : 73
Weather : 71
Events : 63
Adventure : 60
Comics : 54
Beauty : 53
Art & Design : 53
Parenting : 44
Card : 40
Casino : 38
Trivia : 37
Educational;Education : 35
Board : 34
Educational : 33
Education;Education : 30
Word : 23
Casual;Pretend Play : 21
Music : 18
Racing;Action & Adventure : 15
Puzzle;Brain Games : 15
Entertainment;Music & Video : 15

Casual;Brain Games : 12
Casual;Action & Adventure : 12
Arcade;Action & Adventure : 11
Action;Action & Adventure : 9
Educational;Pretend Play : 8
Simulation;Action & Adventure : 7
Parenting;Education : 7
Entertainment;Brain Games : 7
Board;Brain Games : 7
Parenting;Music & Video : 6
Educational;Brain Games : 6
Casual;Creativity : 6
Art & Design;Creativity : 6
Education;Pretend Play : 5
Role Playing;Pretend Play : 4
Education;Creativity : 4
Role Playing;Action & Adventure : 3
Puzzle;Action & Adventure : 3
Entertainment;Creativity : 3
Entertainment;Action & Adventure : 3
Educational;Creativity : 3
Educational;Action & Adventure : 3
Education;Music & Video : 3
Education;Brain Games : 3
Education;Action & Adventure : 3
Adventure;Action & Adventure : 3
Video Players & Editors;Music & Video : 2
Sports;Action & Adventure : 2
Simulation;Pretend Play : 2
Puzzle;Creativity : 2
Music;Music & Video : 2
Entertainment;Pretend Play : 2
Casual;Education : 2
Board;Action & Adventure : 2
Video Players & Editors;Creativity : 1
Trivia;Education : 1
Travel & Local;Action & Adventure : 1
Tools;Education : 1
Strategy;Education : 1
Strategy;Creativity : 1
Strategy;Action & Adventure : 1
Simulation;Education : 1
Role Playing;Brain Games : 1
Racing;Pretend Play : 1
Puzzle;Education : 1
Parenting;Brain Games : 1
Music & Audio;Music & Video : 1
Lifestyle;Pretend Play : 1
Lifestyle;Education : 1
Health & Fitness;Education : 1
Health & Fitness;Action & Adventure : 1
Entertainment;Education : 1
Communication;Creativity : 1
Comics;Creativity : 1
Casual;Music & Video : 1
Card;Action & Adventure : 1
Books & Reference;Education : 1

```
Art & Design;Pretend Play : 1
Art & Design;Action & Adventure : 1
Arcade;Pretend Play : 1
Adventure;Education : 1
```

The most popular categories for Apple apps are Games, Entertainment, Photo & Video. The most common categories for Google Playstore apps are Family, Game, and Tools. Top three genres for Google Playstore are Tools, Entertainment, and Education.

Now, I am going to look at the link between apps types and users.

For the Apple data set, the closest variable to assessing total app users is the total amount of user ratings `rating_count_tot`. In the following code, the first for loop loops through `genres_apps_data` for each genre and assigns both total and len_genre as 0. To get the genres and set up the total number of ratings (`total`) and the total number of genres (`len_genre`). Then it loops through apps_data_free for each app and assigns genre_app to index -5 (which is genre). If the genre_app equals genre then, the number of ratings is taken and added to the total number of ratings. The total number of apps in the genre also gets added by one. Then the average rating is calculated for each genre and printed as "genre: avg. number of ratings".

In [19]:
```
genres_apps_data = freq_table(apps_data_free, -5)

for genre in genres_apps_data:
    total = 0
    len_genre = 0
    for app in apps_data_free:
        genre_app = app[-5]
        if genre_app == genre:
            n_ratings = float(app[5])
            total += n_ratings
            len_genre += 1
    avg_n_ratings = total / len_genre
    print(genre, ':', avg_n_ratings)
```

```
Finance : 31467.944444444445
Entertainment : 14029.830708661417
Lifestyle : 16485.764705882353
Travel : 28243.8
Utilities : 18684.456790123455
Sports : 23008.898550724636
Music : 57326.530303030304
Medical : 612.0
Photo & Video : 28441.54375
Social Networking : 71548.34905660378
Shopping : 26919.690476190477
Productivity : 21028.410714285714
Business : 7491.117647058823
Catalogs : 4004.0
Navigation : 86090.33333333333
Weather : 52279.892857142855
Book : 39758.5
Reference : 74942.11111111111
Games : 22788.6696905016
News : 21248.023255813954
Health & Fitness : 23298.015384615384
Food & Drink : 33333.92307692308
Education : 7003.983050847458
```

For the Google Play dataset,

In [20]:
```
display_table(google_data_free, 5)
#Frequency table of number of installs
# Please note that number of installs are not exact, they signify a range
```

```
1,000,000+ : 1394
100,000+ : 1024
10,000,000+ : 935
10,000+ : 904
1,000+ : 744
100+ : 613
5,000,000+ : 605
500,000+ : 493
50,000+ : 423
5,000+ : 400
10+ : 314
500+ : 288
50,000,000+ : 204
100,000,000+ : 189
50+ : 170
5+ : 70
1+ : 45
500,000,000+ : 24
1,000,000,000+ : 20
0+ : 4
0 : 1
```

For the Google data set, I'm getting the averages number of installs in a similar way that I did with the Apple data set. The only differences is that I have a couple lines of code removing the commas and pluses from the `Installs` values.

In [21]:
```
categories_google = freq_table(google_data_free, 1)

for category in categories_google:
    total = 0
    len_category = 0
    for app in google_data_free:
        category_app = app[1]
        if category_app == category:
            n_installs = app[5]
            n_installs = n_installs.replace(',', '')
            n_installs = n_installs.replace('+', '')
            total += float(n_installs)
            len_category += 1
    avg_n_installs = total / len_category
    print(category, ':', avg_n_installs)
```

```
FINANCE : 1387692.475609756
EDUCATION : 1833495.145631068
COMICS : 817657.2727272727
VIDEO_PLAYERS : 24727872.452830188
SHOPPING : 7036877.311557789
HOUSE_AND_HOME : 1331540.5616438356
COMMUNICATION : 38456119.167247385
FAMILY : 3695641.8198090694
NEWS_AND_MAGAZINES : 9549178.467741935
BEAUTY : 513151.88679245283
LIFESTYLE : 1437816.2687861272
ENTERTAINMENT : 11640705.88235294
DATING : 854028.8303030303
MAPS_AND_NAVIGATION : 4056941.7741935486
TRAVEL_AND_LOCAL : 13984077.710144928
WEATHER : 5074486.197183099
BUSINESS : 1712290.1474201474
GAME : 15588015.603248259
MEDICAL : 120550.61980830671
SPORTS : 3638640.1428571427
ART_AND_DESIGN : 1986335.0877192982
PERSONALIZATION : 5201482.6122448975
SOCIAL : 23253652.127118643
EVENTS : 253542.22222222222
HEALTH_AND_FITNESS : 4188821.9853479853
AUTO_AND_VEHICLES : 647317.8170731707
BOOKS_AND_REFERENCE : 8767811.894736841
PARENTING : 542603.6206896552
FOOD_AND_DRINK : 1924897.7363636363
TOOLS : 10801391.298666667
PRODUCTIVITY : 16787331.344927534
LIBRARIES_AND_DEMO : 638503.734939759
PHOTOGRAPHY : 17840110.40229885
```

I'm going to now explore the different apps in these categories

In [31]:
```
google_finance = []
for app in google_data_free:
    if app[1] == 'COMMUNICATION':
         print(app[0], ':', app[5])
```

WhatsApp Messenger : 1,000,000,000+
Messenger for SMS : 10,000,000+
My Tele2 : 5,000,000+
imo beta free calls and text : 100,000,000+
Contacts : 50,000,000+
Call Free – Free Call : 5,000,000+
Web Browser & Explorer : 5,000,000+
Browser 4G : 10,000,000+
MegaFon Dashboard : 10,000,000+
ZenUI Dialer & Contacts : 10,000,000+
Cricket Visual Voicemail : 10,000,000+
TracFone My Account : 1,000,000+
Xperia Link™ : 10,000,000+
TouchPal Keyboard - Fun Emoji & Android Keyboard : 10,000,000+
Skype Lite - Free Video Call & Chat : 5,000,000+
My magenta : 1,000,000+
Android Messages : 100,000,000+
Google Duo - High Quality Video Calls : 500,000,000+
Seznam.cz : 1,000,000+
Antillean Gold Telegram (original version) : 100,000+
AT&T Visual Voicemail : 10,000,000+
GMX Mail : 10,000,000+
Omlet Chat : 10,000,000+
My Vodacom SA : 5,000,000+
Microsoft Edge : 5,000,000+
Messenger – Text and Video Chat for Free : 1,000,000,000+
imo free video calls and chat : 500,000,000+
Calls & Text by Mo+ : 5,000,000+
free video calls and chat : 50,000,000+
Skype - free IM & video calls : 1,000,000,000+
Who : 100,000,000+
GO SMS Pro - Messenger, Free Themes, Emoji : 100,000,000+
Messaging+ SMS, MMS Free : 1,000,000+
chomp SMS : 10,000,000+
Glide - Video Chat Messenger : 10,000,000+
Text SMS : 10,000,000+
Talkray - Free Calls & Texts : 10,000,000+
LINE: Free Calls & Messages : 500,000,000+
GroupMe : 10,000,000+
mysms SMS Text Messaging Sync : 1,000,000+
2ndLine - Second Phone Number : 1,000,000+
Google Chrome: Fast & Secure : 1,000,000,000+
Firefox Browser fast & private : 100,000,000+
Ninesky Browser : 1,000,000+
Dolphin Browser - Fast, Private & Adblock : 50,000,000+
UC Browser - Fast Download Private & Secure : 500,000,000+
Ghostery Privacy Browser : 1,000,000+
InBrowser - Incognito Browsing : 1,000,000+
Lightning Web Browser : 500,000+
Web Browser : 500,000+
Contacts+ : 10,000,000+
ExDialer - Dialer & Contacts : 10,000,000+
PHONE for Google Voice & GTalk : 1,000,000+
Safest Call Blocker : 1,000,000+
Full Screen Caller ID : 5,000,000+
Hiya - Caller ID & Block : 10,000,000+
Mr. Number-Block calls & spam : 10,000,000+

Should I Answer? : 1,000,000+
RocketDial Dialer & Contacts : 1,000,000+
CIA - Caller ID & Call Blocker : 5,000,000+
Calls Blacklist - Call Blocker : 10,000,000+
Call Control - Call Blocker : 5,000,000+
True Contact - Real Caller ID : 1,000,000+
Video Caller Id : 1,000,000+
Sync.ME – Caller ID & Block : 5,000,000+
Burner - Free Phone Number : 1,000,000+
Caller ID + : 1,000,000+
Gmail : 1,000,000,000+
K-9 Mail : 5,000,000+
myMail – Email for Hotmail, Gmail and Outlook Mail : 10,000,000+
Email TypeApp - Mail App : 1,000,000+
All Email Providers : 1,000,000+
Newton Mail - Email App for Gmail, Outlook, IMAP : 1,000,000+
GO Notifier : 10,000,000+
Mail.Ru - Email App : 50,000,000+
Mail1Click - Secure Mail : 10,000+
Daum Mail - Next Mail : 5,000,000+
mail.com mail : 1,000,000+
SolMail - All-in-One email app : 500,000+
Hangouts : 1,000,000,000+
Vonage Mobile® Call Video Text : 1,000,000+
JusTalk - Free Video Calls and Fun Video Chat : 5,000,000+
Azar : 50,000,000+
LokLok: Draw on a Lock Screen : 500,000+
Discord - Chat for Gamers : 10,000,000+
Messenger Lite: Free Calls & Messages : 100,000,000+
AntennaPict β : 1,000,000+
Talkatone: Free Texts, Calls & Phone Number : 10,000,000+
Kik : 100,000,000+
K-@ Mail - Email App : 100,000+
KakaoTalk: Free Calls & Text : 100,000,000+
K-9 Material (unofficial) : 5,000+
M star Dialer : 100,000+
Free WiFi Connect : 10,000,000+
m:go BiH : 10,000+
N-Com Wizard : 50,000+
Opera Mini - fast web browser : 100,000,000+
Opera Browser: Fast and Secure : 100,000,000+
Opera Mini browser beta : 10,000,000+
Psiphon Pro - The Internet Freedom VPN : 10,000,000+
ICQ — Video Calls & Chat Messenger : 10,000,000+
Telegram : 100,000,000+
AT&T Messages for Tablet : 1,000,000+
T-Mobile DIGITS : 100,000+
Truecaller: Caller ID, SMS spam blocking & Dialer : 100,000,000+
Portable Wi-Fi hotspot : 10,000,000+
AT&T Call Protect : 5,000,000+
U - Webinars, Meetings & Messenger : 500,000+
UC Browser Mini -Tiny Fast Private & Secure : 100,000,000+
/u/app : 10,000+
[verify-U] VideoIdent : 10,000+
Viber Messenger : 500,000,000+
WeChat : 100,000,000+
WhatsApp Business : 10,000,000+

WhatsCall Free Global Phone Call App & Cheap Calls : 10,000,000+
X Browser : 50,000+
Yahoo Mail – Stay Organized : 100,000,000+
Free Adblocker Browser - Adblock & Popup Blocker : 10,000,000+
Adblock Browser for Android : 10,000,000+
CM Browser - Ad Blocker , Fast Download , Privacy : 50,000,000+
Adblock Plus for Samsung Internet - Browse safe. : 1,000,000+
Ad Blocker Turbo - Adblocker Browser : 10,000+
Brave Browser: Fast AdBlocker : 5,000,000+
AG Contacts, Lite edition : 5,000+
Oklahoma Ag Co-op Council : 10+
Bee'ah Employee App : 100+
tournaments and more.aj.2 : 100+
Aj.Petra : 100+
AK Phone : 5,000+
PlacarTv Futebol Ao Vivo : 100,000+
WiFi Access Point (hotspot) : 100,000+
Access Point Names : 10,000+
Puffin Web Browser : 10,000,000+
ClanHQ : 10,000+
Ear Agent: Super Hearing : 5,000,000+
Google Voice : 10,000,000+
Google Allo : 10,000,000+
AU Call Blocker - Block Unwanted Calls Texts 2018 : 1,000+
Baby Monitor AV : 100,000+
AV Phone : 1,000+
AW - free video calls and chat : 1,000,000+
Katalogen.ax : 100+
AZ Browser. Private & Download : 100,000+
BA SALES : 1+
BD Data Plan (3G & 4G) : 500,000+
BD Internet Packages (Updated) : 50,000+
BD Dialer : 10,000+
BD Live Call : 5,000+
Best Browser BD social networking : 10+
Traffic signs BD : 500+
BF Browser by Betfilter - Stop Gambling Today! : 10,000+
My BF App : 50,000+
BH Mail : 1,000+
Zalo – Video Call : 50,000,000+
BJ - Confidential : 10+
BK Chat : 1,000+
Of the wall Arapaho bk : 5+
AC-BL : 50+
BBM - Free Calls & Messages : 100,000,000+
DMR BrandMeister Tool : 10,000+
BBMoji - Your personalized BBM Stickers : 1,000,000+
BN MALLORCA Radio : 1,000+
BQ Partners : 1,000+
BS-Mobile : 50+
ATC Unico BS : 500+
BT One Voice mobile access : 5,000+
BT Messenger : 50,000+
BT One Phone Mobile App : 10,000+
SW-100.tch by Callstel : 1,000,000+
BT MeetMe with Dolby Voice : 100,000+
Bluetooth Auto Connect : 5,000,000+

AudioBT: BT audio GPS/SMS/Text : 50,000+
BV : 100+
Feel Performer : 10,000+
Tiny Call Confirm : 1,000,000+
CB Radio Chat - for friends! : 1,000,000+
CB On Mobile : 100,000+
Virtual Walkie Talkie : 1,000,000+
Channel 19 : 100,000+
Cb browser : 50+
CF Chat: Connecting Friends : 100+
retteMi.ch : 5,000+
Chrome Dev : 5,000,000+
CJ Browser - Fast & Private : 100+
CJ DVD Rentals : 100+
CK Call NEW : 10+
CM Transfer - Share any files with friends nearby : 5,000,000+
mail.co.uk Mail : 5,000+
ClanPlay: Community and Tools for Gamers : 1,000,000+
CQ-Mobile : 1,000+
CQ-Alert : 500+
QRZ Assistant : 100,000+
Pocket Prefix Plus : 10,000+
Ham Radio Prefixes : 10,000+
CS Customizer : 1,000+
CS Browser | #1 & BEST BROWSER : 1,000+
CS Browser Beta : 5,000+
My Vodafone (GR) : 1,000,000+
IZ2UUF Morse Koch CW : 50,000+
C W Browser : 100+
CW Bluetooth SPP : 100+
CW BLE Peripheral Simulator : 500+
Morse Code Reader : 100,000+
Learn Morse Code - G0HYN Learn Morse : 5,000+
Ring : 10,000+
Hyundai CX Conference : 50+
Cy Messenger : 100+
Amadeus GR & CY : 100+
Hlášenírozhlasu.cz : 10+
SMS Sender - sluzba.cz : 1,000+
WEB.DE Mail : 10,000,000+
Your Freedom VPN Client : 5,000,000+
CallApp: Caller ID, Blocker & Phone Call Recorder : 10,000,000+
Rádio Sol Nascente DF : 500+
DG Card : 100+
Whoscall - Caller ID & Block : 10,000,000+
DK Browser : 10+
cluster.dk : 1,000+
DK TEL Dialer : 50+
DM for WhatsApp : 5,000+
DM Talk New : 5,000+
DM - The Offical Messaging App : 10+
DM Tracker : 1,000+
Call Blocker & Blacklist : 1,000+
ReadyOp DT : 1,000+
DU Browser—Browse fast & fun : 10,000,000+
Caller ID & Call Block - DU Caller : 5,000,000+
BlueDV AMBE : 1,000+

DW Contacts & Phone & Dialer : 1,000,000+
Deaf World DW : 10,000+
Ham DX Cluster & Spots Finder : 5,000+
Mircules DX Cluster Lite : 5,000+
3G DZ Configuration : 50,000+
chat dz : 100+
love sms good morning : 5,000+
Goodbox - Mega App : 100,000+
Call Blocker - Blacklist, SMS Blocker : 1,000,000+
[EF]ShoutBox : 100+
Eg Call : 10,000+
ei : 10+
EJ messenger : 10+
Ek IRA : 10+
Orfox: Tor Browser for Android : 10,000,000+
EO Mumbai : 10+
EP RSS Reader : 100+
Voxer Walkie Talkie Messenger : 10,000,000+
ES-1 : 500+
Hangouts Dialer - Call Phones : 10,000,000+
EU Council : 1,000+
Council Voting Calculator : 5,000+
Have your say on Europe : 500+
Programi podrške EU : 100+
Inbox.eu : 10,000+
Web Browser for Android : 1,000,000+
Everbridge : 100,000+
Best Auto Call Recorder Free : 500+
EZ Wifi Notification : 10,000+
Test Server SMS FA : 5+
Lite for Facebook Messenger : 1,000,000+
FC Browser - Focus Privacy Browser : 1,000+
EHiN-FH conferenceapp : 100+
Carpooling FH Hagenberg : 100+
Wi-Fi Auto-connect : 1,000,000+
Talkie - Wi-Fi Calling, Chats, File Sharing : 500,000+
WeFi - Free Fast WiFi Connect & Find Wi-Fi Map : 1,000,000+
Sat-Fi : 5,000+
Portable Wi-Fi hotspot Free : 100,000+
TownWiFi | Wi-Fi Everywhere : 500,000+
Jazz Wi-Fi : 10,000+
Sat-Fi Voice : 1,000+
Free Wi-fi HotspoT : 50,000+
FN Web Radio : 10+
FNH Payment Info : 10+
MARKET FO : 100+
FO OP St-Nazaire : 100+
FO SODEXO : 100+
FO RCBT : 100+
FO Interim : 100+
FO PSA Sept-Fons : 100+
FO AIRBUS TLSE : 1,000+
FO STELIA Méaulte : 100+
FO AIRBUS Nantes : 100+
Firefox Focus: The privacy browser : 1,000,000+
FP Connect : 100+
FreedomPop Messaging Phone/SIM : 500,000+

```
FP Live : 10+
HipChat - beta version : 50,000+
```

It seems like because of the pandemic a variety of educational apps have gained popularity. Topics being taught are varied, foreign languegs, coding, school related apps, apps that prepare for exmas(GRE/GMAT).

In [30]:
```
google_finance = []
for app in google_data_free:
    if app[1] == 'COMICS':
         print(app[0], ':', app[5])
```

Manga Master - Best manga & comic reader : 500,000+
GANMA! - All original stories free of charge for all original comics : 1,000,000+
Röhrich Werner Soundboard : 500,000+
Unicorn Pokez - Color By Number : 50,000+
MangaToon - Comics updated Daily : 50,000+
Manga Net – Best Online Manga Reader : 50,000+
Manga Rock - Best Manga Reader : 1,000,000+
Manga - read Thai translation : 10,000+
The Vietnam Story - Fun Stories : 10,000+
Dragon Ball Wallpaper - Ringtones : 10,000+
Funny Jokes Photos : 10,000+
Truyện Vui Tý Quậy : 10,000+
Comic Es - Shojo manga / love comics free of charge ♪ ♪ : 100,000+
comico Popular Original Cartoon Updated Everyday Comico : 5,000,000+
漫咖 Comics - Manga,Novel and Stories : 1,000,000+
Emmanuella Funny Videos 2018 : 100,000+
Manga Zero - Japanese cartoon and comic reader : 1,000,000+
Marvel Unlimited : 1,000,000+
Tapas – Comics, Novels, and Stories : 1,000,000+
Children's cartoons (Mithu-Mina-Raju) : 100,000+
Narrator's Voice : 5,000,000+
【Ranobbe complete free】 Novelba - Free app that you can read and write novels : 50,000+
Faustop Sounds : 100,000+
Manga Mania - Best online manga reader : 10,000+
- Free Comics - Comic Apps : 10,000+
Buff Thun - Daily Free Webtoon / Comics / Web Fiction / Mini Game : 500,000+
pixiv comic - everyone's manga app : 1,000,000+
Funny Jokes and Stories 2018 : 5,000+
Hojiboy Tojiboyev Life Hacks : 1,000+
Perfect Viewer : 5,000,000+
Best Wallpapers Backgrounds(100,000+ 4K HD) : 10,000+
think Comics : 50,000+
Memes Button : 1,000,000+
Laftel - Watching and Announcing Snooping, Streaming : 100,000+
Q Avatar (Avatar Maker) : 100,000+
LINE WEBTOON - Free Comics : 10,000,000+
2000 AD Comics and Judge Dredd : 50,000+
AF Comics Reader - Free : 100+
Manga AZ - Manga Comic Reader : 5,000+
Ba dum tss - Rimshot widget : 50,000+
Izneo, Read Manga, Comics & BD : 500,000+
Comics Reader : 100,000+
Make your Be Like Bill : 5,000+
WebComics : 1,000,000+
Lezhin Comics - Daily Releases : 1,000,000+
Daily Manga - Comic & Webtoon : 100,000+
TappyToon Comics & Webtoons : 100,000+
Manga Books : 500,000+
CJ - BR MEMES : 10,000+
Archie Comics : 100,000+
DC Comics : 1,000,000+
Comics : 5,000,000+
Superheroes, Marvel, DC, Comics, TV, Movies News : 5,000+
Pepsi Cards DC : 50+
Manga-FR - Anime Vostfr : 10,000+

Other than super hero comics, a lot of popular comic apps feature manga. This may not be a viable category to get into.