Question 1

(I cannot use height to load the block, so I use hash to load the block data in this question)

1.1

The ‘txcount’ is how many transactions is this block

The ‘time’ is this block’s timestamp, but it required some transfer to human readable

The ‘totalFees’ is the amount of transfer fees in this block

The ‘confirmations’ is the number of transfer confirmation in this block, high-value transaction may require more

The ‘miner’ is the name of this block’s miner that try to create block to record the transaction and add into block chain

Question 2

2.3

The correlation between rbt and rgt is 0.2424

The correlation between rbt and rmt is 0.1968

From the correlation calculation, the Bitcoin return and Gold return have positive correlation, this means that Bitcoin is an alternative to gold. In addition, Bitcoin is also had positive correlation with market risk, this means that Bitcoin is sensitive in market risk trend. Therefore, Bitcoin has the high-return like gold and high-risk like market risk.

The α and β of Bitcoin is 0.064 and 0.95, of Gold is 0.006 and -0.0065.

The β of Bitcoin shows that Bitcoin has a similar risk like market risk, and the return of Bitcoin trend is like the market return trend. And the Gold has low risk and it may not be influenced by market trend.

**Appendix**

Jupyter code

**Question 1**

import json

import requests

answer\_1 = requests.get("https://api.whatsonchain.com/v1/bsv/main/block/hash/000000000000000005079c082bc1e80e90544ffb806c7b11a96d372a7a957d9f")

block\_1 = json.loads(answer\_1.text)

print(block\_1['txcount'])

print(block\_1['time'])

print(block\_1['totalFees'])

print(block\_1['confirmations'])

print(block\_1['miner'])

import datetime

timestamp\_1 = datetime.datetime.fromtimestamp(block\_1['time'])

print(timestamp\_1.strftime('%Y-%m-%d %H:%M:%S'))

answer\_2 = requests.get("https://api.whatsonchain.com/v1/bsv/main/block/hash/00000000d1145790a8694403d4063f323d499e655c83426834d4ce2f8dd4a2ee")

block\_2 = json.loads(answer\_2.text)

print(block\_2['time'])

timestamp\_2 = datetime.datetime.fromtimestamp(block\_2['time'])

print(timestamp\_2.strftime('%Y-%m-%d %H:%M:%S'))

answer\_3 = requests.get("https://api.whatsonchain.com/v1/bsv/main/block/hash/00000000152340ca42227603908689183edc47355204e7aca59383b0aaac1fd8")

block\_3 = json.loads(answer\_3.text)

print(block\_3['time'])

timestamp\_3 = datetime.datetime.fromtimestamp(block\_3['time'])

print(timestamp\_3.strftime('%Y-%m-%d %H:%M:%S'))

**Question 2**

import pandas as pd

from fredapi import Fred

fred = Fred(api\_key='ba62defdd2d357a1a45f8e2f0d70816a')

bitcoinprice = fred.get\_series('CBBTCUSD')

goldprice = fred.get\_series('ID7108')

market = fred.get\_series('SP500')

riskfreerate = fred.get\_series('TB3MS')

df = pd.concat([bitcoinprice,goldprice,market,riskfreerate], axis=1)

df.columns = ('bitcoinprice','goldprice','market','riskfreerate')

df.to\_csv('q2\_analysis.csv')

df= df.loc['2016-1':'2021-4']

df.to\_csv('q2\_analysis.csv')

df = df.fillna(method='ffill')

df.to\_csv('q2\_analysis.csv')

df = df[df.index.day==1]

import numpy as np

df['bitcoinpriceT-1'] = df['bitcoinprice'].shift(1)

df['(log\_bitcoinprice/bitcoinpricet-1)']=np.log(df['bitcoinprice']/df['bitcoinprice'].shift(1))

df['(log\_goldprice/goldprice-1)']=np.log(df['goldprice']/df['goldprice'].shift(1))

df['(log\_market/market-1)']=np.log(df['market']/df['market'].shift(1))

df['riskfreerate/1200']=df['riskfreerate']/1200

df=df.drop(df.index[0])

rbt=df['(log\_bitcoinprice/bitcoinpricet-1)']

rgt=df['(log\_goldprice/goldprice-1)']

rmt=df['(log\_market/market-1)']

rft=df['riskfreerate/1200']

rbt\_rgt\_correl=rbt.corr(rgt)

rbt\_rmt\_correl=rbt.corr(rmt)

rbt\_rgt\_correl

rbt\_rmt\_correl

y1=rbt-rft

y2=rgt-rft

x=rmt-rft

from sklearn.linear\_model import LinearRegression

y1 = y1.values.reshape(-1,1)

y2 = y2.values.reshape(-1,1)

x = x.values.reshape(-1,1)

Ir = LinearRegression()

Ir.fit(x,y1)

print(Ir.intercept\_,Ir.coef\_)

Ir.fit(x,y2)

print(Ir.intercept\_,Ir.coef\_)