

iOS_Android_App_Data_Analytics

February 27, 2020

1 My first data science project as an analyst

In this project, we will be pretending to be data analysts for a company that creates Android and iOS apps. Our company only creates free apps and our main source of revenue is in our in-app ads. The more ads we have, the more revenue we make.

PART ONE - Create an `explore_data` function that will explore each of the data sets and return columns and data we need to make our analyses. - We will also be using this function to test out our datasets to make sure that they have been cleaned of any unwanted data.

PART TWO - Open our App Store and Google Store datasets into 2 separate files and then store them as lists of lists into an `iOS_data` variable, and an `android_data` variable. - Next we use our `explore_data` function to explore each of the variables that contain each of our datasets as lists of lists. - To test it out we also returned a few columns from each dataset.

```
[1]: def explore_data(dataset, start, end, rows_and_columns=False):
    dataset_slice = dataset[start:end]
    for row in dataset_slice:
        print(row)
        print('\n')

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

file1 = open('AppleStore.csv')
from csv import reader
read_file1 = reader(file1)
iOS_data = list(read_file1)
iOS_header = iOS_data[0]
iOS_data = iOS_data[1:]

file2 = open('googleplaystore.csv')
from csv import reader
read_file2 = reader(file2)
android_data = list(read_file2)
android_header = android_data[0]
android_data = android_data[1:]

explore_data(iOS_data, 0, 6, True)
```

```
explore_data(android_data, 1, 6, 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']
```

```
['284035177', 'Pandora - Music & Radio', '130242560', 'USD', '0.0', '1126879',  
'3594', '4.0', '4.5', '8.4.1', '12+', 'Music', '37', '4', '1', '1']
```

```
['429047995', 'Pinterest', '74778624', 'USD', '0.0', '1061624', '1814', '4.5',  
'4.0', '6.26', '12+', 'Social Networking', '37', '5', '27', '1']
```

Number of rows: 7197

Number of columns: 16

```
['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']
```

```
['Pixel Draw - Number Art Coloring Book', 'ART_AND_DESIGN', '4.3', '967',  
'2.8M', '100,000+', 'Free', '0', 'Everyone', 'Art & Design;Creativity', 'June  
20, 2018', '1.1', '4.4 and up']
```

```
['Paper flowers instructions', 'ART_AND_DESIGN', '4.4', '167', '5.6M',  
'50,000+', 'Free', '0', 'Everyone', 'Art & Design', 'March 26, 2017', '1.0',  
'2.3 and up']
```

Number of rows: 10841

Number of columns: 13

PART THREE - One of the things we don't want in our datasets are duplicate apps. We start by creating empty lists to store duplicates for each of our datasets such as `iOS_duplicates` and `android_duplicates`. - We also have to create a unique apps list for each dataset as well to keep track of all the unique apps in each of our large datasets. Our unique lists are `android_uniques` and `iOS_uniques`. - To perform storing the duplicates and unique apps in the right lists that we create, we loop through each app and if they aren't stored in the 'uniques' lists already, then store them in the 'uniques' list. Otherwise store them in the duplicates list

```
[2]: android_duplicates = []  
iOS_duplicates = []  
android_uniques = []  
iOS_uniques = []  
  
for app in android_data:  
    name = app[0]  
    if name in android_uniques:  
        android_duplicates.append(name)  
    else:  
        android_uniques.append(name)  
print('Android apps that have duplicates: ', android_duplicates)  
print('Amount of Android duplicate apps: ', len(android_duplicates))  
  
for app in iOS_data:  
    name = app[1]  
    if name in iOS_uniques:  
        iOS_duplicates.append(name)  
    else:  
        iOS_uniques.append(name)  
print('iOS apps that have duplicates: ', iOS_duplicates)
```

Android apps that have duplicates: ['Quick PDF Scanner + OCR FREE', 'Box', 'Google My Business', 'ZOOM Cloud Meetings', 'join.me - Simple Meetings', 'Box', 'Zenefits', 'Google Ads', 'Google My Business', 'Slack', 'FreshBooks Classic', 'Insightly CRM', 'QuickBooks Accounting: Invoicing & Expenses', 'HipChat - Chat Built for Teams', 'Xero Accounting Software', 'MailChimp - Email, Marketing Automation', 'Crew - Free Messaging and Scheduling', 'Asana: organize team projects', 'Google Analytics', 'AdWords Express', 'Accounting App - Zoho Books', 'Invoice & Time Tracking - Zoho', 'join.me - Simple Meetings', 'Invoice 2go - Professional Invoices and Estimates', 'SignEasy | Sign and Fill PDF and other

Documents', 'Quick PDF Scanner + OCR FREE', 'Genius Scan - PDF Scanner', 'Tiny Scanner - PDF Scanner App', 'Fast Scanner : Free PDF Scan', 'Mobile Doc Scanner (MDSan) Lite', 'TurboScan: scan documents and receipts in PDF', 'Tiny Scanner Pro: PDF Doc Scan', 'Docs To Go Free Office Suite', 'OfficeSuite : Free Office + PDF Editor', 'Slack', 'QuickBooks Accounting: Invoicing & Expenses', 'WhatsApp Messenger', 'Messenger - Text and Video Chat for Free', 'imo free video calls and chat', 'Viber Messenger', 'Hangouts', 'WeChat', 'Telegram', 'Who', 'Google Voice', 'Android Messages', 'Firefox Focus: The privacy browser', 'Google Allo', 'Google Chrome: Fast & Secure', 'Firefox Browser fast & private', 'Puffin Web Browser', 'Opera Browser: Fast and Secure', 'Opera Mini - fast web browser', 'UC Browser Mini -Tiny Fast Private & Secure', 'UC Browser - Fast Download Private & Secure', 'Calls & Text by Mo+', 'Viber Messenger', 'Call Blocker', 'Gmail', 'Yahoo Mail - Stay Organized', 'Hangouts', 'imo free video calls and chat', 'free video calls and chat', 'Viber Messenger', 'Skype - free IM & video calls', 'WeChat', 'Glide - Video Chat Messenger', 'Talkray - Free Calls & Texts', 'LINE: Free Calls & Messages', 'KakaoTalk: Free Calls & Text', 'OkCupid Dating', 'CMB Free Dating App', 'Hily: Dating, Chat, Match, Meet & Hook up', 'Hinge: Dating & Relationships', 'BBW Dating & Plus Size Chat', 'Casual Dating & Adult Singles - Joyride', 'EliteSingles - Dating for Single Professionals', 'Clover Dating App', 'Moco - Chat, Meet People', 'Hot or Not - Find someone right now', 'Just She - Top Lesbian Dating', 'Once - Quality Matches Every day', 'Sudy - Meet Elite & Rich Single', 'muzmatch: Muslim & Arab Singles, Marriage & Dating', 'Chispa, the Dating App for Latino, Latina Singles', 'Blendr - Chat, Flirt & Meet', 'Find Real Love - YouLove Premium Dating', 'Cougar Dating Life : Date Older Women Sugar Mummy', 'stranger chat - anonymous chat', 'Millionaire Match: Rich Singles Dating App', 'Dating for 50 plus Mature Singles - FINALLY', 'Moco+ - Chat, Meet People', 'Chat Rooms, Avatars, Date - Galaxy', 'FastMeet: Chat, Dating, Love', 'Christian Dating For Free App', 'Meet24 - Love, Chat, Singles', 'Black White Interracial Dating - Interracial Match', 'Gay Sugar Daddy Dating & Hookup - Sudy Gay', 'Adult Dirty Emojis', 'Hide App, Private Dating, Safe Chat - PrivacyHider', 'Meet4U - Chat, Love, Singles!', '95Live -SG#1 Live Streaming App', 'Just She - Top Lesbian Dating', 'Hily: Dating, Chat, Match, Meet & Hook up', 'O-Star', 'Random Video Chat', 'Black People Meet Singles Date', 'Howlr', 'Free Dating & Flirt Chat - Choice of Love', 'Cardi B Live Stream Video Chat - Prank', 'Chat Kids - Chat Room For Kids', 'muzmatch: Muslim & Arab Singles, Marriage & Dating', 'BBW Dating & Plus Size Chat', 'Transenger - Ts Dating and Chat for Free', 'BBW Dating & Curvy Singles Chat- LargeFriends', 'MouseMingle', 'FlirtChat - Free Dating/Flirting App', 'Live Talk - Free Text and Video Chat', 'Adult Dirty Emojis', 'Free Cam Girls - Live Webcam', 'Random Video Chat App With Strangers', 'Live Girls Talk - Free Video Chat', 'Girls Live Chat - Free Text & Video Chat', 'Free Dating App - Meet Local Singles - Flirt Chat', 'iPair-Meet, Chat, Dating', 'Free Dating Hook Up Messenger', 'Free Dating App - YoCutie - Flirt, Chat & Meet', 'Khan Academy', 'TED', 'Lumosity: #1 Brain Games & Cognitive Training App', 'Udemy - Online Courses', 'Khan Academy', 'TED', 'Duolingo: Learn Languages Free', 'Quizlet: Learn Languages & Vocab with Flashcards', 'Coursera: Online courses', 'Udemy - Online Courses', 'Udacity - Lifelong Learning', 'edX - Online Courses by Harvard, MIT & more', 'Lynda - Online Training Videos', 'Learn languages, grammar & vocabulary with Memrise',

'Brilliant', 'Babbel - Learn Languages', 'Duolingo: Learn Languages Free',
 'Rosetta Stone: Learn to Speak & Read New Languages', 'Learn languages, grammar
 & vocabulary with Memrise', 'Learn English with Wlingua', 'Quizlet: Learn
 Languages & Vocab with Flashcards', 'Google Classroom', 'Duolingo: Learn
 Languages Free', 'Learn 50 languages', 'Mango Languages: Lovable Language
 Courses', 'Rosetta Stone: Learn to Speak & Read New Languages', 'Learn
 languages, grammar & vocabulary with Memrise', 'Babbel - Learn Languages',
 'busuu: Learn Languages - Spanish, English & More', 'My Class Schedule:
 Timetable', 'Socratic - Math Answers & Homework Help', 'Google Classroom',
 'ClassDojo', 'HelloTalk - Chat, Speak & Learn Foreign Languages', 'Quizlet:
 Learn Languages & Vocab with Flashcards', 'busuu: Learn Languages - Spanish,
 English & More', 'Rosetta Stone: Learn to Speak & Read New Languages', 'Movies
 by Flixster, with Rotten Tomatoes', 'IMDb Movies & TV', 'Netflix', 'IMDb Movies
 & TV', 'Netflix', 'Tubi TV - Free Movies & TV', 'Crunchyroll - Everything
 Anime', 'STARZ', 'Crackle - Free TV & Movies', 'CBS - Full Episodes & Live TV',
 'Nick', 'Hulu: Stream TV, Movies & more', 'FOX NOW - On Demand & Live TV', 'The
 CW', 'HISTORY: Watch TV Show Full Episodes & Specials', 'HBO NOW: Stream TV &
 Movies', 'A&E - Watch Full Episodes of TV Shows', 'VH1', 'Lifetime - Watch Full
 Episodes & Original Movies', 'BET NOW - Watch Shows', 'Netflix', 'Tubi TV - Free
 Movies & TV', 'Crackle - Free TV & Movies', 'Crunchyroll - Everything Anime',
 'Nick', 'STARZ', 'Hulu: Stream TV, Movies & more', 'Food Network', 'FOX NOW - On
 Demand & Live TV', 'Movies by Flixster, with Rotten Tomatoes', 'HISTORY: Watch
 TV Show Full Episodes & Specials', 'Viki: Asian TV Dramas & Movies', 'The CW',
 'Univision NOW - Live TV and On Demand', 'HBO NOW: Stream TV & Movies', 'A&E -
 Watch Full Episodes of TV Shows', 'VH1', 'SHOWTIME', 'MTV', 'Lifetime - Watch
 Full Episodes & Original Movies', 'Comedy Central', 'BET NOW - Watch Shows',
 'FOX', 'Telemundo Now', 'Viki: Asian TV Dramas & Movies', 'Nick', 'Fandango
 Movies - Times + Tickets', 'Google Pay', 'Wells Fargo Daily Change', 'Credit
 Karma', 'Robinhood - Investing, No Fees', 'Digit Save Money Automatically',
 'Acorns - Invest Spare Change', 'Money Lover: Expense Tracker, Budget Planner',
 'Mint: Budget, Bills, Finance', 'Simple - Better Banking', 'PayPal', 'Google
 Pay', 'Wells Fargo Mobile', 'Capital One® Mobile', 'Grubhub: Food Delivery',
 'Postmates Food Delivery: Order Eats & Alcohol', 'Domino's Pizza USA', 'Chick-
 fil-A', 'Zomato - Restaurant Finder and Food Delivery App', 'Run with Map My
 Run', 'Weight Loss Running by Verv', 'Nike+ Run Club', 'Runtastic Running App &
 Mile Tracker', '8fit Workouts & Meal Planner', 'Daily Yoga - Yoga Fitness
 Plans', 'Pocket Yoga', 'Calorie Counter - MyFitnessPal', 'Weight Loss Running by
 Verv', 'Nike+ Run Club', 'Seven - 7 Minute Workout Training Challenge', 'Weight
 Watchers Mobile', 'Walk with Map My Walk', 'Workout Trainer: fitness coach',
 'Run with Map My Run', 'Nike Training Club - Workouts & Fitness Plans', 'Fitbit
 Coach', 'Calorie Counter - MyFitnessPal', 'Endomondo - Running & Walking',
 'Runkeeper - GPS Track Run Walk', 'Nike+ Run Club', 'Runtastic Running App &
 Mile Tracker', 'Calorie Counter - MyFitnessPal', 'Lose It! - Calorie Counter',
 'Calorie Counter - MyNetDiary', '10 Best Foods for You', 'MyPlate Calorie
 Tracker', 'Weight Loss Tracker - RecStyle', 'Calorie Counter by FatSecret',
 'Calorie Counter - Macros', 'My Diet Diary Calorie Counter', 'Lark - 24/7 Health
 Coach', 'Weight Watchers Mobile', 'Calorie Counter & Diet Tracker', 'MealLogger-
 Photo Food Journal', 'Health and Nutrition Guide', 'Food Calorie Calculator',

'Calorie Counter - MyFitnessPal', 'Lose It! - Calorie Counter', 'Relax
 Meditation: Sleep with Sleep Sounds', 'Meditation Music - Relax, Yoga', '21-Day
 Meditation Experience', 'Fabulous: Motivate Me! Meditate, Relax, Sleep', 'Calm -
 Meditate, Sleep, Relax', 'Relax Melodies: Sleep Sounds', 'Simple Habit
 Meditation', 'Headspace: Meditation & Mindfulness', 'Daily Yoga - Yoga Fitness
 Plans', 'Houzz Interior Design Ideas', 'Mortgage by Zillow: Calculator & Rates',
 'Redfin Real Estate', 'Apartment List: Housing, Apt, and Property Rentals',
 'Realtor.com Real Estate: Homes for Sale and Rent', 'Trulia Real Estate &
 Rentals', 'Zillow: Find Houses for Sale & Apartments for Rent', 'Apartments &
 Rentals - Zillow', 'Trulia Rent Apartments & Homes', 'Apartments.com Rental
 Search', 'Houzz Interior Design Ideas', 'Vaniday - Beauty Booking App',
 'StyleSeat', 'JOANN - Crafts & Coupons', 'Fashion in Vogue', 'Wheretogot: Shop
 in style', 'My Dressing - Fashion closet', 'Chictopia', 'Scarf Fashion
 Designer', 'Fashion in Vogue', 'Zara', 'Subway Surfers', 'ROBLOX', 'Pou', '8
 Ball Pool', 'Clash of Clans', 'Candy Crush Saga', 'Plants vs. Zombies FREE', 'My
 Talking Angela', 'Bubble Shooter', 'Word Search', 'Candy Crush Soda Saga',
 'Fishdom', 'Block Puzzle', 'Clash Royale', 'Sniper 3D Gun Shooter: Free Shooting
 Games - FPS', 'Granny', 'Galaxy Attack: Alien Shooter', 'Angry Birds Rio',
 'Zombie Catchers', 'Zombie Hunter King', 'Temple Run 2', 'Zombie Tsunami', 'Farm
 Heroes Saga', 'Super Jim Jump - pixel 3d', 'slither.io', 'Angry Birds Classic',
 'Flow Free', 'ROBLOX', 'Helix Jump', 'Subway Surfers', 'Candy Crush Saga', 'Toon
 Blast', 'Granny', '8 Ball Pool', 'Sniper 3D Gun Shooter: Free Shooting Games -
 FPS', 'slither.io', 'Temple Run 2', 'Kick the Buddy', 'Magic Tiles 3',
 'Bowmasters', 'Wordscapes', 'Block Craft 3D: Building Simulator Games For Free',
 'Helix Jump', 'PUBG MOBILE', 'Wordscapes', 'DRAGON BALL LEGENDS', 'ROBLOX',
 'Candy Crush Saga', '8 Ball Pool', 'Harry Potter: Hogwarts Mystery', 'PUBG
 MOBILE', 'MARVEL Strike Force', 'Merge Dragons!', 'Honkai Impact 3rd', 'Candy
 Crush Saga', 'ROBLOX', '8 Ball Pool', 'Subway Surfers', 'Candy Crush Soda Saga',
 'Zombie Hunter King', 'Bubble Shooter', 'Toon Blast', 'Toy Blast', 'Clash
 Royale', 'Clash of Clans', 'Farm Heroes Saga', 'Plants vs. Zombies FREE', 'Word
 Search', 'Block Puzzle', 'Super Jim Jump - pixel 3d', 'Pou', 'Temple Run 2',
 'Flow Free', 'Homescapes', 'Wordscapes', 'My Talking Angela', 'slither.io',
 'Cooking Fever', 'Gardenscapes', 'Fishdom', 'Galaxy Attack: Alien Shooter',
 'Score! Hero', 'Zombie Catchers', 'Magic Tiles 3', 'Granny', 'Dream League
 Soccer 2018', 'Fruits Bomb', 'Angry Birds Classic', 'Talking Tom Gold Run',
 'Bowmasters', 'My Talking Tom', 'Hill Climb Racing', 'Sniper 3D Gun Shooter:
 Free Shooting Games - FPS', 'Pixel Art: Color by Number Game', 'Rider', 'Zombie
 Tsunami', 'Garena Free Fire', 'Subway Surfers', 'Helix Jump', 'Temple Run 2',
 'slither.io', 'Bowmasters', 'Talking Tom Gold Run', 'Zombie Catchers', 'Sniper
 3D Gun Shooter: Free Shooting Games - FPS', 'Miraculous Ladybug & Cat Noir - The
 Official Game', 'Kick the Buddy', 'DRAGON BALL LEGENDS', 'Zombie Hunter King',
 'Garena Free Fire', 'Candy Crush Saga', 'Plants vs. Zombies FREE', 'Block
 Puzzle', 'Helix Jump', '8 Ball Pool', 'Bubble Shooter', 'Solitaire', 'Traffic
 Racer', 'Hill Climb Racing', 'Earn to Die 2', 'Bubble Shooter 2', 'Flow Free',
 'Zombie Catchers', 'Angry Birds Rio', 'Candy Crush Jelly Saga', 'Cut the Rope
 FULL FREE', 'Jewels Star: OZ adventure', 'Hungry Shark Evolution', 'Angry Birds
 Classic', 'Best Fiends - Free Puzzle Game', 'Hill Climb Racing 2', 'Swamp
 Attack', 'Bowmasters', 'Magic Tiles 3', 'Block Puzzle Classic Legend !', 'Pixel

Art: Color by Number Game', 'Score! Hero', 'Zombie Tsunami', 'DEAD TARGET: FPS
 Zombie Apocalypse Survival Games', 'Word Search', 'Farm Heroes Saga', 'YouTube
 Kids', 'Candy Bomb', 'ROBLOX', 'Solitaire', 'Princess Coloring Book', 'Hello
 Kitty Nail Salon', 'Dog Run - Pet Dog Simulator', 'Coloring book moana', 'Bubble
 Shooter', 'Barbie Fashion Closet', 'Minion Rush: Despicable Me Official Game',
 'No.Draw - Colors by Number 2018', 'Duolingo: Learn Languages Free', 'Super ABC!
 Learning games for kids! Preschool apps', 'ROBLOX', 'PJ Masks: Moonlight
 Heroes', 'Minion Rush: Despicable Me Official Game', 'Dog Run - Pet Dog
 Simulator', 'Hot Wheels: Race Off', 'Farming Simulator 14', 'Mcqueen Coloring
 pages', 'Monster Truck Driver & Racing', 'Strawberry Shortcake BerryRush', 'DC
 Super Hero Girls ', 'Toca Kitchen 2', 'DC Super Hero Girls ', 'Strawberry
 Shortcake BerryRush', 'Disney Magic Kingdoms: Build Your Own Magical Park',
 'Toca Life: City', 'Papumba Academy - Fun Learning For Kids', 'Kids Balloon Pop
 Game Free ', 'Sounds for Toddlers FREE', 'Elmo Calls by Sesame Street', 'Sago
 Mini Friends', 'Papumba Academy - Fun Learning For Kids', 'Tee and Mo Bath Time
 Free', 'Bita and the Animals - Pelos Ares', 'TO-FU Oh!SUSHI', 'DreamWorks
 Friends', 'Avokiddo Emotions', 'Nighty Night Circus', 'Sago Mini Babies', "Dr.
 Panda & Toto's Treehouse", 'ROBLOX', 'PlayKids - Educational cartoons and games
 for kids', 'YouTube Kids', 'Baby Panda Care', 'Monster High ', 'Duolingo: Learn
 Languages Free', 'Shopkins World!', 'DisneyNOW - TV Shows & Games', 'Equestria
 Girls', 'Frozen Free Fall', 'Nick', 'Thomas & Friends: Race On!', 'Inside Out
 Thought Bubbles', 'Sago Mini Friends', 'School of Dragons', 'Peak - Brain Games
 & Training', 'Period Tracker', 'Vargo Anesthesia Mega App', 'Monash Uni Low
 FODMAP Diet', 'mySugr: the blood sugar tracker made just for you', 'Human
 Anatomy Atlas 2018: Complete 3D Human Body', 'ASCCP Mobile', 'Paramedic Protocol
 Provider', '2017 EMRA Antibiotic Guide', 'Essential Anatomy 3', 'EMT PASS',
 'Block Buddy', 'EMT Review Plus', 'Journal Club: Medicine', 'Pedi STAT',
 'AnatomyMapp', 'Diabetes & Diet Tracker', 'A Manual of Acupuncture', 'PTA
 Content Master', 'Muscle Premium - Human Anatomy, Kinesiology, Bones', 'Cardiac
 diagnosis (heart rate, arrhythmia)', 'Medical ID - In Case of Emergency (ICE)',
 'IBM Micromedex Drug Info', 'Advanced Comprehension Therapy', 'Hospitalist
 Handbook', 'Teladoc Member', 'Ada - Your Health Guide', 'Ovia Fertility Tracker
 & Ovulation Calculator', 'Youper - AI Therapy', 'MoodSpace', 'Super Hearing
 Super Ear Amplifier', 'Penn State Health OnDemand', 'ScriptSave WellRx Rx
 Discounts', 'Free Blood Pressure', 'All Mental disorders', 'Nurse Grid', 'JH
 Blood Pressure Monitor', 'Blood Pressure', 'RT 516 VET', 'Anthem Anywhere',
 'Sway Medical', "fred's Pharmacy", 'Breastfeeding Tracker Baby Log', 'Banfield
 Pet Health Tracker', '1800 Contacts - Lens Store', 'TextNow - free text +
 calls', 'Tumblr', 'Snapchat', 'Instagram', 'Periscope - Live Video', 'Snapchat',
 'Instagram', 'Pinterest', 'MeetMe: Chat & Meet New People', 'ooVoo Video Calls,
 Messaging & Stories', 'LinkedIn', 'Tango - Live Video Broadcast', 'SayHi Chat,
 Meet New People', 'Tapatalk - 100,000+ Forums', 'Badoo - Free Chat & Dating
 App', 'Nextdoor - Local neighborhood news & classifieds', 'MeetMe: Chat & Meet
 New People', 'Meetup', 'Text Free: WiFi Calling App', 'textPlus: Free Text &
 Calls', 'Meetup', 'POF Free Dating App', 'MeetMe: Chat & Meet New People',
 'Tagged - Meet, Chat & Dating', 'LOVOO', 'SKOUT - Meet, Chat, Go Live', 'Badoo -
 Free Chat & Dating App', 'Jaumo Dating, Flirt & Live Video', 'SayHi Chat, Meet
 New People', 'Couple - Relationship App', 'Meetup', 'Wish - Shopping Made Fun',

'SnipSnap Coupon App', 'Extreme Coupon Finder', 'Checkout 51: Grocery coupons',
 'The Coupons App', 'RetailMeNot - Coupons, Deals & Discount Shopping', 'Groupon
 - Shop Deals, Discounts & Coupons', 'Stocard - Rewards Cards Wallet', 'Extreme
 Coupon Finder', 'eBay: Buy & Sell this Summer - Discover Deals Now!', 'Checkout
 51: Grocery coupons', 'Gyft - Mobile Gift Card Wallet', 'Shopkick: Free Gift
 Cards, Shop Rewards & Deals', 'The Coupons App', 'Shopular: Coupons, Weekly Ads
 & Shopping Deals', 'Wish - Shopping Made Fun', 'Carousell: Snap-Sell, Chat-Buy',
 'Walmart', 'Ibotta: Cash Back Savings, Rewards & Coupons App', 'AliExpress -
 Smarter Shopping, Better Living', 'LivingSocial - Local Deals', 'Amazon
 Shopping', 'RetailMeNot - Coupons, Deals & Discount Shopping', 'Poshmark - Buy &
 Sell Fashion', 'Target - now with Cartwheel', 'ZALORA Fashion Shopping', 'eBay:
 Buy & Sell this Summer - Discover Deals Now!', 'Fancy', 'Modcloth - Unique Indie
 Women's Fashion & Style', 'Gyft - Mobile Gift Card Wallet', 'JackThreads: Men's
 Shopping', 'LivingSocial - Local Deals', 'Zappos - Shoe shopping made simple',
 'Wanelo Shopping', 'Etsy: Handmade & Vintage Goods', 'Groupon - Shop Deals,
 Discounts & Coupons', 'eBay: Buy & Sell this Summer - Discover Deals Now!',
 'JackThreads: Men's Shopping', 'AliExpress - Smarter Shopping, Better Living',
 'Slickdeals: Coupons & Shopping', 'Target - now with Cartwheel', 'Wish -
 Shopping Made Fun', 'Fancy', 'ASOS', 'Google Photos', 'Shutterfly: Free Prints,
 Photo Books, Cards, Gifts', 'InstaBeauty -Makeup Selfie Cam', 'B612 - Beauty &
 Filter Camera', 'BeautyPlus - Easy Photo Editor & Selfie Camera', 'YouCam
 Perfect - Selfie Photo Editor', 'Google Photos', 'Muzy - Share photos &
 collages', 'QuickPic - Photo Gallery with Google Drive Support', 'Flickr',
 'Shutterfly: Free Prints, Photo Books, Cards, Gifts', 'Open Camera', 'Camera for
 Android', 'Cymera Camera- Photo Editor, Filter,Collage,Layout', 'Candy Camera -
 selfie, beauty camera, photo editor', 'Camera360: Selfie Photo Editor with Funny
 Sticker', 'Facetune - For Free', 'Photo Editor Selfie Camera Filter & Mirror
 Image', 'HD Camera for Android', 'Photo Editor Pro', 'YouCam Makeup - Magic
 Selfie Makeovers', 'Photo Editor-', 'Camera for Android', 'Photo Editor',
 'Cymera Camera- Photo Editor, Filter,Collage,Layout', 'Adobe Photoshop
 Express:Photo Editor Collage Maker', 'BeautyPlus - Easy Photo Editor & Selfie
 Camera', 'InstaSize Photo Filters & Collage Editor', 'Candy Camera - selfie,
 beauty camera, photo editor', 'YouCam Perfect - Selfie Photo Editor',
 'Camera360: Selfie Photo Editor with Funny Sticker', 'Facetune - For Free',
 'Shutterfly: Free Prints, Photo Books, Cards, Gifts', 'BeautyPlus - Easy Photo
 Editor & Selfie Camera', 'CBS Sports App - Scores, News, Stats & Watch Live',
 'Yahoo Fantasy Sports - #1 Rated Fantasy App', 'ESPN', 'NFL', 'Bleacher Report:
 sports news, scores, & highlights', 'ESPN Fantasy Sports', 'theScore: Live
 Sports Scores, News, Stats & Videos', 'CBS Sports App - Scores, News, Stats &
 Watch Live', 'ESPN', 'MLB At Bat', 'CBS Sports App - Scores, News, Stats & Watch
 Live', 'WatchESPN', 'Hole19: Golf GPS App, Rangefinder & Scorecard', 'Yahoo
 Fantasy Sports - #1 Rated Fantasy App', 'ESPN Fantasy Sports', 'CBS Sports
 Fantasy', 'ESPN', 'Bleacher Report: sports news, scores, & highlights',
 'theScore: Live Sports Scores, News, Stats & Videos', 'CBS Sports App - Scores,
 News, Stats & Watch Live', 'ESPN', 'Bleacher Report: sports news, scores, &
 highlights', 'MLB At Bat', 'theScore: Live Sports Scores, News, Stats & Videos',
 'CBS Sports App - Scores, News, Stats & Watch Live', 'Yahoo Sports - scores,
 stats, news, & highlights', 'WatchESPN', 'FotMob - Live Soccer Scores', 'Yahoo

Fantasy Sports - #1 Rated Fantasy App', 'ESPN', 'NFL', 'US Open Tennis Championships 2018', 'Bleacher Report: sports news, scores, & highlights', 'MLB At Bat', 'FIFA - Tournaments, Soccer News & Live Scores', 'theScore: Live Sports Scores, News, Stats & Videos', 'Golfshot: Golf GPS + Tee Times', 'BBC Sport', 'CBS Sports App - Scores, News, Stats & Watch Live', 'Yahoo Sports - scores, stats, news, & highlights', 'WatchESPN', 'MLB Ballpark', 'FOX Sports: Live Streaming, Scores & News', 'Fantasy Football', 'PGA TOUR', 'UFC', 'trivago: Hotels & Travel', 'Expedia Hotels, Flights & Car Rental Travel Deals', 'TripAdvisor Hotels Flights Restaurants Attractions', 'Skyscanner', 'Booking.com Travel Deals', 'TripAdvisor Hotels Flights Restaurants Attractions', 'Priceline Hotel Deals, Rental Cars & Flights', 'United Airlines', 'Expedia Hotels, Flights & Car Rental Travel Deals', 'Southwest Airlines', 'Hopper - Watch & Book Flights', 'Fly Delta', 'KAYAK Flights, Hotels & Cars', 'American Airlines', 'Skyscanner', 'Priceline Hotel Deals, Rental Cars & Flights', 'trivago: Hotels & Travel', 'Expedia Hotels, Flights & Car Rental Travel Deals', 'KAYAK Flights, Hotels & Cars', 'Orbitz - Hotels, Flights & Package Deals', 'Skyscanner', 'Hotels.com: Book Hotel Rooms & Find Vacation Deals', 'Booking.com Travel Deals', 'Hostelworld: Hostels & Cheap Hotels Travel App', 'TripAdvisor Hotels Flights Restaurants Attractions', 'Airbnb', 'Skyscanner', 'HotelTonight: Book amazing deals at great hotels', 'Maps - Navigate & Explore', 'Google Street View', 'Calculator', 'Gboard - the Google Keyboard', 'ZEDGE Ringtones & Wallpapers', 'ZEDGE Ringtones & Wallpapers', 'Nova Launcher', 'Apex Launcher', 'Smart Launcher 5', 'Google Keep', 'Evernote - Organizer, Planner for Notes & Memos', 'ES File Explorer File Manager', 'Microsoft Word', 'Google Drive', 'Adobe Acrobat Reader', 'Google PDF Viewer', 'Microsoft Excel', 'Google Docs', 'Microsoft PowerPoint', 'Microsoft OneNote', 'Google Calendar', 'Google Keep', 'Wunderlist: To-Do List & Tasks', 'Evernote - Organizer, Planner for Notes & Memos', 'Any.do: To-do list, Calendar, Reminders & Planner', 'Todoist: To-do lists for task management & errands', 'Microsoft OneNote', 'Planner Pro-Personal Organizer', 'Google Calendar', 'Google Drive', 'Microsoft OneDrive', 'Dropbox', 'MX Player', 'Video Editor', 'Google News', 'Flipboard: News For Our Time', 'BBC News', 'Fox News - Breaking News, Live Video & News Alerts', 'USA TODAY', 'CNN Breaking US & World News', 'Twitter', 'BBC News', 'NPR News', 'Fox News - Breaking News, Live Video & News Alerts', 'Haystack TV: Local & World News - Free', 'ABC News - US & World News', 'USA TODAY', 'NBC News', 'The Wall Street Journal: Business & Market News', 'CNN Breaking US & World News', 'NYTimes - Latest News', 'Newsroom: News Worth Sharing', 'Google News', 'BuzzFeed: News, Tasty, Quizzes', 'Flipboard: News For Our Time', 'Snapchat', 'Flashlight', 'Pou', 'Agar.io', 'Angry Birds Classic', 'My Talking Tom', 'Netflix', 'Bubble Shooter', 'Adobe Acrobat Reader', 'Subway Surfers', 'LEGO® Juniors Create & Cruise', 'WhatsApp Messenger', 'Google Translate', 'Pokémon GO', 'Instagram', 'My Talking Angela', 'YouTube Kids', 'PAC-MAN', 'Colorfy: Coloring Book for Adults - Free', 'Toca Kitchen 2', 'Amazon Shopping', 'Chick-fil-A', 'YouTube', 'Flow Free', 'Microsoft Word', 'Alto's Adventure', 'Zombie Tsunami', 'Facebook', 'B612 - Beauty & Filter Camera', 'Block Craft 3D: Building Simulator Games For Free', '8 Ball Pool', 'VPN Free - BetterNet Hotspot VPN & Private Browser', 'EMT Tutor NREMT-B Study Guide', 'EMT-B Pocket Prep', 'UC Browser - Fast Download Private & Secure', 'Hungry Shark Evolution', 'Diary with lock', 'Clash of

Clans', 'Clash Royale', 'C Programming', 'CppDroid - C/C++ IDE', 'Candy Crush Saga', 'Google Chrome: Fast & Secure', 'Learn C++', 'Hill Climb Racing', 'ZEDGE Ringtones & Wallpapers', 'Minion Rush: Despicable Me Official Game', 'Google Duo - High Quality Video Calls', 'Crossy Road', 'Temple Run 2', 'Dropbox', 'Sniper 3D Gun Shooter: Free Shooting Games - FPS', 'Plants vs. Zombies FREE', 'Dream League Soccer 2018', 'eBay: Buy & Sell this Summer - Discover Deals Now!', 'ESPN', 'ES File Explorer File Manager', 'Firefox Browser fast & private', 'E*TRADE Mobile', 'WWE', 'Amazon Kindle', 'Evernote - Organizer, Planner for Notes & Memos', 'Microsoft Edge', 'Microsoft Outlook', 'Pinterest', 'ClassDojo', 'The Coupons App', 'Ebook Reader', 'Gmail', 'Maps - Navigate & Explore', 'AliExpress - Smarter Shopping, Better Living', 'Flipkart Online Shopping App', 'Wish - Shopping Made Fun', 'Messenger - Text and Video Chat for Free', 'Facebook Lite', 'Messenger Lite: Free Calls & Messages', 'Twitter', 'LINE: Free Calls & Messages', 'imo beta free calls and text', 'Geometry Dash World', 'Google+', 'PUBG MOBILE', 'Gboard - the Google Keyboard', 'Granny', 'Google', 'Hangouts', 'G Cloud Backup', 'Google Drive', 'Helix Jump', 'H&M', 'H TV', 'Talking Ben the Dog', 'imo free video calls and chat', 'free video calls and chat', 'slither.io', 'POF Free Dating App', 'Skype - free IM & video calls', 'Sonic Dash', 'Text Free: WiFi Calling App', 'Talkatone: Free Texts, Calls & Phone Number', 'Textgram - write on photos', 'Zombie Catchers', 'Jetpack Joyride', 'Anger of stick 5 : zombie', 'Cut the Rope FULL FREE', 'Turbo FAST', 'K PLUS', 'PowerDirector Video Editor App: 4K, Slow Mo & More', 'Fuzzy Numbers: Pre-K Number Foundation', 'KakaoTalk: Free Calls & Text', 'LiveMe - Video chat, new friends, and make money', 'Talking Tom Gold Run', 'letgo: Buy & Sell Used Stuff, Cars & Real Estate', 'Love Balls', 'Last Day on Earth: Survival', 'Minecraft', 'MEGA', 'MX Player', 'I'm Expecting - Pregnancy App', 'Diabetes:M', 'Opera Mini - fast web browser', 'Opera Browser: Fast and Secure', 'O-Star', 'PicsArt Photo Studio: Collage Maker & Pic Editor', 'Quora', 'ROBLOX', 'SHAREit - Transfer & Share', 'Tumblr', 'Topbuzz: Breaking News, Videos & Funny GIFs', 'Twitch: Livestream Multiplayer Games & Esports', 'Telegram', 'myAT&T', 'Truecaller: Caller ID, SMS spam blocking & Dialer', 'Showtime Anytime', 'UC Browser Mini -Tiny Fast Private & Secure', 'Uber', 'Viber Messenger', 'VLC for Android', 'Vigo Video', 'WeChat', 'Wattpad Free Books', 'Waze - GPS, Maps, Traffic Alerts & Live Navigation', 'Dating App, Flirt & Chat : W-Match', 'WPS Office - Word, Docs, PDF, Note, Slide & Sheet', 'LINE WEBTOON - Free Comics', 'WhatsApp Business', 'We Heart It', 'TripAdvisor Hotels Flights Restaurants Attractions', 'Telegram X', 'Share Music & Transfer Files - Xender', 'Yandex Browser with Protect', 'YouTube Studio', 'Yahoo Mail - Stay Organized', 'PBS KIDS Video', 'YouTube Gaming', 'GO Keyboard - Emoticon keyboard, Free Theme, GIF', 'Zello PTT Walkie Talkie', 'Z Camera - Photo Editor, Beauty Selfie, Collage', 'Six Pack in 30 Days - Abs Workout', 'Angry Birds 2', 'Angry Birds Rio', 'AC - Tips & News for Android', 'CM Browser - Ad Blocker , Fast Download , Privacy', 'Google Ads', 'Mobi Calculator free & AD free!', 'Flipp - Weekly Shopping', 'A&E - Watch Full Episodes of TV Shows', 'Camera FV-5 Lite', 'Cardiac diagnosis (heart rate, arrhythmia)', 'Open Camera', 'All Football - Latest News & Videos', 'Maricopa AH', 'Youper - AI Therapy', 'Animal Jam - Play Wild!', 'RULES OF SURVIVAL', 'Amazon for Tablets', 'Final Fantasy XV: A New Empire', 'The Sims FreePlay', 'Text free - Free Text + Call', 'Google Photos',

'365Scores - Live Scores', 'DINO HUNTER: DEADLY SHORES', 'AP Mobile - Breaking News', 'Reuters News', 'Puffin Web Browser', 'AccuWeather: Daily Forecast & Live Weather Reports', 'Moovit: Bus Time & Train Time Live Info', 'Jurassic World Alive', 'Houzz Interior Design Ideas', 'NYTimes - Latest News', 'Overstock - Home Decor, Furniture Shopping', 'Google Voice', 'Choices: Stories You Play', 'Runtastic Sleep Better: Sleep Cycle & Smart Alarm', 'Google Pay', 'Ringtone Maker', 'Google Allo', 'Plants vs. Zombies Heroes', 'CM FILE MANAGER HD', 'MLB At Bat', 'HotelTonight: Book amazing deals at great hotels', 'realestate.com.au - Buy, Rent & Sell Property', 'Video Player All Format', 'DEER HUNTER 2018', 'Video Editor', 'Google Play Games', 'ai.type Free Emoji Keyboard', 'Manga AZ - Manga Comic Reader', 'British Airways', 'American Airlines', 'Anthem BC Anywhere', 'Transit: Real-Time Transit App', 'PMHNP-BC Pocket Prep', 'BeautyPlus - Easy Photo Editor & Selfie Camera', 'Bowmasters', 'Nick', 'mySugr: the blood sugar tracker made just for you', 'Backgrounds HD (Wallpapers)', 'Blur Image Background', 'Newegg Mobile', 'Moco - Chat, Meet People', 'Hot or Not - Find someone right now', 'MeetMe: Chat & Meet New People', 'TED', 'English Dictionary - Offline', 'OkCupid Dating', 'Mint: Budget, Bills, Finance', 'English Grammar Test', 'Daily Manga - Comic & Webtoon', 'BBM - Free Calls & Messages', 'BeyondMenu Food Delivery', 'NOOK: Read eBooks & Magazines', 'NOOK App for NOOK Devices', 'Badoo - Free Chat & Dating App', 'HBO GO: Stream with TV Package', 'No Crop & Square for Instagram', 'Hungry Shark World', 'iBP Blood Pressure', 'Blood Pressure', 'Blood Pressure Log - MyDiary', 'Blood Pressure(BP) Diary', 'BP Journal - Blood Pressure Diary', 'Blood Pressure Monitor', 'Blood Pressure Companion', 'Free Blood Pressure', 'High Blood Pressure Symptoms', 'QR Scanner & Barcode Scanner 2018', 'Camera FV-5', 'Camera MX - Free Photo & Video Camera', 'Bleacher Report: sports news, scores, & highlights', 'Cardboard', 'Kick the Buddy', 'Maps & GPS Navigation - OsmAnd', 'Beautiful Widgets Pro', 'Beautiful Widgets Free', 'HD Widgets', 'Color by Number - New Coloring Book', 'Photo Editor by Aviary', 'UNICORN - Color By Number & Pixel Art Coloring', 'Elmo Calls by Sesame Street', '420 BZ Budeze Delivery', 'BZWBK24 mobile', 'Zoosk Dating App: Meet Singles', 'Cricbuzz - Live Cricket Scores & News', 'Cheapflights - Flight Search', 'Chrome Beta', 'Chrome Dev', 'CJmall', 'Credit Karma', 'Castle Clash: Heroes of the Empire US', 'CM Launcher 3D - Theme, Wallpapers, Efficient', 'CM Locker - Security Lockscreen', 'CM Flashlight (Compass, SOS)', 'Ruler', 'QuickPic - Photo Gallery with Google Drive Support', 'Cartoon Network App', 'LEGO® TV', 'DisneyNOW - TV Shows & Games', 'Brit + Co', 'CT Scan Cross Sectional Anatomy', 'Shadow Fight 2', 'Curriculum vitae App CV Builder Free Resume Maker', 'The CW', 'CW Seed', 'Hulu: Stream TV, Movies & more', 'Cymera Camera- Photo Editor, Filter,Collage,Layout', 'Camera360 Lite - Selfie Camera', 'Mapy.cz - Cycling & Hiking offline maps', 'Face Filter, Selfie Editor - Sweet Camera', 'Metal Soldiers 2', 'COOKING MAMA Let's Cook!', 'Run Sausage Run!', 'Knife Hit', 'DRAGON BALL LEGENDS', 'DC Comics', 'DC Super Hero Girls', 'MARVEL Contest of Champions', 'MARVEL Strike Force', 'wetter.com - Weather and Radar', 'Babbel - Learn Languages', 'CallApp: Caller ID, Blocker & Phone Call Recorder', 'LINE Camera - Photo editor', 'Racing in Car 2', 'Google PDF Viewer', 'Periscope - Live Video', 'Dungeon Hunter Champions: Epic Online Action RPG', 'Red Bull TV: Live Sports, Music & Entertainment', 'Idle Heroes', 'Duolingo: Learn Languages Free', 'Free phone calls, free texting SMS on free number', 'Phone Tracker :

Family Locator', 'My Photo Keyboard', 'Whoscall - Caller ID & Block', 'Google Sheets', 'Video Downloader', 'Google Docs', 'Any.do: To-do list, Calendar, Reminders & Planner', 'Notepad & To do list', 'Polaris Office - Word, Docs, Sheets, Slide, PDF', 'Google Keep', 'Do It Later: Tasks & To-Dos', 'Todoist: To-do lists for task management & errands', 'To-Do Calendar Planner', 'Wunderlist: To-Do List & Tasks', 'TickTick: To Do List with Reminder, Day Planner', 'ColorNote Notepad Notes', 'Apex Launcher', 'Dude Perfect 2', 'Dairy Queen', 'SONIC Drive-In', 'McDonald's', 'Wendy's - Food and Offers', 'Dunkin' Donuts', 'SUBWAY®', 'Panera Bread', 'Starbucks', 'Dr. Panda & Toto's Treehouse', 'Cache Cleaner-DU Speed Booster (booster & cleaner)', 'DU Browser-Browse fast & fun', 'Real Racing 3', 'Equestria Girls', 'My Little Pony Celebration', 'Miraculous Ladybug & Cat Noir - The Official Game', 'My Little Pony: Harmony Quest', 'PJ Masks: Moonlight Heroes', 'The Emirates App', 'Phogy, 3D Camera', 'Weather by eltiempo.es', 'The Game of Life', 'Spanish English Translator', 'Human Anatomy Atlas 2018: Complete 3D Human Body', 'Game for KIDS: KIDS match'em', 'CBS Sports App - Scores, News, Stats & Watch Live', 'Yahoo Fantasy Sports - #1 Rated Fantasy App', 'Dictionary - Merriam-Webster', 'Edmodo', 'busuu: Learn Languages - Spanish, English & More', 'Chess Free', 'Oxford Dictionary of English : Free', 'Masha and the Bear Child Games', 'Frozen Free Fall', 'Episode - Choose Your Story', 'The NBC App - Watch Live TV and Full Episodes', 'Moto File Manager', 'HBO NOW: Stream TV & Movies', 'Moneycontrol - Stocks, Sensex, Mutual Funds, IPO', 'CNBC: Breaking Business News & Live Market Data', 'Google Earth', 'Groupon - Shop Deals, Discounts & Coupons', 'Google News', 'Amino: Communities and Chats', 'Nike Training Club - Workouts & Fitness Plans', 'Hangouts Dialer - Call Phones', 'Offline Maps & Navigation', 'Strawberry Shortcake Ice Cream Island', 'Home Workout - No Equipment', 'Home Security Camera WardenCam - reuse old phones', 'Food Network', 'Web Browser for Android', 'Airway Ex - Intubate. Anesthetize. Train.', 'FilterGrid - Cam&Photo Editor', 'Messages, Text and Video Chat for Messenger', 'All Social Networks', 'Premier League - Official App', 'Farm Heroes Saga', 'ESPN Fantasy Sports', 'Fallout Shelter', 'Facebook Pages Manager', 'Facebook Ads Manager', 'Who Viewed My Facebook Profile - Stalkers Visitors', 'The 5th Stand', 'Garena Free Fire', 'osmino Wi-Fi: free WiFi', 'Fun Kid Racing - Motocross', 'Podcast App: Free & Offline Podcasts by Player FM', 'Motorola FM Radio', 'FarmersOnly Dating', 'Firefox Focus: The privacy browser', 'FP Notebook', 'Slickdeals: Coupons & Shopping', 'AAFP']

Amount of Android duplicate apps: 1181

iOS apps that have duplicates: ['Mannequin Challenge', 'VR Roller Coaster']

PART FOUR - As explained in the instructions, there are some apps that contain the wrong info. For instance, the `android_data[0]` and the `android_data[10472]` sections contain incorrect data so we must remove them from our android dataset. - First we print the apps with incorrect data and then we use the `del` built-in function to remove them from the dataset.

```
[3]: #Deleting the wrong data
print(android_data[0])
print(android_data[10472])
del android_data[10472]
```

```
['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']
['Life Made WI-Fi Touchscreen Photo Frame', '1.9', '19', '3.0M', '1,000+',
'Free', '0', 'Everyone', '', 'February 11, 2018', '1.0.19', '4.0 and up']
```

```
[4]: #To remove Duplicate Apps from Google Play Store Dataset
print('Expected length of Google play apps dataset without duplicates: ',
      len(android_data)-1181)
reviews_max = {}

for app in android_data:
    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

android_clean = []
already_added = []

for app in android_data:
    name = app[0]
    n_reviews = float(app[3])
    if (reviews_max[name] == n_reviews) and (name not in already_added):
        android_clean.append(app)
        already_added.append(name)

print('Actual length of Google play apps without duplicates: ',
      len(reviews_max))
explore_data(android_clean, 1, 3, True)
```

Expected length of Google play apps dataset without duplicates: 9659

Actual length of Google play apps without duplicates: 9659

```
['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']
```

Number of rows: 9659

Number of columns: 13

[5]: *#Other apps to remove from data set: non-english apps.*

```
#Here are some examples:
print(iOS_data[813][1])
print(iOS_data[6731][1])
print(android_clean[4412][0])
print(android_clean[7940][0])

#To remove apps with non-english names.
def is_English (name):
    special_char_cnt = 0
    for letter in name:
        if ord(letter) > 127:
            special_char_cnt += 1
    if special_char_cnt > 3:
        return False
    else:
        return True

#Testing out is_English function
print(is_English('Instagram'))
print(is_English(' PPS - 2 '))
print(is_English('Docs To Go Free Office Suite'))
print(is_English('Instachat '))

android_english = []
iOS_english = []

for app in android_clean:
    name = app[0]
    if is_English(name) == True:
        android_english.append(app)

for app in iOS_data:
    name = app[1]
    if is_English(name) == True:
        iOS_english.append(app)

explore_data(android_english, 1, 3, True)
explore_data(iOS_english, 0, 3, True)
```

PPS - 2

AQ

DZ

True

False

True

True

```
['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']
```

Number of rows: 9614

Number of columns: 13

```
['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']
```

Number of rows: 6183

Number of columns: 16

```
[6]: #Isolating Free Apps and adding them to seperate lists  
android_final = []  
iOS_final = []  
  
for app in android_english:  
    price = app[7]  
    if price == '0':  
        android_final.append(app)  
  
for app in iOS_english:  
    price = app[4]  
    if price == '0.0':  
        iOS_final.append(app)  
  
explore_data (android_final, 1 , 1, True)  
explore_data (iOS_final, 1, 1, True)
```

```
Number of rows: 8864
Number of columns: 13
Number of rows: 3222
Number of columns: 16
```

PART 5: Building a frequency table to find trending Apps

- We have to find the most profitable apps from the Android/ Google Play Data Set. To do that we have to take a few steps into consideration:
 - Creating the minimal version of the app from the Android Dataset
 - If the app gets good responses from its users than we develop the app even further.
 - If the app is profitable for 6 months, we create an iOS version of the app.
- Our goal is to find apps that will be successful in both markets. We start by looking at genres that are the most common in each market. We also need to build a frequency table for a few columns.
- We build a function that determines the frequency of certain columns in a table. We'll look at the `prime_genre`, `genres`, and `category` columns of the Google Play Data set.

```
[7]: def find_frequency (dataset, index):
    freq_table = {}
    total = 0

    for row in dataset:
        total += 1
        value = row[index]

        if value in freq_table:
            freq_table[value] += 1
        else:
            freq_table[value] = 1

    table_percentages = {}
    for key in freq_table:
        app_percentage = (freq_table[key] / total) * 100
        table_percentages[key] = app_percentage

    return table_percentages

def display_frequency(dataset, index):
    table = find_frequency(dataset, index)
    table_display = []
    for key in table:
        key_val_as_tuple = (table[key], key)
        table_display.append(key_val_as_tuple)

    sorted_table = sorted(table_display, reverse = True)
```



```

for entry in sorted_table:
    print(entry[1], ': ', entry[0])

display_frequency(iOS_final, -5)

```

```

Games : 58.16263190564867
Entertainment : 7.883302296710118
Photo & Video : 4.9658597144630665
Education : 3.662321539416512
Social Networking : 3.2898820608317814
Shopping : 2.60707635009311
Utilities : 2.5139664804469275
Sports : 2.1415270018621975
Music : 2.0484171322160147
Health & Fitness : 2.0173805090006205
Productivity : 1.7380509000620732
Lifestyle : 1.5828677839851024
News : 1.3345747982619491
Travel : 1.2414649286157666
Finance : 1.1173184357541899
Weather : 0.8690254500310366
Food & Drink : 0.8069522036002483
Reference : 0.5586592178770949
Business : 0.5276225946617008
Book : 0.4345127250155183
Navigation : 0.186219739292365
Medical : 0.186219739292365
Catalogs : 0.12414649286157665

```

- As you can see from the results pulled up from above, Gaming apps are the most common genre while Entertainment is the runner up.
- There's a huge gap between the most popular and second most popular genre. As you can see most people prefer to play games on their iPhones than anything else.
- Social media accounts for only 3 percent of the popularity which makes sense considering there are only a few very popular Social Media apps that people visit daily.
- The more practical genres are the most rare which shows that people only use those apps when they need to and there's only a handful of popular apps designed for practical use such as those for Health and Fitness, Food and Drink, and Medical.
- Most of the apps are designed for Entertainment than the practical uses. About 75% of all these apps shown belong in the Entertainment section.
- An app profile I would likely to recommend to a user from the App Store would be any in the gaming section based on the percentage it has.

```
[8]: display_frequency(android_final, 1)
```

```

FAMILY : 18.907942238267147
GAME : 9.724729241877256
TOOLS : 8.461191335740072

```

BUSINESS : 4.591606498194946
 LIFESTYLE : 3.9034296028880866
 PRODUCTIVITY : 3.892148014440433
 FINANCE : 3.7003610108303246
 MEDICAL : 3.531137184115524
 SPORTS : 3.395758122743682
 PERSONALIZATION : 3.3167870036101084
 COMMUNICATION : 3.2378158844765346
 HEALTH_AND_FITNESS : 3.0798736462093865
 PHOTOGRAPHY : 2.944494584837545
 NEWS_AND_MAGAZINES : 2.7978339350180503
 SOCIAL : 2.6624548736462095
 TRAVEL_AND_LOCAL : 2.33528880866426
 SHOPPING : 2.2450361010830324
 BOOKS_AND_REFERENCE : 2.1435018050541514
 DATING : 1.861462093862816
 VIDEO_PLAYERS : 1.7937725631768955
 MAPS_AND_NAVIGATION : 1.3989169675090252
 FOOD_AND_DRINK : 1.2409747292418771
 EDUCATION : 1.1620036101083033
 ENTERTAINMENT : 0.9589350180505415
 LIBRARIES_AND_DEMO : 0.9363718411552346
 AUTO_AND_VEHICLES : 0.9250902527075812
 HOUSE_AND_HOME : 0.8235559566787004
 WEATHER : 0.8009927797833934
 EVENTS : 0.7107400722021661
 PARENTING : 0.6543321299638989
 ART_AND_DESIGN : 0.6430505415162455
 COMICS : 0.6204873646209386
 BEAUTY : 0.5979241877256317

- The most common genre in the google play dataset is the Family genre, followed by Game, Tools, and Business.
- You can also see that dataset is divided into more genres than in the App Store dataset.
- Also compared to the App Store dataset, majority of the apps in the Google Play store dataset are designed for more practical purposes than they are for entertainment.
- An app i would probably recommend is an app from the Family section with the highest ratings. You'll likely find that app has a high amount ratings as well.

PART 6 - Now we use our `find_frequency` app to find the average number of user ratings for each genre in the App Store dataset.

```
[9]: genres_iOS = find_frequency(iOS_final, -5)

for genre in genres_iOS:
    total = 0
    len_genre = 0
```

```

for app in iOS_final:
    app_genre = app[-5]

    if app_genre == genre:
        num_user_ratings = float(app[5])
        total += num_user_ratings
        len_genre += 1

avg_number_user_ratings = total / len_genre
print (genre, ': ', avg_number_user_ratings)

```

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

```

[10]: num_apps = 0
for app in iOS_final:
    if app[-5] == 'Social Networking':
        print(app[1], ': ', app[5])
        num_apps += 1
print('Number of apps in this genre: ', num_apps)

```

Facebook : 2974676
 Pinterest : 1061624
 Skype for iPhone : 373519
 Messenger : 351466
 Tumblr : 334293
 WhatsApp Messenger : 287589

Kik : 260965
 ooVoo - Free Video Call, Text and Voice : 177501
 TextNow - Unlimited Text + Calls : 164963
 Viber Messenger - Text & Call : 164249
 Followers - Social Analytics For Instagram : 112778
 MeetMe - Chat and Meet New People : 97072
 We Heart It - Fashion, wallpapers, quotes, tattoos : 90414
 InsTrack for Instagram - Analytics Plus More : 85535
 Tango - Free Video Call, Voice and Chat : 75412
 LinkedIn : 71856
 Match - #1 Dating App. : 60659
 Skype for iPad : 60163
 POF - Best Dating App for Conversations : 52642
 Timehop : 49510
 Find My Family, Friends & iPhone - Life360 Locator : 43877
 Whisper - Share, Express, Meet : 39819
 Hangouts : 36404
 LINE PLAY - Your Avatar World : 34677
 WeChat : 34584
 Badoo - Meet New People, Chat, Socialize. : 34428
 Followers + for Instagram - Follower Analytics : 28633
 GroupMe : 28260
 Marco Polo Video Walkie Talkie : 27662
 Miitomo : 23965
 SimSimi : 23530
 Grindr - Gay and same sex guys chat, meet and date : 23201
 Wishbone - Compare Anything : 20649
 imo video calls and chat : 18841
 After School - Funny Anonymous School News : 18482
 Quick Reposter - Repost, Regram and Reshare Photos : 17694
 Weibo HD : 16772
 Repost for Instagram : 15185
 Live.me - Live Video Chat & Make Friends Nearby : 14724
 Nextdoor : 14402
 Followers Analytics for Instagram - InstaReport : 13914
 YouNow: Live Stream Video Chat : 12079
 FollowMeter for Instagram - Followers Tracking : 11976
 LINE : 11437
 eHarmony Dating App - Meet Singles : 11124
 Discord - Chat for Gamers : 9152
 QQ : 9109
 Telegram Messenger : 7573
 Weibo : 7265
 Periscope - Live Video Streaming Around the World : 6062
 Chat for Whatsapp - iPad Version : 5060
 QQ HD : 5058
 Followers Analysis Tool For Instagram App Free : 4253
 live.ly - live video streaming : 4145

Houseparty - Group Video Chat : 3991
SOMA Messenger : 3232
Monkey : 3060
Down To Lunch : 2535
Flinch - Video Chat Staring Contest : 2134
Highrise - Your Avatar Community : 2011
LOV00 - Dating Chat : 1985
PlayStation®Messages : 1918
BOO! - Video chat camera with filters & stickers : 1805
Qzone : 1649
Chatous - Chat with new people : 1609
Kiwi - Q&A : 1538
GhostCodes - a discovery app for Snapchat : 1313
Jodel : 1193
FireChat : 1037
Google Duo - simple video calling : 1033
Fiesta by Tango - Chat & Meet New People : 885
Google Allo - smart messaging : 862
Peach - share vividly : 727
Hey! VINA - Where Women Meet New Friends : 719
Battlefield Companion : 689
All Devices for WhatsApp - Messenger for iPad : 682
Chat for Pokemon Go - GoChat : 500
IAmNaughty - Dating App to Meet New People Online : 463
Qzone HD : 458
Zenly - Locate your friends in realtime : 427
League of Legends Friends : 420
: 407
Candid - Speak Your Mind Freely : 398
: 397
Selfeo : 366
Fake-A-Location Free : 354
Popcorn Buzz - Free Group Calls : 281
Fam - Group video calling for iMessage : 279
QQ International : 274
Ameba : 269
SoundCloud Pulse: for creators : 240
Tantan : 235
Cougar Dating & Life Style App for Mature Women : 213
Rawr Messenger - Dab your chat : 180
WhenToPost: Best Time to Post Photos for Instagram : 158
Inke-Broadcast an amazing life : 147
Mustknow - anonymous video Q&A : 53
CTFxCmoji : 39
Lobi : 36
Chain: Collaborate On MyVideo Story/Group Video : 35
botman - Real time video chat : 7
BestieBox : 0

```
MATCH ON LINE chat : 0
niconico ch : 0
LINE BLOG : 0
bit-tube - Live Stream Video Chat : 0
Number of apps in this genre: 106
```

- Facebook and Pinterest have the highest amount of ratings of any social media app on the App Store dataset adding up to almost 4 million reviews combined. Part of the reason why social media averages the highest average in the amount of reviews even though there's over 100 different social media apps in the 'Social Networking' genre.
- The same can be said for Navigation and Gaming.
- Some genres may seem more popular than they really are and the average number of user ratings for each genre maybe skewed based on the genre due to the fact that certain genres have apps that have hundreds of thousands (even millions) of reviews but not a whole lot of other apps in that genre.
- This doesn't make the genre popular, it just makes the app popular.
- For instance, the 2 most popular app in the 'Photo & Video' Genre don't have nearly as many ratings as the Facebook or Pinterest but the 'Photo & Video' Genre has 160 apps in total while the 'Social Networking' Genre has only 106 apps.

```
[11]: num_apps = 0
for app in iOS_final:
    if app[-5] == 'Photo & Video':
        print(app[1], ': ', app[5])
        num_apps += 1

print('Number of Apps in this genre: ', num_apps)
```

```
Instagram : 2161558
Snapchat : 323905
YouTube - Watch Videos, Music, and Live Streams : 278166
Pic Collage - Picture Editor & Photo Collage Maker : 123433
Funimate video editor: add cool effects to videos : 123268
musical.ly - your video social network : 105429
Photo Collage Maker & Photo Editor - Live Collage : 93781
Vine Camera : 90355
Google Photos - unlimited photo and video storage : 88742
Flipagram : 79905
Mixgram - Picture Collage Maker - Pic Photo Editor : 54282
Shutterfly: Prints, Photo Books, Cards Made Easy : 51427
Pic Jointer - Photo Collage, Camera Effects Editor : 51330
Color Pop Effects - Photo Editor & Picture Editing : 45320
Photo Grid - photo collage maker & photo editor : 40531
iSwap Faces LITE : 39722
MOLDIV - Photo Editor, Collage & Beauty Camera : 39501
Photo Editor by Aviary : 39501
```

Photo Lab: Picture Editor, effects & fun face app : 34585
 Rookie Cam - Photo Editor & Filter Camera : 33921
 FotoRus -Camera & Photo Editor & Pic Collage Maker : 32558
 PicsArt Photo Studio: Collage Maker & Pic Editor : 29078
 Quik - GoPro Video Editor to edit clips with music : 28654
 Splice - Video Editor + Movie Maker by GoPro : 28189
 FreePrints - Photos Delivered : 26060
 Triller - Music Video & Film Maker : 25683
 Ghost Lens+Scary Photo Video Edit&Collage Maker : 18316
 Camera360 - Selfie Filter Camera, Photo Editor : 16729
 InstaMag - Free Pic and Photo Collage Maker : 16221
 Over- Edit Photos, Add Text & Captions to Pictures : 16221
 Photo Transfer App - Easy backup of photos+videos : 15654
 InstaSize: Photo Editor, Picture Effects & Collage : 15605
 Prisma: Photo Editor, Art Filters Pic Effects : 15060
 Filterra - Photo Editor, Effects for Pictures : 14744
 YouCam Makeup: Magic Makeup Selfie Cam : 14188
 MSQRD - Live Filters & Face Swap for Video Selfies : 12982
 Artisto - Video and Photo Editor with Art Filters : 12963
 InShot Video Editor Music, No Crop, Cut : 12779
 Layout from Instagram : 12616
 Face Swap App- Funny Face Changer Photo Effects : 11977
 Moments - private albums with friends and family : 11955
 VSCO : 11174
 Retrica - Selfie Camera with Filter, Sticker & GIF : 11021
 VivaVideo - Best Video Editor & Photo Movie Maker : 10618
 Prime Photos from Amazon : 10511
 Canva - Graphic Design & Photo Editing : 9114
 Photo Editor- : 9095
 Snapseed : 8683
 You Doodle - draw on photos & pictures, add text : 8520
 PIP Camera-Selfie Cam&Pic Collage&Photo Editor : 8454
 BeautyPlus - Selfie Camera for a Beautiful Image : 7503
 Baby Story - Pregnancy Pics Baby Milestones Photo : 6700
 Capture - Control Your GoPro Camera - Share Video : 6542
 Meitu : 6478
 Visage makeup editor plus photo teeth whitener : 5767
 Video & TV Cast for Chromecast: Best Browser to cast and stream webvideos and local videos on TV & Displays : 5676
 Adobe Photoshop Mix - Cut out, combine, create : 5253
 Collageable - Photo Collage Maker, Pic Grid Free : 5112
 Bazaart Photo Editor Pro and Picture Collage Maker : 4909
 InstaBeauty -Camera&Photo Editor&Pic Collage Maker : 4818
 YouCam Perfect - Photo & Selfie Editor : 4293
 PHHHOTO - Look Alive : 4280
 MuseCam - Edit Photos & Manual Camera : 4267
 VR Tube - Virtual Reality 360 Video Player : 4142
 Fyuse - 3D Photos : 4126

MakeupPlus - Natural, Professional Makeup Looks : 3987
 LINE Camera - Photo editor, Animated Stamp, Filter : 3978
 Printicular Print Photos - 1 Hour Pickup : 3909
 Lumyer - augmented reality camera effects : 3896
 KODAK Kiosk Connect App : 3711
 Cool Wallpapers for Pokemon : 3694
 Pro Editor - Video Maker for FaceBook & Youtube : 3668
 Lomotif Music Video Editor - Add Music & Effects! : 3507
 Epson iPrint : 2838
 YouCam Fun - Live Selfie Video Filters : 2522
 A Color Story : 2436
 Boomerang from Instagram : 2373
 B612 - Trendy Filters, Selfiegenic Camera : 2275
 Polarr Photo Editor - Photo Editing Tools for All : 2246
 Retouch Vogue - Facetune Wrinkles & Pimples Makeup : 2235
 Kanvas - Express Yourself : 2177
 Easy Save - Repost your Instagram Photos & Videos : 2159
 Meitu HD : 2150
 Pixlr - Photo Collages, Effects, Overlays, Filters : 2099
 Patternator Pattern Maker Backgrounds & Wallpapers : 2092
 BeautyCam - AR Carnie selfie : 2082
 GIPHY. The GIF Search Engine for All the GIFs : 2069
 Adobe Photoshop Lightroom for iPad : 2005
 SuperPhoto - Photo Effects & Filters : 1952
 Solo Selfie : 1799
 Felt: Birthday & Greeting Cards & Thank You Card : 1724
 Perfect Image - Pic Collage Maker, Add Text to Photo, Cool Picture Editor : 1646
 InstaBoard for Instagram - photos & videos repost : 1571
 Adobe Photoshop Lightroom for iPhone : 1494
 PhotoScan - scanner by Google Photos : 1421
 RealTimes: Video Maker : 1274
 Meipai : 1190
 POTO - Photo Collage Maker : 1149
 SNOW - Selfie, Motion sticker, Fun camera : 1115
 Bestie-Beauty Camera 360 & Portrait Selfie Editor : 1035
 Facetune 2 : 1009
 Pitu : 968
 intoLive - Custom Live Photos wallpaper maker : 938
 LOL Movie: Change your face + voice! : 849
 Camcorder - Record VHS Home Videos : 830
 Anime Power FX : 807
 Squaready for Video - Convert Rectangle Movie Clip into Square Shape for Instagram : 778
 Canon PRINT Inkjet/SELPHY : 689
 Microsoft Pix Camera : 678
 Kwai - Share your video moments : 668
 Polaroid Print App - ZIP : 631

Photo Quilt - Auto Collage Maker : 599
 Cymera - Photo & Beauty Editor & Collage : 523
 FACIE : 514
 Photo Editing Effects & Collage Maker - Effectshop : 422
 Pic-it Collage - Photo Collage Maker and Editor : 415
 Candy Camera : 397
 Microsoft Selfie : 375
 Color Pop Free - Selective Color Splash Effects and Black & White Photography Editor : 352
 SelfieCity : 252
 InstaSave for Instagram - Download & Repost your own Videos & Photos for Free : 243
 CATCHY Photos-Easter Bunny, Tooth Fairy and more.. : 228
 SW/NG - Living Photos. Memories that Swing. : 222
 SlideStory - Create a slideshow movie and a snap video : 220
 April - Layouts, Photo Collage, and Poster Maker : 165
 PopCam Photo : 160
 Foodie - Delicious Camera for Food : 144
 FreeVRPlayer : 134
 Confetti - Geofilter Design Maker for Snapchat : 120
 Philm-Video&Photo Editor,REAL-TIME Magic Filter : 103
 Digital Domain : 102
 Homido 360 VR player : 100
 Best 9 for Instagram : 88
 VR Video World - Virtual Reality : 88
 FilmStory - For All Your Video Editing Needs : 66
 GIFYme - Create video loops and gifs with amazing filters for Whatsapp and Instagram : 65
 Kiosk Photo Transfer by Fujifilm : 58
 Pikazo - AI art that YOU control : 56
 lollicam - photo, video, and selfie camera : 51
 LOOKS - Real Makeup Camera : 25
 C CHANNEL -Watch tips & tricks videos for girls : 21
 in-capturing moments in life : 16
 Everfilter - transform your photos into artworks : 15
 GoSnaps - Share Screenshots for Pokémon GO : 12
 NightShooting : 9
 MixChannel : 6
 Simple Camera - Fast Minimal Design : 3
 SwapperFace - Face Swap Free, Live Mask Effects : 2
 LINE Moments - Capture Your Fun Moments : 1
 Video speed editor - VBooster : 1
 Video Smith - A Powerful video editing tool set : 1
 MeiCam - Video Production Master : 0
 Instant X - Take instant-camera-like photo with double exposure and bulb mode : 0
 EOPAN : 0
 StageCameraHD : 0

```

Pictalive for Live Photos - Create from videos : 0
BlurEffect-Blur Photo & Video, Hide Face : 0
camera for filter : 0
Emojil - original emoji stamp, decoration camera : 0
CelebrityDiagnosis! : 0
Number of Apps in this genre: 160

```

Part 7 - Now we'll use our `find_frequency` function to find the frequency of the 'Category' column in our Google Play/ Android dataset. Just as we did for the 'genre' category in the App Store dataset.

```

[25]: categories_android = find_frequency(android_final, 1)
num_apps = 0
for category in categories_android:
    total = 0
    len_category = 0
    hundred_k_plus = 0
    million_installs = 0
    five_mil_plus = 0
    for app in android_final:
        category_app = app[1]
        if category_app == category:
            n_installs = app[5]
            n_installs = n_installs.replace('+', '')
            n_installs = n_installs.replace(',', '')
            n_installs = float(n_installs)
            total += n_installs
            len_category += 1
            if n_installs >= 100000:
                hundred_k_plus += 1
            if n_installs == 1000000:
                million_installs += 1
            if n_installs >= 5000000:
                five_mil_plus += 1

    print('Amount of apps in the',category, 'category: ', len_category)
    print('Amount of apps with 100,000+ installs:', hundred_k_plus)
    print('Amount of apps with 1,000,000 installs:', million_installs)
    print('Amount of apps with 5,000,000+ installs:', five_mil_plus)
    print('Percentage of 100,000+ installs: ', ((hundred_k_plus / len_category)
→* 100), '%')
    print('Percentage of 1,000,000 installs: ', ((million_installs /
→len_category)* 100), '%')
    print('Percentage of 5,000,000+ installs: ', ((five_mil_plus /
→len_category) * 100), '%')
    avg_num_installs = total / len_category
    print (category, 'Average number of installations: ', avg_num_installs)
    print ('\n')

```

Amount of apps in the ART_AND_DESIGN category: 57
Amount of apps with 100,000+ installs: 34
Amount of apps with 1,000,000 installs: 4
Amount of apps with 5,000,000+ installs: 8
Percentage of 100,000+ installs: 59.64912280701754 %
Percentage of 1,000,000 installs: 7.017543859649122 %
Percentage of 5,000,000+ installs: 14.035087719298245 %
ART_AND_DESIGN Average number of installations: 1986335.0877192982

Amount of apps in the AUTO_AND_VEHICLES category: 82
Amount of apps with 100,000+ installs: 46
Amount of apps with 1,000,000 installs: 13
Amount of apps with 5,000,000+ installs: 5
Percentage of 100,000+ installs: 56.09756097560976 %
Percentage of 1,000,000 installs: 15.853658536585366 %
Percentage of 5,000,000+ installs: 6.097560975609756 %
AUTO_AND_VEHICLES Average number of installations: 647317.8170731707

Amount of apps in the BEAUTY category: 53
Amount of apps with 100,000+ installs: 24
Amount of apps with 1,000,000 installs: 8
Amount of apps with 5,000,000+ installs: 2
Percentage of 100,000+ installs: 45.28301886792453 %
Percentage of 1,000,000 installs: 15.09433962264151 %
Percentage of 5,000,000+ installs: 3.7735849056603774 %
BEAUTY Average number of installations: 513151.88679245283

Amount of apps in the BOOKS_AND_REFERENCE category: 190
Amount of apps with 100,000+ installs: 89
Amount of apps with 1,000,000 installs: 20
Amount of apps with 5,000,000+ installs: 33
Percentage of 100,000+ installs: 46.8421052631579 %
Percentage of 1,000,000 installs: 10.526315789473683 %
Percentage of 5,000,000+ installs: 17.36842105263158 %
BOOKS_AND_REFERENCE Average number of installations: 8767811.894736841

Amount of apps in the BUSINESS category: 407
Amount of apps with 100,000+ installs: 105
Amount of apps with 1,000,000 installs: 34
Amount of apps with 5,000,000+ installs: 35
Percentage of 100,000+ installs: 25.7985257985258 %

Percentage of 1,000,000 installs: 8.353808353808354 %
Percentage of 5,000,000+ installs: 8.5995085995086 %
BUSINESS Average number of installations: 1712290.1474201474

Amount of apps in the COMICS category: 55
Amount of apps with 100,000+ installs: 31
Amount of apps with 1,000,000 installs: 11
Amount of apps with 5,000,000+ installs: 5
Percentage of 100,000+ installs: 56.36363636363636 %
Percentage of 1,000,000 installs: 20.0 %
Percentage of 5,000,000+ installs: 9.090909090909092 %
COMICS Average number of installations: 817657.2727272727

Amount of apps in the COMMUNICATION category: 287
Amount of apps with 100,000+ installs: 164
Amount of apps with 1,000,000 installs: 40
Amount of apps with 5,000,000+ installs: 99
Percentage of 100,000+ installs: 57.14285714285714 %
Percentage of 1,000,000 installs: 13.937282229965156 %
Percentage of 5,000,000+ installs: 34.494773519163765 %
COMMUNICATION Average number of installations: 38456119.167247385

Amount of apps in the DATING category: 165
Amount of apps with 100,000+ installs: 75
Amount of apps with 1,000,000 installs: 19
Amount of apps with 5,000,000+ installs: 14
Percentage of 100,000+ installs: 45.45454545454545 %
Percentage of 1,000,000 installs: 11.515151515151516 %
Percentage of 5,000,000+ installs: 8.484848484848486 %
DATING Average number of installations: 854028.8303030303

Amount of apps in the EDUCATION category: 103
Amount of apps with 100,000+ installs: 92
Amount of apps with 1,000,000 installs: 41
Amount of apps with 5,000,000+ installs: 20
Percentage of 100,000+ installs: 89.32038834951457 %
Percentage of 1,000,000 installs: 39.80582524271845 %
Percentage of 5,000,000+ installs: 19.41747572815534 %
EDUCATION Average number of installations: 1833495.145631068

Amount of apps in the ENTERTAINMENT category: 85
Amount of apps with 100,000+ installs: 83
Amount of apps with 1,000,000 installs: 33

Amount of apps with 5,000,000+ installs: 40
Percentage of 100,000+ installs: 97.6470588235294 %
Percentage of 1,000,000 installs: 38.82352941176471 %
Percentage of 5,000,000+ installs: 47.05882352941176 %
ENTERTAINMENT Average number of installations: 11640705.88235294

Amount of apps in the EVENTS category: 63
Amount of apps with 100,000+ installs: 19
Amount of apps with 1,000,000 installs: 4
Amount of apps with 5,000,000+ installs: 2
Percentage of 100,000+ installs: 30.158730158730158 %
Percentage of 1,000,000 installs: 6.349206349206349 %
Percentage of 5,000,000+ installs: 3.1746031746031744 %
EVENTS Average number of installations: 253542.2222222222

Amount of apps in the FINANCE category: 328
Amount of apps with 100,000+ installs: 144
Amount of apps with 1,000,000 installs: 57
Amount of apps with 5,000,000+ installs: 36
Percentage of 100,000+ installs: 43.90243902439025 %
Percentage of 1,000,000 installs: 17.378048780487802 %
Percentage of 5,000,000+ installs: 10.975609756097562 %
FINANCE Average number of installations: 1387692.475609756

Amount of apps in the FOOD_AND_DRINK category: 110
Amount of apps with 100,000+ installs: 74
Amount of apps with 1,000,000 installs: 26
Amount of apps with 5,000,000+ installs: 23
Percentage of 100,000+ installs: 67.27272727272727 %
Percentage of 1,000,000 installs: 23.636363636363637 %
Percentage of 5,000,000+ installs: 20.909090909090907 %
FOOD_AND_DRINK Average number of installations: 1924897.7363636363

Amount of apps in the HEALTH_AND_FITNESS category: 273
Amount of apps with 100,000+ installs: 168
Amount of apps with 1,000,000 installs: 56
Amount of apps with 5,000,000+ installs: 56
Percentage of 100,000+ installs: 61.53846153846154 %
Percentage of 1,000,000 installs: 20.51282051282051 %
Percentage of 5,000,000+ installs: 20.51282051282051 %
HEALTH_AND_FITNESS Average number of installations: 4188821.9853479853

Amount of apps in the HOUSE_AND_HOME category: 73

Amount of apps with 100,000+ installs: 53
Amount of apps with 1,000,000 installs: 21
Amount of apps with 5,000,000+ installs: 9
Percentage of 100,000+ installs: 72.6027397260274 %
Percentage of 1,000,000 installs: 28.767123287671232 %
Percentage of 5,000,000+ installs: 12.32876712328767 %
HOUSE_AND_HOME Average number of installations: 1331540.5616438356

Amount of apps in the LIBRARIES_AND_DEMO category: 83
Amount of apps with 100,000+ installs: 33
Amount of apps with 1,000,000 installs: 8
Amount of apps with 5,000,000+ installs: 5
Percentage of 100,000+ installs: 39.75903614457831 %
Percentage of 1,000,000 installs: 9.63855421686747 %
Percentage of 5,000,000+ installs: 6.024096385542169 %
LIBRARIES_AND_DEMO Average number of installations: 638503.734939759

Amount of apps in the LIFESTYLE category: 346
Amount of apps with 100,000+ installs: 137
Amount of apps with 1,000,000 installs: 43
Amount of apps with 5,000,000+ installs: 39
Percentage of 100,000+ installs: 39.59537572254335 %
Percentage of 1,000,000 installs: 12.427745664739884 %
Percentage of 5,000,000+ installs: 11.271676300578035 %
LIFESTYLE Average number of installations: 1437816.2687861272

Amount of apps in the GAME category: 862
Amount of apps with 100,000+ installs: 683
Amount of apps with 1,000,000 installs: 150
Amount of apps with 5,000,000+ installs: 381
Percentage of 100,000+ installs: 79.23433874709977 %
Percentage of 1,000,000 installs: 17.40139211136891 %
Percentage of 5,000,000+ installs: 44.19953596287703 %
GAME Average number of installations: 15588015.603248259

Amount of apps in the FAMILY category: 1676
Amount of apps with 100,000+ installs: 882
Amount of apps with 1,000,000 installs: 258
Amount of apps with 5,000,000+ installs: 299
Percentage of 100,000+ installs: 52.62529832935561 %
Percentage of 1,000,000 installs: 15.393794749403341 %
Percentage of 5,000,000+ installs: 17.840095465393794 %
FAMILY Average number of installations: 3695641.8198090694

Amount of apps in the MEDICAL category: 313
Amount of apps with 100,000+ installs: 71
Amount of apps with 1,000,000 installs: 16
Amount of apps with 5,000,000+ installs: 2
Percentage of 100,000+ installs: 22.683706070287542 %
Percentage of 1,000,000 installs: 5.111821086261981 %
Percentage of 5,000,000+ installs: 0.6389776357827476 %
MEDICAL Average number of installations: 120550.61980830671

Amount of apps in the SOCIAL category: 236
Amount of apps with 100,000+ installs: 135
Amount of apps with 1,000,000 installs: 33
Amount of apps with 5,000,000+ installs: 67
Percentage of 100,000+ installs: 57.20338983050848 %
Percentage of 1,000,000 installs: 13.983050847457626 %
Percentage of 5,000,000+ installs: 28.389830508474578 %
SOCIAL Average number of installations: 23253652.127118643

Amount of apps in the SHOPPING category: 199
Amount of apps with 100,000+ installs: 144
Amount of apps with 1,000,000 installs: 34
Amount of apps with 5,000,000+ installs: 72
Percentage of 100,000+ installs: 72.36180904522614 %
Percentage of 1,000,000 installs: 17.08542713567839 %
Percentage of 5,000,000+ installs: 36.18090452261307 %
SHOPPING Average number of installations: 7036877.311557789

Amount of apps in the PHOTOGRAPHY category: 261
Amount of apps with 100,000+ installs: 202
Amount of apps with 1,000,000 installs: 48
Amount of apps with 5,000,000+ installs: 124
Percentage of 100,000+ installs: 77.39463601532567 %
Percentage of 1,000,000 installs: 18.39080459770115 %
Percentage of 5,000,000+ installs: 47.509578544061306 %
PHOTOGRAPHY Average number of installations: 17840110.40229885

Amount of apps in the SPORTS category: 301
Amount of apps with 100,000+ installs: 169
Amount of apps with 1,000,000 installs: 43
Amount of apps with 5,000,000+ installs: 74
Percentage of 100,000+ installs: 56.14617940199336 %
Percentage of 1,000,000 installs: 14.285714285714285 %
Percentage of 5,000,000+ installs: 24.58471760797342 %

SPORTS Average number of installations: 3638640.1428571427

Amount of apps in the TRAVEL_AND_LOCAL category: 207
Amount of apps with 100,000+ installs: 118
Amount of apps with 1,000,000 installs: 38
Amount of apps with 5,000,000+ installs: 55
Percentage of 100,000+ installs: 57.00483091787439 %
Percentage of 1,000,000 installs: 18.357487922705314 %
Percentage of 5,000,000+ installs: 26.570048309178745 %
TRAVEL_AND_LOCAL Average number of installations: 13984077.710144928

Amount of apps in the TOOLS category: 750
Amount of apps with 100,000+ installs: 395
Amount of apps with 1,000,000 installs: 100
Amount of apps with 5,000,000+ installs: 174
Percentage of 100,000+ installs: 52.666666666666664 %
Percentage of 1,000,000 installs: 13.333333333333334 %
Percentage of 5,000,000+ installs: 23.200000000000003 %
TOOLS Average number of installations: 10801391.298666667

Amount of apps in the PERSONALIZATION category: 294
Amount of apps with 100,000+ installs: 148
Amount of apps with 1,000,000 installs: 42
Amount of apps with 5,000,000+ installs: 66
Percentage of 100,000+ installs: 50.34013605442177 %
Percentage of 1,000,000 installs: 14.285714285714285 %
Percentage of 5,000,000+ installs: 22.448979591836736 %
PERSONALIZATION Average number of installations: 5201482.6122448975

Amount of apps in the PRODUCTIVITY category: 345
Amount of apps with 100,000+ installs: 191
Amount of apps with 1,000,000 installs: 56
Amount of apps with 5,000,000+ installs: 91
Percentage of 100,000+ installs: 55.362318840579704 %
Percentage of 1,000,000 installs: 16.231884057971012 %
Percentage of 5,000,000+ installs: 26.3768115942029 %
PRODUCTIVITY Average number of installations: 16787331.344927534

Amount of apps in the PARENTING category: 58
Amount of apps with 100,000+ installs: 34
Amount of apps with 1,000,000 installs: 13
Amount of apps with 5,000,000+ installs: 2
Percentage of 100,000+ installs: 58.620689655172406 %

Percentage of 1,000,000 installs: 22.413793103448278 %
Percentage of 5,000,000+ installs: 3.4482758620689653 %
PARENTING Average number of installations: 542603.6206896552

Amount of apps in the WEATHER category: 71
Amount of apps with 100,000+ installs: 60
Amount of apps with 1,000,000 installs: 21
Amount of apps with 5,000,000+ installs: 21
Percentage of 100,000+ installs: 84.50704225352112 %
Percentage of 1,000,000 installs: 29.577464788732392 %
Percentage of 5,000,000+ installs: 29.577464788732392 %
WEATHER Average number of installations: 5074486.197183099

Amount of apps in the VIDEO_PLAYERS category: 159
Amount of apps with 100,000+ installs: 101
Amount of apps with 1,000,000 installs: 33
Amount of apps with 5,000,000+ installs: 52
Percentage of 100,000+ installs: 63.52201257861635 %
Percentage of 1,000,000 installs: 20.754716981132077 %
Percentage of 5,000,000+ installs: 32.70440251572327 %
VIDEO_PLAYERS Average number of installations: 24727872.452830188

Amount of apps in the NEWS_AND_MAGAZINES category: 248
Amount of apps with 100,000+ installs: 116
Amount of apps with 1,000,000 installs: 46
Amount of apps with 5,000,000+ installs: 37
Percentage of 100,000+ installs: 46.774193548387096 %
Percentage of 1,000,000 installs: 18.548387096774192 %
Percentage of 5,000,000+ installs: 14.919354838709678 %
NEWS_AND_MAGAZINES Average number of installations: 9549178.467741935

Amount of apps in the MAPS_AND_NAVIGATION category: 124
Amount of apps with 100,000+ installs: 68
Amount of apps with 1,000,000 installs: 25
Amount of apps with 5,000,000+ installs: 29
Percentage of 100,000+ installs: 54.83870967741935 %
Percentage of 1,000,000 installs: 20.161290322580644 %
Percentage of 5,000,000+ installs: 23.387096774193548 %
MAPS_AND_NAVIGATION Average number of installations: 4056941.7741935486

- A profile/ app category that I think has a lot of potential is the ENTERTAINMENT Category for the following reasons:

- Although this Category has only 85 apps in it, almost all of the apps have 100,000+ installs. 97.65% of those apps to be exact (83).
- Out of all of those apps, 33 of them have 1M+ installs which is 38.82% of the total amount of apps in this category
- The most striking number that came up was the total number of apps that have 5M+ installs. 40 of the 85 apps had 5M+ installs which accounts for 47.06% of the total number of apps in this category.

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