MileStone_5_Raghuwanshi_Prashant_DSC540_Term_End_Project_Code

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Term Project: Milestone 5, Merging the Data and Storing in a Database/Visualizing Data

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Course: DSC540-T301 Data Preparation (2221-1)

[1]:
```python
# Import common Data preparation libraries:
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
```

[2]:
```python
# Insert data from each data source to a SQL Lite database - create a table with the following data
# import sqllite library
import sqlite3 as sql
conn = sql.connect('crypto.sqlite')
```

API Data Source:

[3]:
```python
# import libraries for Api Data Source
from requests import Request, Session
from requests.exceptions import ConnectionError, Timeout, TooManyRedirects
import json
```

Fetching all crypto currency latest price data from coinmarket api

[4]:
```python
# Calling api request and storing the responce in dict
url = 'https://pro-api.coinmarketcap.com/v1/cryptocurrency/listings/latest'
parameters = {
  'start':'1',
  'limit':'100',
  'convert':'USD'
}
headers = {
  'Accepts': 'application/json',
  'X-CMC_PRO_API_KEY': 'c6d563eb-5020-4805-822e-422c3a9b018c',
}

session = Session()
session.headers.update(headers)

try:
  response = session.get(url, params=parameters)
# storing jason to Dict
  data = json.loads(response.text)
except (ConnectionError, Timeout, TooManyRedirects) as e:
  print(e)
```

Parsing nested Api Json data into Dataframe

[5]:

```
# crearted the list -step 1
cryptodata = data['data']
# display the first element, with all columns in dataset
cryptodata[0]
```

[5]:

```
{'id': 1,
 'name': 'Bitcoin',
 'symbol': 'BTC',
 'slug': 'bitcoin',
 'num_market_pairs': 8316,
 'date_added': '2013-04-28T00:00:00.000Z',
 'tags': ['mineable',
  'pow',
  'sha-256',
  'store-of-value',
  'state-channel',
  'coinbase-ventures-portfolio',
  'three-arrows-capital-portfolio',
  'polychain-capital-portfolio',
  'binance-labs-portfolio',
  'blockchain-capital-portfolio',
  'boostvc-portfolio',
  'cms-holdings-portfolio',
  'dcg-portfolio',
  'dragonfly-capital-portfolio',
  'electric-capital-portfolio',
  'fabric-ventures-portfolio',
  'framework-ventures-portfolio',
  'galaxy-digital-portfolio',
  'huobi-capital-portfolio',
  'alameda-research-portfolio',
  'a16z-portfolio',
  '1confirmation-portfolio',
  'winklevoss-capital-portfolio',
  'usv-portfolio',
  'placeholder-ventures-portfolio',
  'pantera-capital-portfolio',
  'multicoin-capital-portfolio',
  'paradigm-portfolio'],
 'max_supply': 21000000,
 'circulating_supply': 18878637,
 'total_supply': 18878637,
 'platform': None,
 'cmc_rank': 1,
 'last_updated': '2021-11-20T17:20:02.000Z',
 'quote': {'USD': {'price': 57795.820848495045,
   'volume_24h': 32894324385.555397,
   'volume_change_24h': -15.6177,
   'percent_change_1h': 0.56742082,
   'percent_change_24h': -0.86309808,
   'percent_change_7d': -10.46270615,
   'percent_change_30d': -8.59758588,
   'percent_change_60d': 36.53245423,
   'percent_change_90d': 18.62581681,
   'market_cap': 1091106321915.7699,
   'market_cap_dominance': 42.3698,
   'fully_diluted_market_cap': 1213712237818.4,
   'last_updated': '2021-11-20T17:20:02.000Z'}}}
```

[6]:

```
# Format data into a more readable format-- parsing the api data and writting␣
 ↪it to list
# parsing the nested Jason data present in quote collumns and creating␣
 ↪datafrane for data preparation requirment
rows=[]
for currency in cryptodata:
    currency_id = currency['id']
    slug = currency['slug']
    cmc_rank = currency['cmc_rank']
    total_supply = currency['total_supply']
    currency_name = currency['name']
    currency_symbol = currency['symbol']
    currenct_price = currency['quote']['USD']['price']
    last_updated = currency['quote']['USD']['last_updated']
    rows.append([currency_id, slug, currency_name , currency_symbol, cmc_rank,␣
 ↪currenct_price, total_supply,last_updated])
```

[7]:

```
# Created new Dataframe which contains required price quote columns
# Replace Headers
```

```
df_parse_nested_json = pd.DataFrame(rows, columns=["currency_id", "slug",␣
↪"currency_name", "currency_symbol", "cmc_rank", "currency_price",␣
↪"total_supply", "last_updated"])
```

[8]:

```
# Display the new df data, use full for creating the lookup file..which␣
↪contains the currency name and its corresponding short name
df_parse_nested_lookup = pd.DataFrame(df_parse_nested_json, columns = ['slug',␣
↪'currency_symbol'])
# writting the df to csv file for archiving the fetch data for future refrences
df_parse_nested_lookup.to_csv(r'coin_lookup.csv')
```

[9]:

```
# display parsed and reshaped dataframe
df_parse_nested_lookup. head()
```

[9]:

```
          slug currency_symbol
0      bitcoin             BTC
1     ethereum             ETH
2 binance-coin             BNB
3       tether            USDT
4       solana             SOL
```

[10]:

```
#Fix Header casing, updating columns name in uppercase
df_crypto_price = df_parse_nested_json.rename(columns=str.upper)
df_crypto_price.head()
```

[10]:

```
   CURRENCY_ID          SLUG CURRENCY_NAME CURRENCY_SYMBOL  CMC_RANK  \
0            1       bitcoin       Bitcoin             BTC         1
1         1027      ethereum      Ethereum             ETH         2
2         1839  binance-coin  Binance Coin             BNB         3
3          825        tether        Tether            USDT         4
4         5426        solana        Solana             SOL         5

   CURRENCY_PRICE  TOTAL_SUPPLY              LAST_UPDATED
0    57795.820848  1.887864e+07  2021-11-20T17:20:02.000Z
1     4245.260330  1.184195e+08  2021-11-20T17:20:02.000Z
2      580.665077  1.668011e+08  2021-11-20T17:19:09.000Z
3        1.000777  7.635705e+10  2021-11-20T17:19:10.000Z
4      209.144407  5.093972e+08  2021-11-20T17:20:05.000Z
```

[11]:

```
# transforming total supply value in millions
# create function, convert counts in million
def convert_to_million(total):
    total1 = total/1000000
    return total1
```

[12]:

```
# call created function and update the date column value by using lambda␣
↪function
```

```
df_crypto_price['TOTAL_SUPPLY'] = df_crypto_price['TOTAL_SUPPLY'].apply(lambda␣
 ↪x: convert_to_million(x))
```

[13]:
```
df_crypto_price.head()
```

[13]:
```
   CURRENCY_ID          SLUG CURRENCY_NAME CURRENCY_SYMBOL  CMC_RANK  \
0            1       bitcoin       Bitcoin             BTC         1
1         1027      ethereum      Ethereum             ETH         2
2         1839  binance-coin  Binance Coin             BNB         3
3          825        tether        Tether            USDT         4
4         5426        solana        Solana             SOL         5

   CURRENCY_PRICE  TOTAL_SUPPLY              LAST_UPDATED
0    57795.820848     18.878637  2021-11-20T17:20:02.000Z
1     4245.260330    118.419508  2021-11-20T17:20:02.000Z
2      580.665077    166.801148  2021-11-20T17:19:09.000Z
3        1.000777  76357.051672  2021-11-20T17:19:10.000Z
4      209.144407    509.397234  2021-11-20T17:20:05.000Z
```

[14]:
```
# drop dublicate currency price entries from dataframe
df_crypto_price_drop_dup = df_crypto_price.
 ↪drop_duplicates(subset=['CURRENCY_ID', 'CURRENCY_SYMBOL'], keep='first')
```

[15]:
```
df_crypto_price_drop_dup.shape
```

[15]:
```
(100, 8)
```

[16]:
```
#created function to convert timestame to date
def tstodate(ts):
    a2 = pd.to_datetime(ts)
    a3 = a2.strftime('%Y%m%d')
    return a3
```

[17]:
```
# call created function and update the date column value by using lambda␣
 ↪function
df_crypto_price_drop_dup['LAST_UPDATED'] =␣
 ↪df_crypto_price_drop_dup['LAST_UPDATED'].apply(lambda x: tstodate(x))
```

[18]:
```
realtime_cripto_rate = df_crypto_price_drop_dup
```

[19]:
```
#Doping EMPLOYEE table if already exists
cursor0 = conn.cursor()
cursor0.execute("DROP TABLE realtime_cripto_rate")
# loading data to sqllite DB
realtime_cripto_rate.to_sql('realtime_cripto_rate', conn)
#Commit the transaction
conn.commit()
```

[20]:
```
 # pull out records from table
cursor = conn.execute('select CURRENCY_ID, CURRENCY_SYMBOL, CURRENCY_PRICE from␣
 ↪realtime_cripto_rate limit 10')
#fetch all rows by using cursor
rows = cursor.fetchall()
# display the fetched data
rows
```

[20]:
```
[(1, 'BTC', 57795.820848495045),
 (1027, 'ETH', 4245.260330101385),
 (1839, 'BNB', 580.6650774716106),
 (825, 'USDT', 1.0007766027504192),
 (5426, 'SOL', 209.14440715164895),
 (2010, 'ADA', 1.87988973875135),
 (52, 'XRP', 1.072959974658014),
 (6636, 'DOT', 40.32423075776385),
 (3408, 'USDC', 1.000115219713096),
 (74, 'DOGE', 0.22699429017168016)]
```

Web Data Source Import libraries for Web Scraping

[21]:
```
# import library to open urls and download htmls
# print out python data structures
from pprint import pprint
# for parsing all the tables present
# on the website
import urllib.request
from html_table_parser.parser import HTMLTableParser
# for converting the parsed data to pandas dataframe
from bs4 import BeautifulSoup
```

[22]:
```
# define function to pull the website html file
def url_load_html(url):
    # request to the website
    req = urllib.request.Request(url=url)
    f = urllib.request.urlopen(req)
    # reading contents of the website
    return f.read()
```

[23]:
```
# define the html contents of a URL.
xhtml = url_load_html('https://www.moneycontrol.com/stocks/marketstats/
 ↪fii_dii_activity/index.php').decode('utf-8')
# Defining the HTMLTableParser object
par = HTMLTableParser()
# feeding the html contents in the
# HTMLTableParser object
par.feed(xhtml)
```

```
[24]: # Format data into a more readable format

      #This step pulls the required table data from html file
      #pprint(par.tables[4])
      # converting the parsed web table data to dataframe
      df_html_data = pd.DataFrame(par.tables[4])
      # display the fetch table data in dataframe
      df_html_data.head()
```

```
[24]:                                  0               1              2  \
      0                                    FII Rs Crores  DII Rs Crores   
      1                             Date  Gross Purchase    Gross Sales   
      2      October 2021     October 2021      185,566.83     211,139.02   
      3   September 2021   September 2021      217,636.41     216,722.64   
      4         August 2021    August 2021      175,168.36     177,736.88   

                            3               4            5                     6  
      0                  None            None         None                  None  
      1  Net Purchase / Sales  Gross Purchase  Gross Sales  Net Purchase / Sales  
      2            -25,572.19      151,607.74   147,136.75              4,470.99  
      3                913.77      144,147.33   138,198.48              5,948.85  
      4             -2,568.52      131,185.18   124,290.49              6,894.69  
```

```
[25]: # setting second row as header
      # step-1 extracting the header information
      new_header = df_html_data.iloc[1] #grab the first row for the header
```

```
[26]: new_header[1] = 'Tot_Gross_Purchase'
      new_header[2] = 'Gross_Sales'
      new_header[3] = 'net_purchase'
      new_header
```

```
[26]: 0                     Date
      1       Tot_Gross_Purchase
      2              Gross_Sales
      3             net_purchase
      4           Gross Purchase
      5              Gross Sales
      6     Net Purchase / Sales
      Name: 1, dtype: object
```

```
[27]: df_html_data1 = df_html_data[2:] #take out the data less the header row
```

```
[28]: df_html_data1.head()
```

```
[28]:                                  0           1           2           3  \
      2      October 2021     October 2021  185,566.83  211,139.02  -25,572.19   
      3   September 2021   September 2021  217,636.41  216,722.64      913.77   
```

```
4        August 2021   August 2021  175,168.36  177,736.88   -2,568.52
5            July 2021    July 2021  125,896.68  149,090.07  -23,193.39
6            June 2021    June 2021  170,188.95  170,214.84      -25.89

            4           5          6
2  151,607.74  147,136.75   4,470.99
3  144,147.33  138,198.48   5,948.85
4  131,185.18  124,290.49   6,894.69
5  117,910.10   99,516.18  18,393.92
6  114,289.67  107,246.16   7,043.51
```

[29]:

```
df_html_data1.columns = new_header #set the header row as the df header
df_html_data1.head()
```

[29]:

```
1                             Date Tot_Gross_Purchase Gross_Sales  \
2      October 2021   October 2021         185,566.83  211,139.02
3  September 2021   September 2021         217,636.41  216,722.64
4        August 2021    August 2021         175,168.36  177,736.88
5            July 2021    July 2021         125,896.68  149,090.07
6            June 2021    June 2021         170,188.95  170,214.84

1 net_purchase Gross Purchase Gross Sales Net Purchase / Sales
2   -25,572.19     151,607.74  147,136.75             4,470.99
3       913.77     144,147.33  138,198.48             5,948.85
4    -2,568.52     131,185.18  124,290.49             6,894.69
5   -23,193.39     117,910.10   99,516.18            18,393.92
6       -25.89     114,289.67  107,246.16             7,043.51
```

[30]:

```
# renaming the columns names
df_html_data2 = df_html_data1.rename(columns={"Gross Purchase":
 ↪"Int_Gross_Purchase", "Gross Sales":"Int_Gross_Sales", "Net Purchase /␣
 ↪Sales":"int_Net_Purchase"})
df_html_data2.head()
```

[30]:

```
1                             Date Tot_Gross_Purchase Gross_Sales  \
2      October 2021   October 2021         185,566.83  211,139.02
3  September 2021   September 2021         217,636.41  216,722.64
4        August 2021    August 2021         175,168.36  177,736.88
5            July 2021    July 2021         125,896.68  149,090.07
6            June 2021    June 2021         170,188.95  170,214.84

1 net_purchase Int_Gross_Purchase Int_Gross_Sales int_Net_Purchase
2   -25,572.19         151,607.74      147,136.75         4,470.99
3       913.77         144,147.33      138,198.48         5,948.85
4    -2,568.52         131,185.18      124,290.49         6,894.69
5   -23,193.39         117,910.10       99,516.18        18,393.92
6       -25.89         114,289.67      107,246.16         7,043.51
```

[31]:
```
#Fix Header casing
# updating columns name in uppercase
df_html_data3 = df_html_data2.rename(columns=str.upper)
df_html_data3.head()
```

[31]:
```
1                             DATE TOT_GROSS_PURCHASE GROSS_SALES  \
2      October 2021   October 2021         185,566.83  211,139.02
3   September 2021   September 2021         217,636.41  216,722.64
4         August 2021    August 2021         175,168.36  177,736.88
5             July 2021    July 2021         125,896.68  149,090.07
6             June 2021    June 2021         170,188.95  170,214.84

1 NET_PURCHASE INT_GROSS_PURCHASE INT_GROSS_SALES INT_NET_PURCHASE
2   -25,572.19         151,607.74      147,136.75         4,470.99
3       913.77         144,147.33      138,198.48         5,948.85
4    -2,568.52         131,185.18      124,290.49         6,894.69
5   -23,193.39         117,910.10       99,516.18        18,393.92
6       -25.89         114,289.67      107,246.16         7,043.51
```

[32]:
```
# create lambda function to fix the date inconsistent values
# input -- September 2021 September 2021 --> out put : 2021-09-01
import re
def remove_dup_date(row):
        k = re.split("   ", row)
        k1 = re.split(" ", k[1])
        a = pd.to_datetime(k1[1] + k1[0], format='%Y%B')
        #print(a)
        return a
```

[33]:
```
# fixing inconsistent values for date columns -- date values are populting␣
 ↪twice
# step 1 create function and update the date column value by using lambda␣
 ↪function
df_html_data3['DATE'] = df_html_data3['DATE'].apply(lambda x:␣
 ↪remove_dup_date(x))
```

[34]:
```
# create lambda function to fix the amount inconsistent values
# input -- '175,168.36' --> out put : 175168.36
import re
def fix_amount_value(row):
        b = row.replace(',', '')
        b2 = float(b)
        #print(b2)
        return b
```

[35]:
```
# displaying df after fixing date value
df_html_data3.head()
```

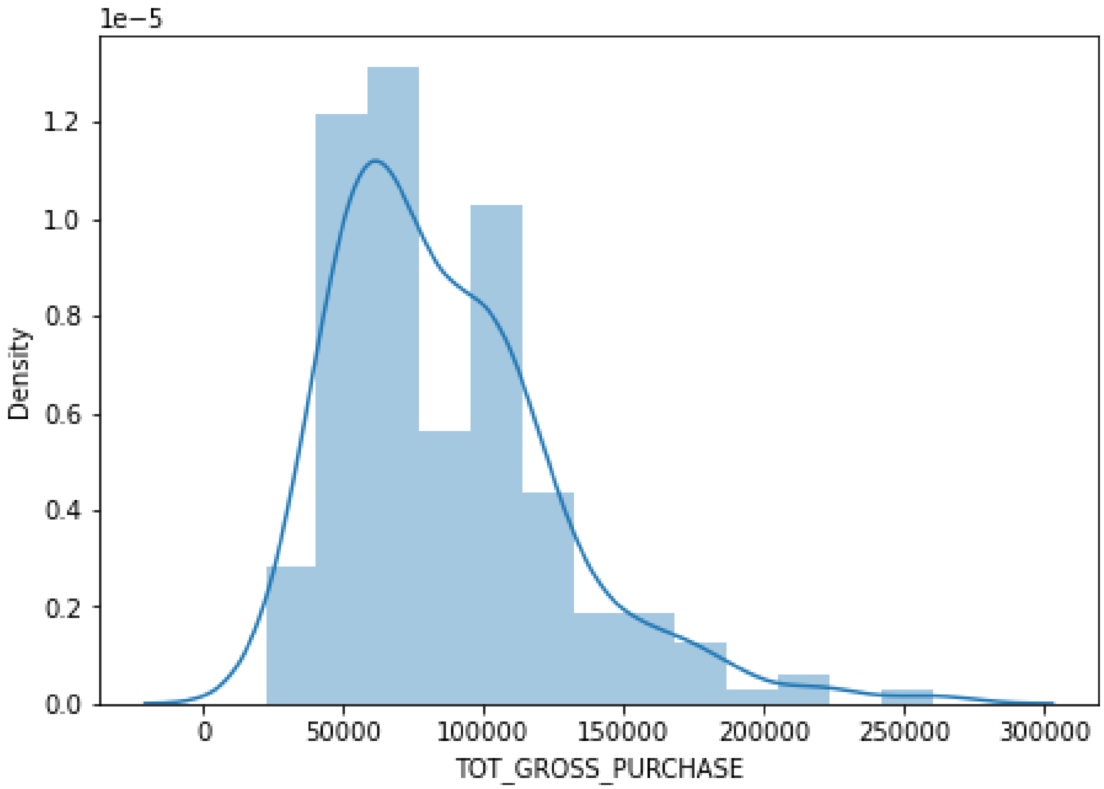
```
[35]: 1        DATE TOT_GROSS_PURCHASE GROSS_SALES NET_PURCHASE INT_GROSS_PURCHASE  \
      2 2021-10-01         185,566.83  211,139.02   -25,572.19         151,607.74
      3 2021-09-01         217,636.41  216,722.64       913.77         144,147.33
      4 2021-08-01         175,168.36  177,736.88    -2,568.52         131,185.18
      5 2021-07-01         125,896.68  149,090.07   -23,193.39         117,910.10
      6 2021-06-01         170,188.95  170,214.84       -25.89         114,289.67

      1 INT_GROSS_SALES INT_NET_PURCHASE
      2      147,136.75         4,470.99
      3      138,198.48         5,948.85
      4      124,290.49         6,894.69
      5       99,516.18        18,393.92
      6      107,246.16         7,043.51
```

```
[36]: df_html_data3['TOT_GROSS_PURCHASE'] = df_html_data3['TOT_GROSS_PURCHASE'].
       ↪apply(lambda x: fix_amount_value(x))
```

```
[37]: # Remove duplicates based on second and third columns value
      df_html_data3_rm_dup = df_html_data3.drop_duplicates(['TOT_GROSS_PURCHASE',␣
       ↪'GROSS_SALES'], keep='last')
      df_html_data3_rm_dup.head()
```

```
[37]: 1        DATE TOT_GROSS_PURCHASE GROSS_SALES NET_PURCHASE INT_GROSS_PURCHASE  \
      2 2021-10-01          185566.83  211,139.02   -25,572.19         151,607.74
      3 2021-09-01          217636.41  216,722.64       913.77         144,147.33
      4 2021-08-01          175168.36  177,736.88    -2,568.52         131,185.18
      5 2021-07-01          125896.68  149,090.07   -23,193.39         117,910.10
      6 2021-06-01          170188.95  170,214.84       -25.89         114,289.67

      1 INT_GROSS_SALES INT_NET_PURCHASE
      2      147,136.75         4,470.99
      3      138,198.48         5,948.85
      4      124,290.49         6,894.69
      5       99,516.18        18,393.92
      6      107,246.16         7,043.51
```

```
[38]: #Identify outliers and bad data
      #plot boxplot to find outliers data
      import warnings
      import seaborn as sns
      warnings.filterwarnings('ignore')
      plt.figure(figsize=(16,5))
      plt.subplot(1,2,1)
      sns.distplot(df_html_data3_rm_dup['TOT_GROSS_PURCHASE'])
      plt.show()
```



[39]:
```
#  Finding the Outliers
df_html_data3_rm_dup[(df_html_data3_rm_dup['TOT_GROSS_PURCHASE'] > '250000') |␣
 ↪(df_html_data3_rm_dup['TOT_GROSS_PURCHASE'] < '25000')].head(5)
```

[39]:
```
1       DATE TOT_GROSS_PURCHASE GROSS_SALES NET_PURCHASE INT_GROSS_PURCHASE  \
2 2021-10-01          185566.83  211,139.02   -25,572.19         151,607.74
3 2021-09-01          217636.41  216,722.64       913.77         144,147.33
4 2021-08-01          175168.36  177,736.88    -2,568.52         131,185.18
5 2021-07-01          125896.68  149,090.07   -23,193.39         117,910.10
6 2021-06-01          170188.95  170,214.84       -25.89         114,289.67

1 INT_GROSS_SALES INT_NET_PURCHASE
2      147,136.75         4,470.99
3      138,198.48         5,948.85
4      124,290.49         6,894.69
5       99,516.18        18,393.92
6      107,246.16         7,043.51
```

[40]:
```
#Trimming of Outliers
```

```
df_html_data_trim_out =␣
 ↪df_html_data3_rm_dup[(df_html_data3_rm_dup['TOT_GROSS_PURCHASE'] < '250000')␣
 ↪| (df_html_data3_rm_dup['TOT_GROSS_PURCHASE'] > '25000')]
df_html_data_trim_out.head()
```

[40]:
```
1        DATE TOT_GROSS_PURCHASE GROSS_SALES NET_PURCHASE INT_GROSS_PURCHASE  \
2 2021-10-01          185566.83  211,139.02   -25,572.19         151,607.74
3 2021-09-01          217636.41  216,722.64       913.77         144,147.33
4 2021-08-01          175168.36  177,736.88    -2,568.52         131,185.18
5 2021-07-01          125896.68  149,090.07   -23,193.39         117,910.10
6 2021-06-01          170188.95  170,214.84       -25.89         114,289.67

1 INT_GROSS_SALES INT_NET_PURCHASE
2      147,136.75         4,470.99
3      138,198.48         5,948.85
4      124,290.49         6,894.69
5       99,516.18        18,393.92
6      107,246.16         7,043.51
```

[41]:
```
monthly_cripto_transaction = df_html_data_trim_out
```

[42]:
```
cursor0 = conn.cursor()
cursor0.execute("DROP TABLE monthly_cripto_transaction")
monthly_cripto_transaction.to_sql('monthly_cripto_transaction', conn)
#Commit the transaction
conn.commit()
```

[43]:
```
 # pull out records from table
cursor1 = conn.execute('select DATE,TOT_GROSS_PURCHASE,GROSS_SALES,NET_PURCHASE␣
 ↪from monthly_cripto_transaction limit 10')
#fetch all rows by using cursor
rows1 = cursor1.fetchall()
# display the fetched data
rows1
```

[43]:
```
[('2021-10-01 00:00:00', '185566.83', '211,139.02', '-25,572.19'),
 ('2021-09-01 00:00:00', '217636.41', '216,722.64', '913.77'),
 ('2021-08-01 00:00:00', '175168.36', '177,736.88', '-2,568.52'),
 ('2021-07-01 00:00:00', '125896.68', '149,090.07', '-23,193.39'),
 ('2021-06-01 00:00:00', '170188.95', '170,214.84', '-25.89'),
 ('2021-05-01 00:00:00', '166976.74', '172,992.08', '-6,015.34'),
 ('2021-04-01 00:00:00', '133795.77', '145,835.20', '-12,039.43'),
 ('2021-03-01 00:00:00', '190759.51', '189,514.29', '1,245.22'),
 ('2021-02-01 00:00:00', '223030.67', '180,986.21', '42,044.46'),
 ('2021-01-01 00:00:00', '168241.42', '159,260.61', '8,980.81')]
```

Flat File Source Data: Data Source : https://www.kaggle.com/danielbethell/adult-incomes-in-the-united-states

crypto_income for adult, updated the dataset by adding additional columns crypto_slang & crypto symbol

Data Set Details: Dataset columns details: age: continuous.

workclass: Private, Self-emp-not-inc, Self-emp-inc, Federal-gov, Local-gov, State-gov, Without-pay, Never-worked.

fnlwgt: continuous.

education: Bachelors, Some-college, 11th, HS-grad, Prof-school, Assoc-acdm, Assoc-voc, 9th, 7th-8th, 12th, Masters, 1st-4th, 10th, Doctorate, 5th-6th, Preschool.

education-num: continuous.

marital-status: Married-civ-spouse, Divorced, Never-married, Separated, Widowed, Married-spouse-absent, Married-AF-spouse.

relationship: Wife, Own-child, Husband, Not-in-family, Other-relative, Unmarried.

sex: Female, Male.

capital-gain: continuous.

capital-loss: continuous.

hours-per-week: continuous.

native-country: United-States, Cambodia, England, Puerto-Rico, Canada, Germany, Outlying-US(Guam-USVI-etc), India, Japan, Greece, South, China, Cuba, Iran, Honduras, Philippines, Italy, Poland, Jamaica, Vietnam, Mexico, Portugal, Ireland, France, Dominican-Republic, Laos, Ecuador, Taiwan, Haiti, Columbia, Hungary, Guatemala, Nicaragua, Scotland, Thailand, Yugoslavia, El-Salvador, Trinadad&Tobago, Peru, Hong, Holand-Netherlands. crypto_slang: 20 crypto currencires name like bitcoins crypto_symbol:

[44]:
```python
# read source file into dataframe
crypto_income_df = pd.read_csv(r"crypto_income_data.txt", sep="|")
# display firt 5 records
crypto_income_df.head(5)
```

[44]:
```
   age         workclass  fnlwgt  education  education-num  \
0   39         State-gov   77516  Bachelors             13
1   50  Self-emp-not-inc   83311  Bachelors             13
2   38           Private  215646    HS-grad              9
3   53           Private  234721       11th              7
4   28           Private  338409  Bachelors             13

       marital-status   relationship    sex  capital-gain  capital-loss  \
0       Never-married  Not-in-family   Male          2174             0
1  Married-civ-spouse        Husband   Male             0             0
```

```
2            Divorced  Not-in-family    Male             0             0
3  Married-civ-spouse        Husband    Male             0             0
4  Married-civ-spouse           Wife  Female             0             0

   hours-per-week native-country total-income  crypto_slang crypto_symbol
0              40  United-States        <=50K       bitcoin           BTC
1              13  United-States        <=50K      ethereum           ETH
2              40  United-States        <=50K       cardano           ADA
3              40  United-States        <=50K  binance-coin           BNB
4              40           Cuba        <=50K        tether          USDT
```

```
[45]: # Headers, updating columns name in uppercase
      crypto_income_df = crypto_income_df.rename(columns=str.upper)
      crypto_income_df.head()
```

```
[45]:    AGE         WORKCLASS  FNLWGT  EDUCATION  EDUCATION-NUM  \
      0   39         State-gov   77516  Bachelors             13
      1   50  Self-emp-not-inc   83311  Bachelors             13
      2   38           Private  215646    HS-grad              9
      3   53           Private  234721       11th              7
      4   28           Private  338409  Bachelors             13

             MARITAL-STATUS   RELATIONSHIP     SEX  CAPITAL-GAIN  CAPITAL-LOSS  \
      0       Never-married  Not-in-family    Male          2174             0
      1  Married-civ-spouse        Husband    Male             0             0
      2            Divorced  Not-in-family    Male             0             0
      3  Married-civ-spouse        Husband    Male             0             0
      4  Married-civ-spouse           Wife  Female             0             0

         HOURS-PER-WEEK NATIVE-COUNTRY TOTAL-INCOME  CRYPTO_SLANG CRYPTO_SYMBOL
      0              40  United-States        <=50K       bitcoin           BTC
      1              13  United-States        <=50K      ethereum           ETH
      2              40  United-States        <=50K       cardano           ADA
      3              40  United-States        <=50K  binance-coin           BNB
      4              40           Cuba        <=50K        tether          USDT
```

Performing the transformation operation on File data source:

```
[46]: # renaming the columns names
      crypto_income_df2 = crypto_income_df.rename(columns={"EDUCATION-NUM":
       ↪"EDUCATION_NUM", "CAPITAL-GAIN":"CAPITAL_GAIN", "HOURS-PER-WEEK":
       ↪"HOURS_PER_WEEK", "NATIVE-COUNTRY":"NATIVE_COUNTRY", "TOTAL-INCOME":
       ↪"TOTAL_INCOME"})
```

```
[47]: crypto_income_df2.head()
```

```
[47]:    AGE         WORKCLASS  FNLWGT  EDUCATION  EDUCATION_NUM  \
      0   39         State-gov   77516  Bachelors             13
```

```
1   50  Self-emp-not-inc   83311  Bachelors              13
2   38           Private  215646    HS-grad               9
3   53           Private  234721       11th               7
4   28           Private  338409  Bachelors              13

       MARITAL-STATUS   RELATIONSHIP     SEX  CAPITAL_GAIN  CAPITAL-LOSS  \
0        Never-married  Not-in-family    Male          2174             0
1  Married-civ-spouse        Husband    Male             0             0
2             Divorced  Not-in-family    Male             0             0
3  Married-civ-spouse        Husband    Male             0             0
4  Married-civ-spouse           Wife  Female             0             0

   HOURS_PER_WEEK NATIVE_COUNTRY TOTAL_INCOME  CRYPTO_SLANG CRYPTO_SYMBOL
0              40  United-States        <=50K       bitcoin           BTC
1              13  United-States        <=50K      ethereum           ETH
2              40  United-States        <=50K       cardano           ADA
3              40  United-States        <=50K  binance-coin           BNB
4              40           Cuba        <=50K        tether          USDT
```

[48]:

```
#5. Look at summary information about your data (total, mean, min, max,␣
#freq, unique, etc.) Does this present any more questions for you? Does it␣
#lead you to a conclusion yet?
print("\nDescribe Data\n")
print(crypto_income_df.describe())
print("\nSummarized Data\n")
print(crypto_income_df.describe(include=['O']))
```

```

Describe Data

                AGE        FNLWGT  EDUCATION-NUM  CAPITAL-GAIN  CAPITAL-LOSS  \
count  32561.000000  3.256100e+04   32561.000000  32561.000000  32561.000000
mean      38.581647  1.897784e+05      10.080679   1077.648844     87.303830
std       13.640433  1.055500e+05       2.572720   7385.292085    402.960219
min       17.000000  1.228500e+04       1.000000      0.000000      0.000000
25%       28.000000  1.178270e+05       9.000000      0.000000      0.000000
50%       37.000000  1.783560e+05      10.000000      0.000000      0.000000
75%       48.000000  2.370510e+05      12.000000      0.000000      0.000000
max       90.000000  1.484705e+06      16.000000  99999.000000   4356.000000

       HOURS-PER-WEEK
count    32561.000000
mean        40.437456
std         12.347429
min          1.000000
25%         40.000000
50%         40.000000
75%         45.000000
```

```
max         99.000000

Summarized Data

       WORKCLASS EDUCATION      MARITAL-STATUS RELATIONSHIP    SEX  \
count      32561     32561               32561        32561  32561
unique         9        16                   7            6      2
top      Private   HS-grad  Married-civ-spouse      Husband   Male
freq       22696     10501               14976        13193  21790

       NATIVE-COUNTRY TOTAL-INCOME CRYPTO_SLANG CRYPTO_SYMBOL
count           32561        32561        32561         32561
unique             42            2           47            47
top     United-States         <=50K      bitcoin           BTC
freq            29170        24720         9710          9710
```

[49]:
```
# find out the null present in required columns
print(f"is null is present in AGE -- {crypto_income_df.AGE.isnull().values.
 ↪any()}")
print(f"is null is present in CRYPTO_SYMBOL -- {crypto_income_df.CRYPTO_SYMBOL.
 ↪isnull().values.any()}")
print(f"is null is present in CRYPTO_SLANG -- {crypto_income_df.CRYPTO_SLANG.
 ↪isnull().values.any()}")
print(f"is null is present in CAPITAL_GAIN -- {crypto_income_df2.CAPITAL_GAIN.
 ↪isnull().values.any()}")
```

```
is null is present in AGE -- False
is null is present in CRYPTO_SYMBOL -- False
is null is present in CRYPTO_SLANG -- False
is null is present in CAPITAL_GAIN -- False
```

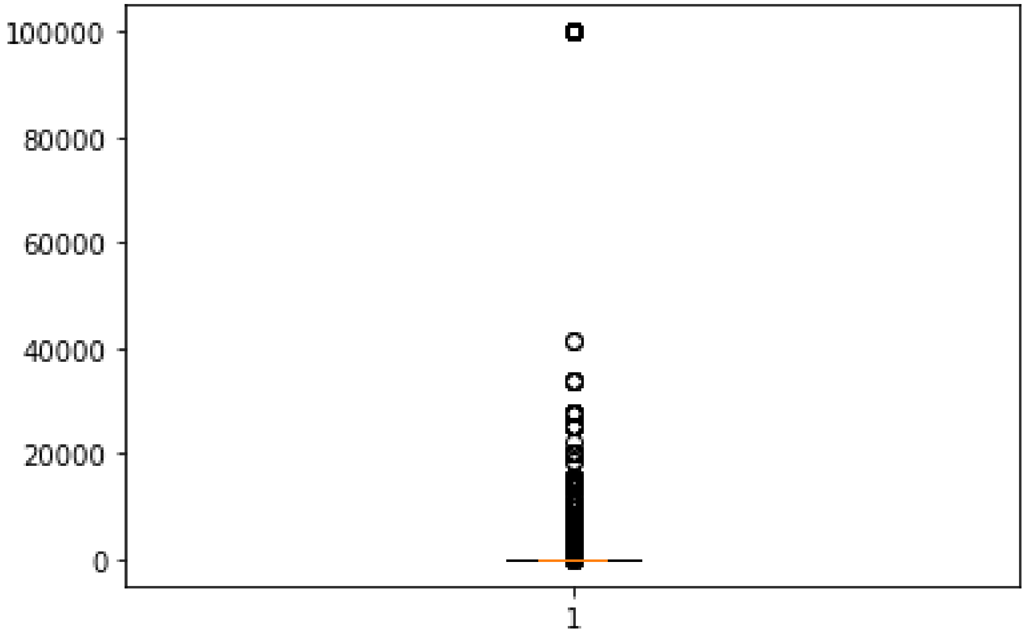
[50]:
```
#from fuzzywuzzy import fuzz
#from fuzzywuzzy import process
#df_crypto_price['name_from_df2'] = df_crypto_price['CURRENCY_NAME'].
 ↪apply(lambda x: process.extractOne(x, crypto_income_df2['CRYPTO_SLANG'].
 ↪to_list(),score_cutoff=80))
#name_from_df2_list = df_crypto_price['name_from_df2'].to_list()
#name_from_df2_list = [_[0] if _ != None else None for _ in name_from_df2_list]
#df_crypto_price['name_from_df2'] = name_from_df2_list

#df_crypto_price = df_crypto_price.merge(crypto_income_df2, left_on =␣
 ↪'name_from_df2', right_on = 'CRYPTO_SLANG', suffixes=('','_2'))
#df_crypto_price.drop(['CURRENCY_NAME','name_from_df2'],axis=1, inplace=True)
```

[51]:
```
# identifying outliers
# load libraries
import numpy as np
import matplotlib.pyplot as plt
```

```
%matplotlib inline
```

[52]:
```
#plot boxplot to find outliers data
plt.boxplot(crypto_income_df2.CAPITAL_GAIN, notch=True)
```

[52]:
```
{'whiskers': [<matplotlib.lines.Line2D at 0x1814cfff730>,
  <matplotlib.lines.Line2D at 0x1814cfffa90>],
 'caps': [<matplotlib.lines.Line2D at 0x1814cfffdf0>,
  <matplotlib.lines.Line2D at 0x1814d3da190>],
 'boxes': [<matplotlib.lines.Line2D at 0x1814cfff3d0>],
 'medians': [<matplotlib.lines.Line2D at 0x1814d3da4f0>],
 'fliers': [<matplotlib.lines.Line2D at 0x1814d3da850>],
 'means': []}
```



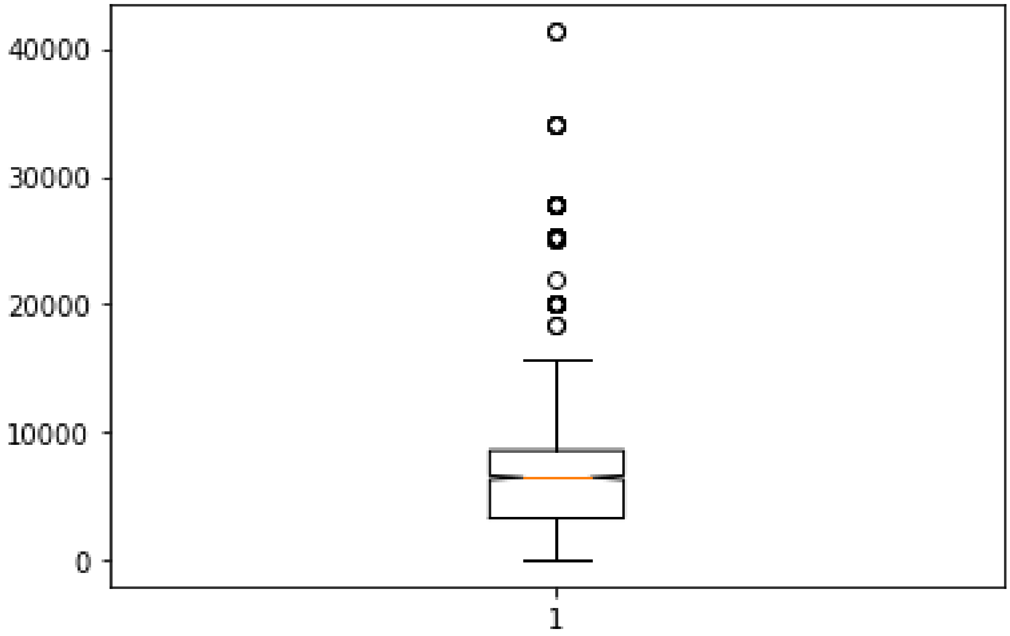
[53]:
```
# fixing outliers
crypto_income_df2_fix = crypto_income_df2[(crypto_income_df2['CAPITAL_GAIN'] <=␣
↪60000) & (crypto_income_df2['CAPITAL_GAIN'] >= 1)]
```

[54]:
```
# new shape of dh after fixing outliers
crypto_income_df2_fix.shape
```

[54]:
```
(2553, 15)
```

[55]:
```
# plot after fixing outliers
#plot boxplot to after fixing outliers data
plt.boxplot(crypto_income_df2_fix.CAPITAL_GAIN, notch=True)
```

[55]:
```
{'whiskers': [<matplotlib.lines.Line2D at 0x1814d43aa00>,
  <matplotlib.lines.Line2D at 0x1814d43ad60>],
 'caps': [<matplotlib.lines.Line2D at 0x1814d448100>,
  <matplotlib.lines.Line2D at 0x1814d448460>],
 'boxes': [<matplotlib.lines.Line2D at 0x1814d43a6a0>],
 'medians': [<matplotlib.lines.Line2D at 0x1814d4487c0>],
 'fliers': [<matplotlib.lines.Line2D at 0x1814d448b20>],
 'means': []}
```



[56]:
```
crypto_income_df2_fix.head()
```

[56]:
```
    AGE  WORKCLASS  FNLWGT  EDUCATION  EDUCATION_NUM      MARITAL-STATUS  \
0    39  State-gov   77516  Bachelors             13       Never-married
8    31    Private   45781    Masters             14       Never-married
9    42    Private  159449  Bachelors             13  Married-civ-spouse
59   30    Private  188146    HS-grad              9  Married-civ-spouse
60   30    Private   59496  Bachelors             13  Married-civ-spouse

     RELATIONSHIP     SEX  CAPITAL_GAIN  CAPITAL-LOSS  HOURS_PER_WEEK  \
0   Not-in-family    Male          2174             0              40
8   Not-in-family  Female         14084             0              50
9         Husband    Male          5178             0              40
59        Husband    Male          5013             0              40
60        Husband    Male          2407             0              40

   NATIVE_COUNTRY TOTAL_INCOME CRYPTO_SLANG CRYPTO_SYMBOL
```

```
0   United-States        <=50K      bitcoin            BTC
8   United-States         >50K     usd-coin           USDC
9   United-States         >50K     dogecoin           DOGE
59  United-States        <=50K     usd-coin           USDC
60  United-States        <=50K     dogecoin           DOGE
```

```
[57]: crypto_adult_income = crypto_income_df2_fix
```

```
[58]: cursor0.execute("DROP TABLE crypto_adult_income")
      # loading data to sqllite DB
      crypto_adult_income.to_sql('crypto_adult_income', conn)
      #Commit the transaction
      conn.commit()
```

```
[59]:  # pull out records from table
      cursor3 = conn.execute('select AGE,WORKCLASS,EDUCATION,EDUCATION_NUM␣
       ↪,RELATIONSHIP,SEX,CAPITAL_GAIN, CRYPTO_SYMBOL from crypto_adult_income limit␣
       ↪10')
      #fetch all rows by using cursor
      rows3 = cursor3.fetchall()
      # dsiplay query records
      rows3
```

```
[59]: [(39, 'State-gov', 'Bachelors', 13, 'Not-in-family', 'Male', 2174, 'BTC'),
       (31, 'Private', 'Masters', 14, 'Not-in-family', 'Female', 14084, 'USDC'),
       (42, 'Private', 'Bachelors', 13, 'Husband', 'Male', 5178, 'DOGE'),
       (30, 'Private', 'HS-grad', 9, 'Husband', 'Male', 5013, 'USDC'),
       (30, 'Private', 'Bachelors', 13, 'Husband', 'Male', 2407, 'DOGE'),
       (44, 'Private', 'HS-grad', 9, 'Not-in-family', 'Female', 14344, 'BNB'),
       (44, 'Private', 'Bachelors', 13, 'Husband', 'Male', 15024, 'ADA'),
       (32, 'Self-emp-inc', 'HS-grad', 9, 'Husband', 'Male', 7688, 'BTC'),
       (17, '?', '10th', 6, 'Own-child', 'Female', 34095, 'ETH'),
       (28, 'Private', 'Some-college', 10, 'Wife', 'Female', 4064, 'ADA')]
```

```
[60]: ## Joining realtime_cripto_rate, crypto_adult_income table to compute the␣
       ↪individual capital gain in respective cryto currency
```

```
[61]: join_adult_income_incrypto = pd.DataFrame()
      cursor4 = conn.execute('select AGE,WORKCLASS,EDUCATION,EDUCATION_NUM␣
       ↪,RELATIONSHIP,SEX,CAPITAL_GAIN, CRYPTO_SYMBOL, CURRENCY_ID, CURRENCY_PRICE,␣
       ↪CAPITAL_GAIN/CURRENCY_PRICE as GAIN_IN_CRYPTO from crypto_adult_income join␣
       ↪realtime_cripto_rate on CRYPTO_SYMBOL = CURRENCY_SYMBOL')
      #fetch all rows by using cursor
      rows4 = cursor4.fetchall()
```

```
join_adult_income_incrypto = join_adult_income_incrypto.append(pd.
 ↪DataFrame(rows4,␣
 ↪columns=['AGE','WORKCLASS','EDUCATION','EDUCATION_NUM','RELATIONSHIP','SEX','CAPITAL_GAIN',
 ↪'CURRENCY_ID', 'CURRENCY_PRICE', 'GAIN_IN_CRYPTO']),ignore_index=True)
# loading data to sqllite DB
cursor0.execute("DROP TABLE join_adult_income_incrypto")
join_adult_income_incrypto.to_sql('join_adult_income_incrypto', conn)
#Commit the transaction
conn.commit()
```

[62]:

```
join_adult_income_incrypto.head()
```

[62]:

```
   AGE  WORKCLASS  EDUCATION  EDUCATION_NUM   RELATIONSHIP     SEX  \
0   39  State-gov  Bachelors             13  Not-in-family    Male
1   31    Private    Masters             14  Not-in-family  Female
2   42    Private  Bachelors             13        Husband    Male
3   30    Private    HS-grad              9        Husband    Male
4   30    Private  Bachelors             13        Husband    Male

   CAPITAL_GAIN CRYPTO_SYMBOL  CURRENCY_ID  CURRENCY_PRICE  GAIN_IN_CRYPTO
0          2174           BTC            1    57795.820848        0.037615
1         14084          USDC         3408        1.000115    14082.377433
2          5178          DOGE           74        0.226994    22811.146466
3          5013          USDC         3408        1.000115     5012.422470
4          2407          DOGE           74        0.226994    10603.790951
```

[63]:

```
 # pull out records from  join_adult_income_incrypto table
cursor5 = conn.execute('select * from join_adult_income_incrypto limit 1')
#fetch all rows by using cursor
rows5 = cursor5.fetchall()
# dsiplay query records
rows5
```

[63]:

```
[(0,
  39,
  'State-gov',
  'Bachelors',
  13,
  'Not-in-family',
  'Male',
  2174,
  'BTC',
  1,
  57795.820848495045,
  0.0376151764623066)]
```

[64]:

```
## subquery between  realtime_cripto_rate & monthly_cripto_transaction table to␣
 ↪compute the monthly transcation in corresponding crypto currency coins
# assuming BTC trade is 30% of daily TOT_GROSS_PURCHASE
# assuming ETH trade is 20% of daily TOT_GROSS_PURCHASE
# assuming BNB trade is 10% of daily TOT_GROSS_PURCHASE
# Deriving new columnss to visualize the corresponding cyrtpo currency monthly␣
 ↪purase in terms of corresponding cryto coins
df2_table2 = pd.DataFrame()
cursor5 = conn.execute("select DATE, TOT_GROSS_PURCHASE as␣
 ↪GROSS_PURCHASE_IN_DOLLAR , TOT_GROSS_PURCHASE*0.3/CURRENCY_PRICE_BTC as␣
 ↪COINS_IN_BTC, TOT_GROSS_PURCHASE*0.2/CURRENCY_PRICE_ETH as COINS_IN_ETH,␣
 ↪TOT_GROSS_PURCHASE*0.1/CURRENCY_PRICE_BNB as COINS_IN_BNB  from␣
 ↪monthly_cripto_transaction, (select SUM(CURRENCY_PRICE) FILTER (WHERE␣
 ↪CURRENCY_SYMBOL = 'BTC') CURRENCY_PRICE_BTC,SUM(CURRENCY_PRICE) FILTER␣
 ↪(WHERE CURRENCY_SYMBOL = 'ETH') CURRENCY_PRICE_ETH, SUM(CURRENCY_PRICE)␣
 ↪FILTER (WHERE CURRENCY_SYMBOL = 'BNB') CURRENCY_PRICE_BNB from␣
 ↪realtime_cripto_rate limit 3)")
rows5 = cursor5.fetchall()
df2_table2 = df2_table2.append(pd.DataFrame(rows5,␣
 ↪columns=['DATE','TOT_GROSS_PURCHASE','COINS_IN_BTC','COINS_IN_ETH','COINS_IN_BNB']),ignore_
# loading data to sqllite DB
cursor0.execute("DROP TABLE subq_monthly_coin_counts")
join_adult_income_incrypto.to_sql('subq_monthly_coin_counts', conn)
#Commit the transaction
conn.commit()
```

[65]:

```
df2_table2.head()
```

[65]:

```
                  DATE TOT_GROSS_PURCHASE  COINS_IN_BTC  COINS_IN_ETH  \
0  2021-10-01 00:00:00          185566.83      0.963219      8.742306
1  2021-09-01 00:00:00          217636.41      1.129682     10.253148
2  2021-08-01 00:00:00          175168.36      0.909244      8.252420
3  2021-07-01 00:00:00          125896.68      0.653490      5.931164
4  2021-06-01 00:00:00          170188.95      0.883398      8.017833

   COINS_IN_BNB
0     31.957636
1     37.480541
2     30.166849
3     21.681462
4     29.309314
```

[66]:

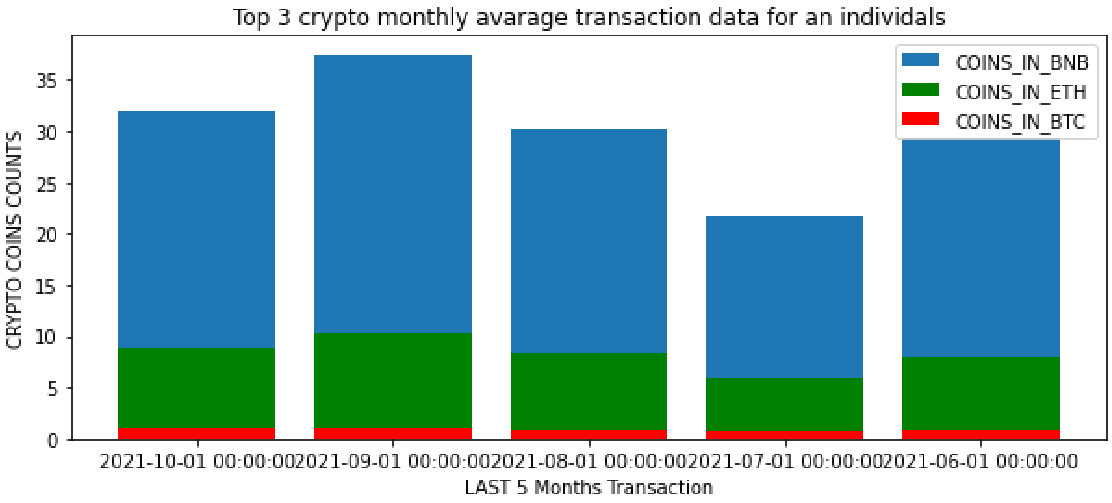
```
 # pull out records from  subq_monthly_coin_counts table
cursor6 = conn.execute('select * from subq_monthly_coin_counts limit 1')
#fetch all rows by using cursor
rows6 = cursor6.fetchall()
# dsiplay query records
```

```
rows6
```

```
[66]: [(0,
        39,
        'State-gov',
        'Bachelors',
        13,
        'Not-in-family',
        'Male',
        2174,
        'BTC',
        1,
        57795.820848495045,
        0.0376151764623066)]
```

Visualizing Data

```
[67]: # Bar char visualization - visualizing data by using subq_monthly_coin_counts.␣
       ↪(realtime_cripto_rate & monthly_cripto_transaction table)
      import matplotlib.pyplot as plt
      # selecting the transaction data for last 5 mounths
      df3_table2 = df2_table2.head()
      plt.rcParams['figure.figsize'] = [10, 4]
      plt.bar(df3_table2.DATE,df3_table2.COINS_IN_BNB, label="COINS_IN_BNB")
      plt.bar(df3_table2.DATE,df3_table2.COINS_IN_ETH, label="COINS_IN_ETH",␣
       ↪color='g')
      plt.bar(df3_table2.DATE,df3_table2.COINS_IN_BTC, label="COINS_IN_BTC",␣
       ↪color='r')
      plt.legend()
      plt.xlabel('LAST 5 Months Transaction')
      plt.ylabel('CRYPTO COINS COUNTS')
      plt.title('Top 3 crypto monthly avarage transaction data for an individals')
      plt.show()
```



[68]:

```
# aggregating the data  from join_adult_income_incrypto table to find out if␣
 ↪education level is contributting in crypto profitability
education_income_incrypto = pd.DataFrame()
cursor7 = conn.execute('select EDUCATION, count(CAPITAL_GAIN > 0)␣
 ↪CAPITAL_GAIN_CNT from join_adult_income_incrypto group by EDUCATION ')
#fetch all rows by using cursor
rows7 = cursor7.fetchall()
education_income_incrypto = education_income_incrypto.append(pd.
 ↪DataFrame(rows7, columns=['EDUCATION','CAPITAL_GAIN_CNT']),ignore_index=True)
```

[69]:

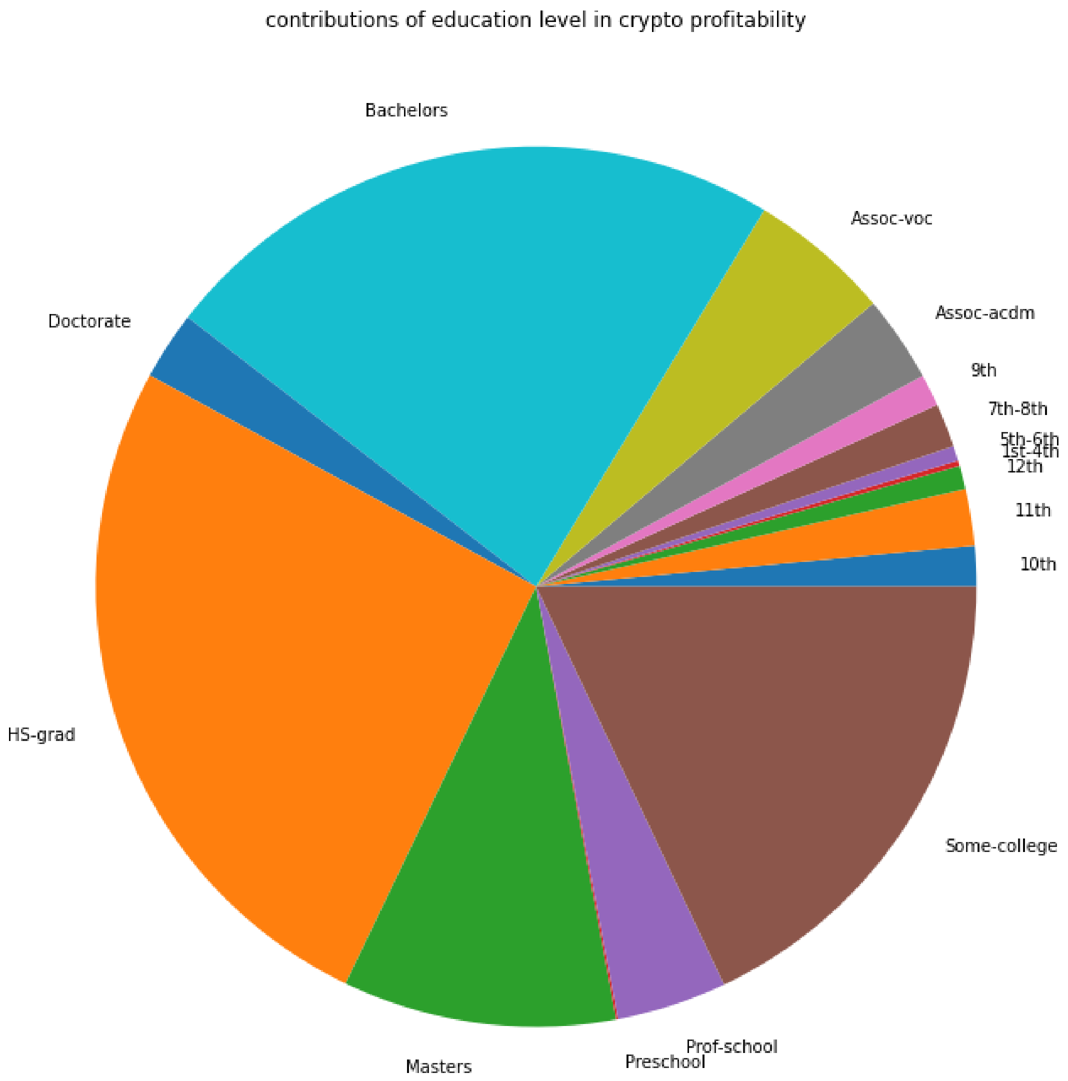
```
education_income_incrypto.head()
```

[69]:

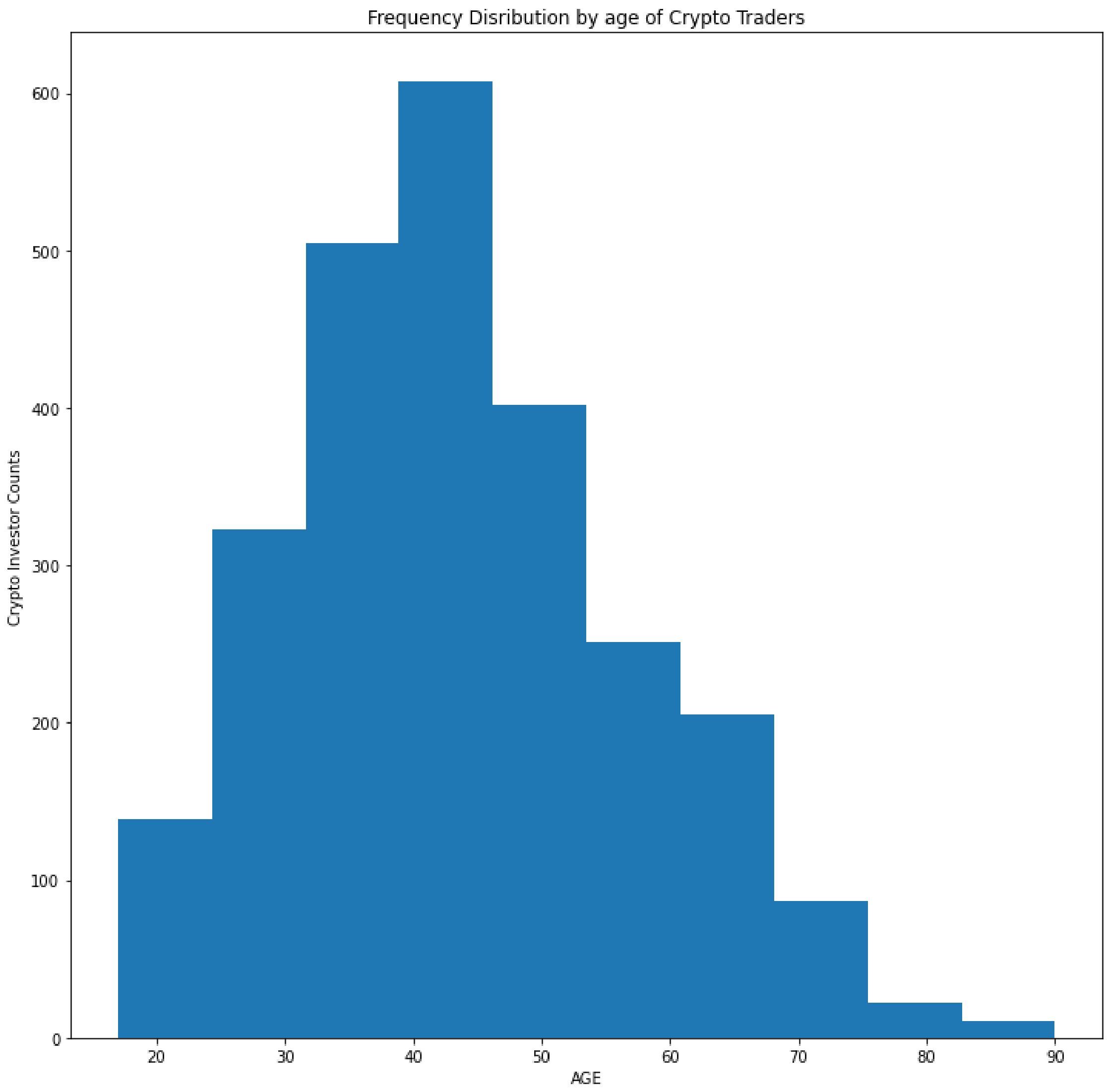
```
  EDUCATION  CAPITAL_GAIN_CNT
0      10th                38
1      11th                53
2      12th                22
3   1st-4th                 5
4   5th-6th                14
```

[70]:

```
# Pie Char Visualization to show the contributions of education level in crypto␣
 ↪profitability
import numpy as np
%matplotlib inline
plt.rcParams['figure.figsize'] = [12, 12]
y = np.array(education_income_incrypto.CAPITAL_GAIN_CNT)
mylabels = education_income_incrypto.EDUCATION
plt.pie(y, labels = mylabels)
plt.title('contributions of education level in crypto profitability')
plt.show()
```



[71]:
```python
# Histrogram Visualization to show the Frequency Disribution by age of Crypto Traders/investors
x = np.array(join_adult_income_incrypto.AGE)
plt.xlabel('AGE')
plt.ylabel('Crypto Investor Counts')
plt.title('Frequency Disribution by age of Crypto Traders')
plt.hist(x)
plt.show()
```



[72]:
```
# aggregating the data  from join_adult_income_incrypto table to find out the␣
↪distribution of different crypto currency amoung Males
sex_incrypto_male = pd.DataFrame()
cursor8 = conn.execute("select CRYPTO_SYMBOL, count(CRYPTO_SYMBOL)␣
↪CRYPTO_SYMBOL_CNT from join_adult_income_incrypto  where SEX = 'Male' group␣
↪by CRYPTO_SYMBOL")
#fetch all rows by using cursor
rows8 = cursor8.fetchall()
sex_incrypto_male = sex_incrypto_male.append(pd.DataFrame(rows8,␣
↪columns=['CRYPTO_SYMBOL','CRYPTO_SYMBOL_CNT']),ignore_index=True)
```

[73]:
```
sex_incrypto_male.head()
```

[73]:

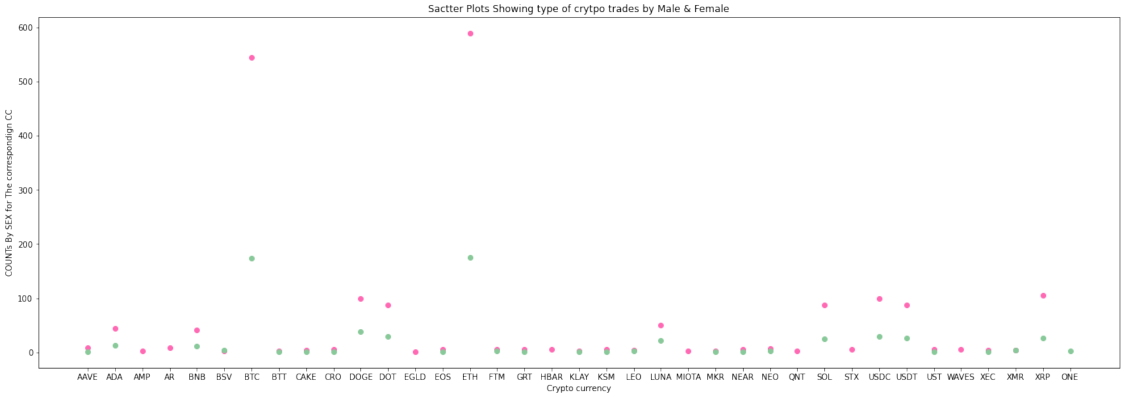
```
  CRYPTO_SYMBOL  CRYPTO_SYMBOL_CNT
0          AAVE                  8
1           ADA                 44
2           AMP                  3
3            AR                  8
4           BNB                 41
```

[74]:

```
# aggregating the data  from join_adult_income_incrypto table to find out the␣
↪distribution of different crypto currency amoung females
sex_incrypto_female = pd.DataFrame()
cursor8 = conn.execute("select CRYPTO_SYMBOL, count(CRYPTO_SYMBOL)␣
↪CRYPTO_SYMBOL_CNT from join_adult_income_incrypto  where SEX = 'Female'␣
↪group by CRYPTO_SYMBOL")
#fetch all rows by using cursor
rows8 = cursor8.fetchall()
sex_incrypto_female = sex_incrypto_female.append(pd.DataFrame(rows8,␣
↪columns=['CRYPTO_SYMBOL','CRYPTO_SYMBOL_CNT']),ignore_index=True)
```

[75]:

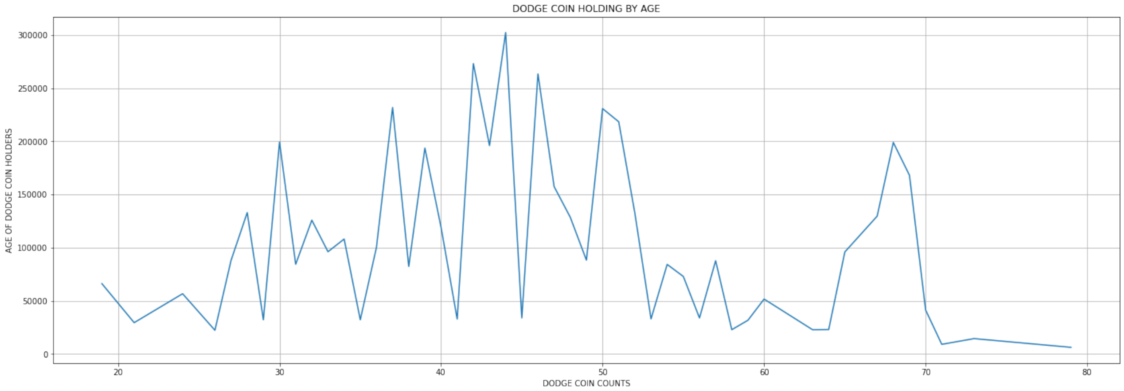
```
# Sactter Plots Showing type of crytpo trades by Male & Female
plt.rcParams['figure.figsize'] = [24, 8]
x = np.array(sex_incrypto_male.CRYPTO_SYMBOL)
y = np.array(sex_incrypto_male.CRYPTO_SYMBOL_CNT)
plt.scatter(x, y, color = 'hotpink')

x = np.array(sex_incrypto_female.CRYPTO_SYMBOL)
y = np.array(sex_incrypto_female.CRYPTO_SYMBOL_CNT)
plt.scatter(x, y, color = '#88c999')

plt.xlabel('Crypto currency')
plt.ylabel('COUNTs By SEX for The correspondign CC')
plt.title('Sactter Plots Showing type of crytpo trades by Male & Female')

plt.show()
```



```
[76]: # aggregating the data  from join_adult_income_incrypto table to find out the␣
       ↪DOGDE coin holding by age
      DOGE_COIN_HOLDER_BY_AGE = pd.DataFrame()
      cursor9 = conn.execute("select AGE, SUM(GAIN_IN_CRYPTO) DOGE_COIN_CNT from␣
       ↪join_adult_income_incrypto  where CRYPTO_SYMBOL = 'DOGE' group by AGE")
      #fetch all rows by using cursor
      rows9 = cursor9.fetchall()
      DOGE_COIN_HOLDER_BY_AGE = DOGE_COIN_HOLDER_BY_AGE.append(pd.DataFrame(rows9,␣
       ↪columns=['AGE','DOGE_COIN_CNT']),ignore_index=True)
      DOGE_COIN_HOLDER_BY_AGE.head()
```

```
[76]:    AGE  DOGE_COIN_CNT
      0   19   66186.686849
      1   21   29436.863786
      2   24   56653.407406
      3   26   22286.904204
      4   27   88072.699912
```

```
[77]: # Grid Lines visualization to show the distribution of DODGE coin by Age
      x = np.array(DOGE_COIN_HOLDER_BY_AGE.AGE)
      y = np.array(DOGE_COIN_HOLDER_BY_AGE.DOGE_COIN_CNT)
      plt.title("DODGE COIN HOLDING BY AGE")
      plt.xlabel("DODGE COIN COUNTS")
      plt.ylabel("AGE OF DODGE COIN HOLDERS")
      plt.plot(x, y)
      plt.grid()

      plt.show()
```



```
[ ]:
```