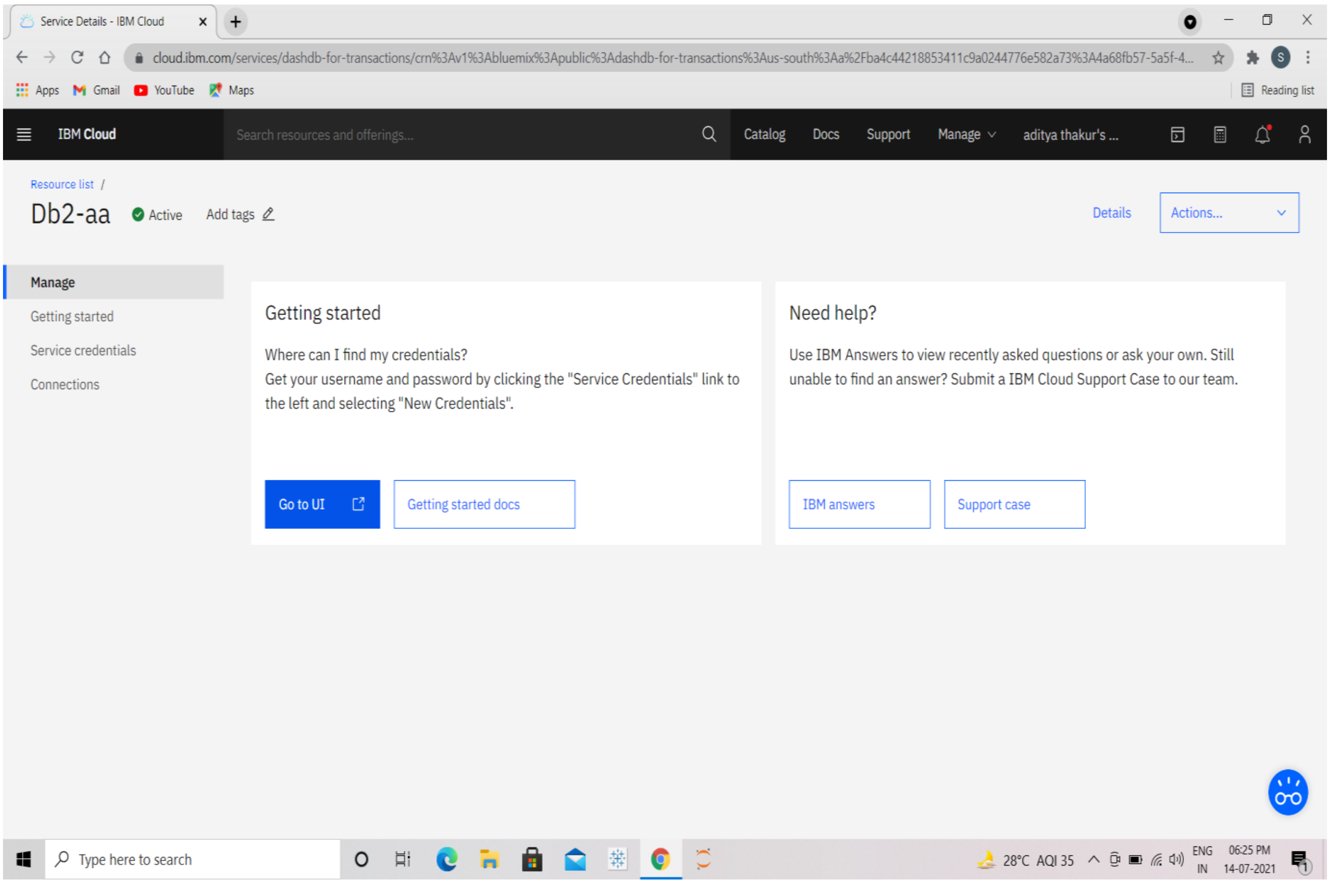
Crime Analysis using SQL with Python

Introduction

In this project I am going to analysis the crime case with help of the sql inside python and IBM cloud as the data server .

Data Preprocessing

Downloaded the 3-csv file of Chicago (crime, public and school) data for the analysis. Next step involves uploading the data in the db2. For the uploading purpose I prefer the IBM cloud as its interface is really easy to handle with the db2 . I used the magic Sql command to perform the analysis.



Getting started

Where can I find my credentials?
Get your username and password by clicking the "Service Credentials" link to the left and selecting "New Credentials".

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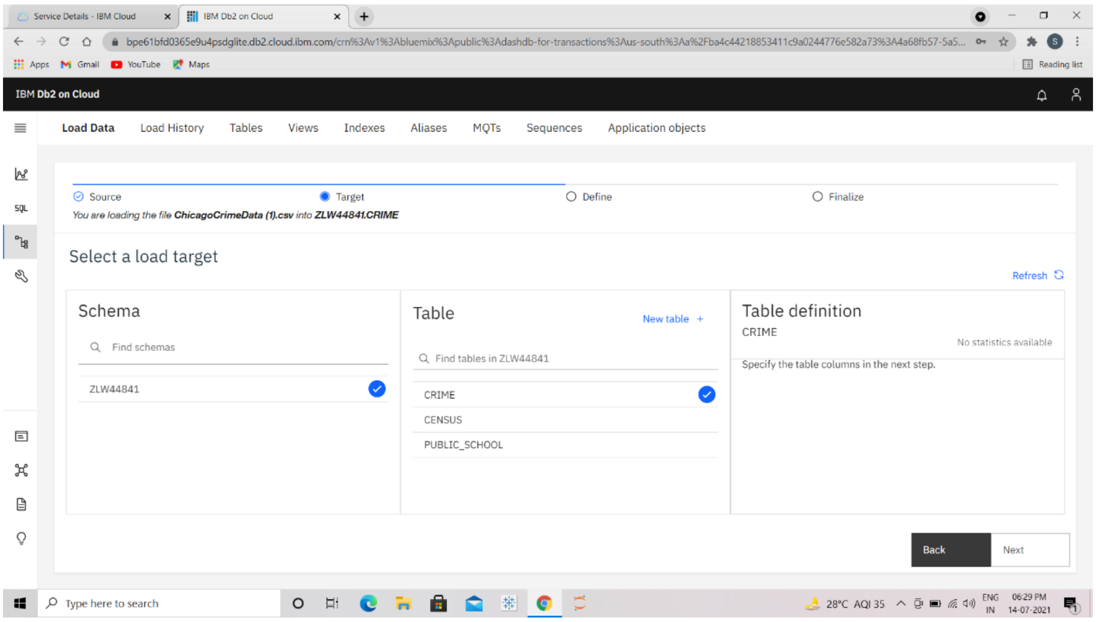
while uploading the data I need to create the schema , table name with its definition along with table then to upload the data .



You are loading the file **ChicagoCrimeData (1).csv** into **ZLW44841.CRIME**

Select a load target

Schema

Find schemas

ZLW44841 ✓

Table

Find tables in ZLW44841

CRIME ✓

CENSUS

PUBLIC_SCHOOL

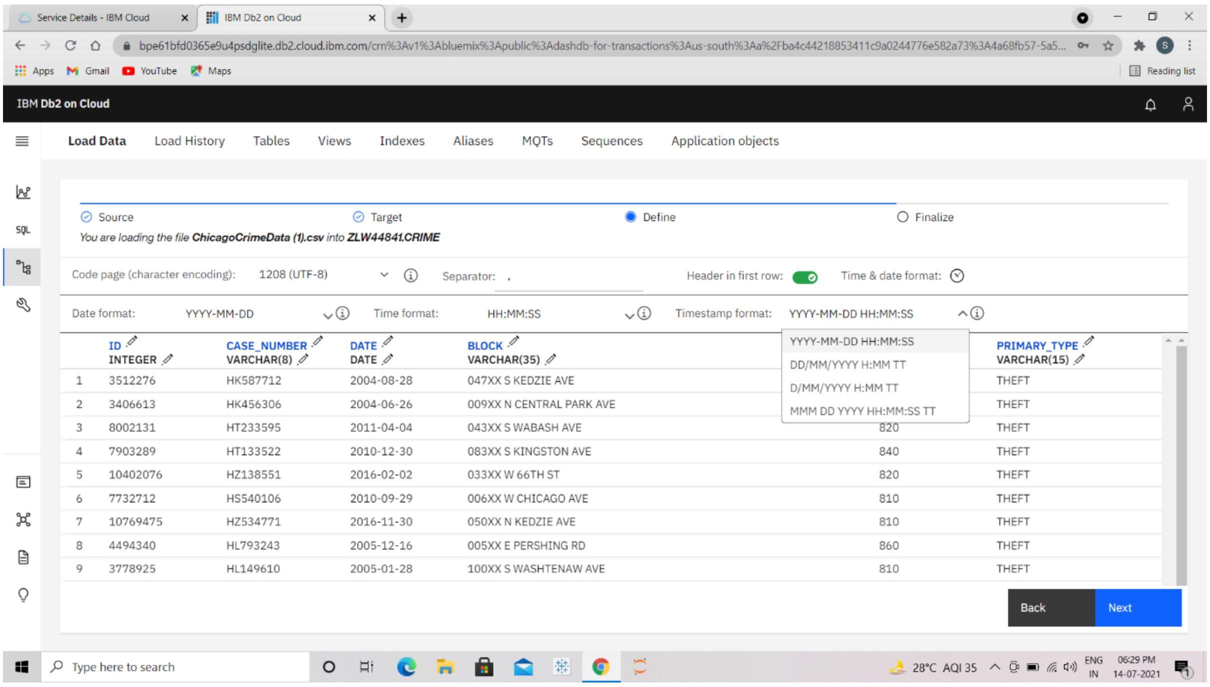
Table definition

CRIME

No statistics available

Specify the table columns in the next step.

After this inside the preview option I have managed to managed to do change the time format , along with including headers, and even changing the data type some time .



You are loading the file **ChicagoCrimeData (1).csv** into **ZLW44841.CRIME**

Code page (character encoding): 1208 (UTF-8)

Separator: ,

Header in first row: ● (on)

Time & date format:

Date format: YYYY-MM-DD

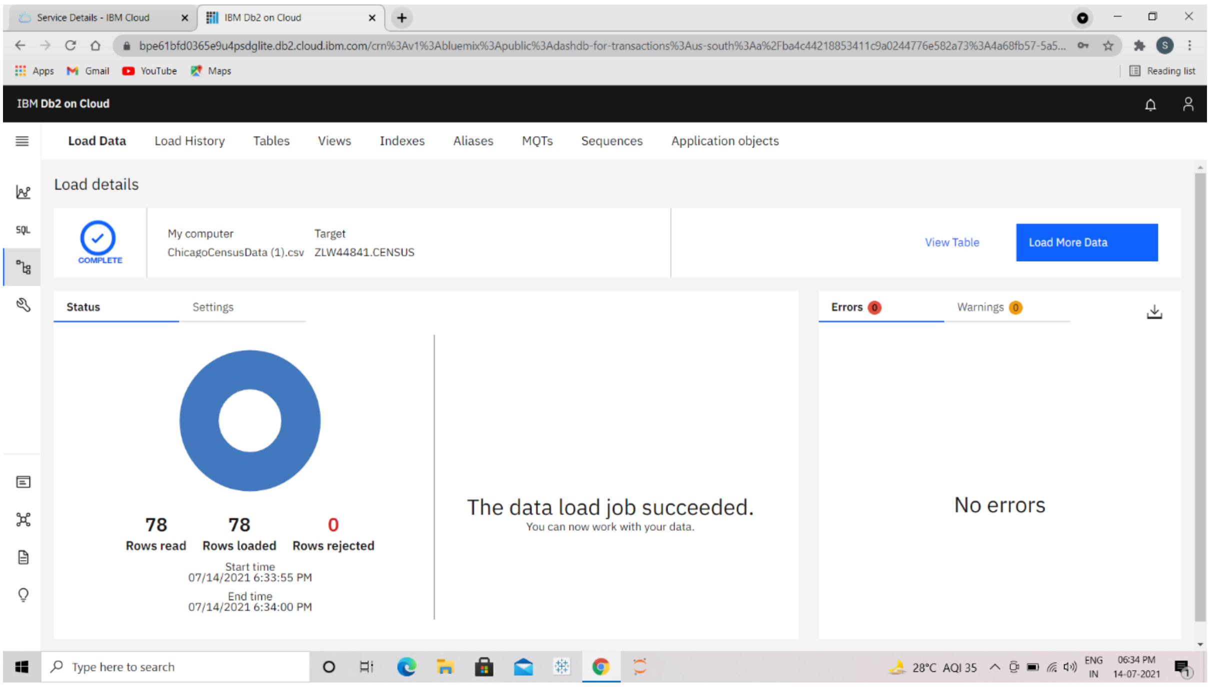
Time format: HH:MM:SS

Timestamp format: YYYY-MM-DD HH:MM:SS

YYYY-MM-DD HH:MM:SS
DD/MM/YYYY H:MM TT
D/MM/YYYY H:MM TT
MMM DD YYYY HH:MM:SS TT

	ID INTEGER	CASE_NUMBER VARCHAR(8)	DATE DATE	BLOCK VARCHAR(35)		PRIMARY_TYPE VARCHAR(15)
1	3512276	HK587712	2004-08-28	047XX S KEDZIE AVE		THEFT
2	3406613	HK456306	2004-06-26	009XX N CENTRAL PARK AVE		THEFT
3	8002131	HT233595	2011-04-04	043XX S WABASH AVE	820	THEFT
4	7903289	HT133522	2010-12-30	083XX S KINGSTON AVE	840	THEFT
5	10402076	HZ138551	2016-02-02	033XX W 66TH ST	820	THEFT
6	7732712	HS540106	2010-09-29	006XX W CHICAGO AVE	810	THEFT
7	10769475	HZ534771	2016-11-30	050XX N KEDZIE AVE	810	THEFT
8	4494340	HL793243	2005-12-16	005XX E PERSHING RD	860	THEFT
9	3778925	HL149610	2005-01-28	100XX S WASHTENAW AVE	810	THEFT

Later on uploaded the data set with no warning or error. To move on the further analysis .



Load details

My computer	Target
ChicagoCensusData (1).csv	ZLW44841.CENSUS

78	78	0
Rows read	Rows loaded	Rows rejected

Start time
07/14/2021 6:33:55 PM

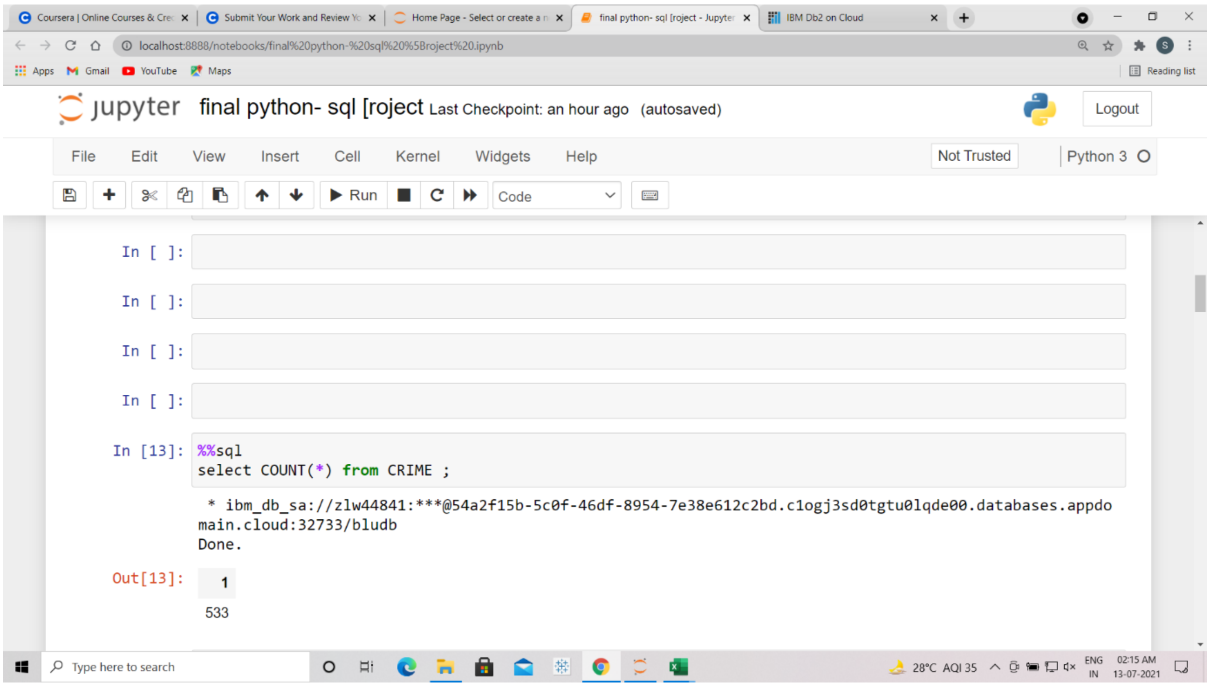
End time
07/14/2021 6:34:00 PM

The data load job succeeded.
You can now work with your data.

No errors

Analysis:

1) Find the total number of crime recorded in the crime table ?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```
In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [13]: %%sql
         select COUNT(*) from CRIME ;

          * ibm_db_sa://zlw44841:***@54a2f15b-5c0f-46df-8954-7e38e612c2bd.c1ogj3sd0tgtu0lqde00.databases.appdo
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         Done.

Out[13]:   1
         533
```
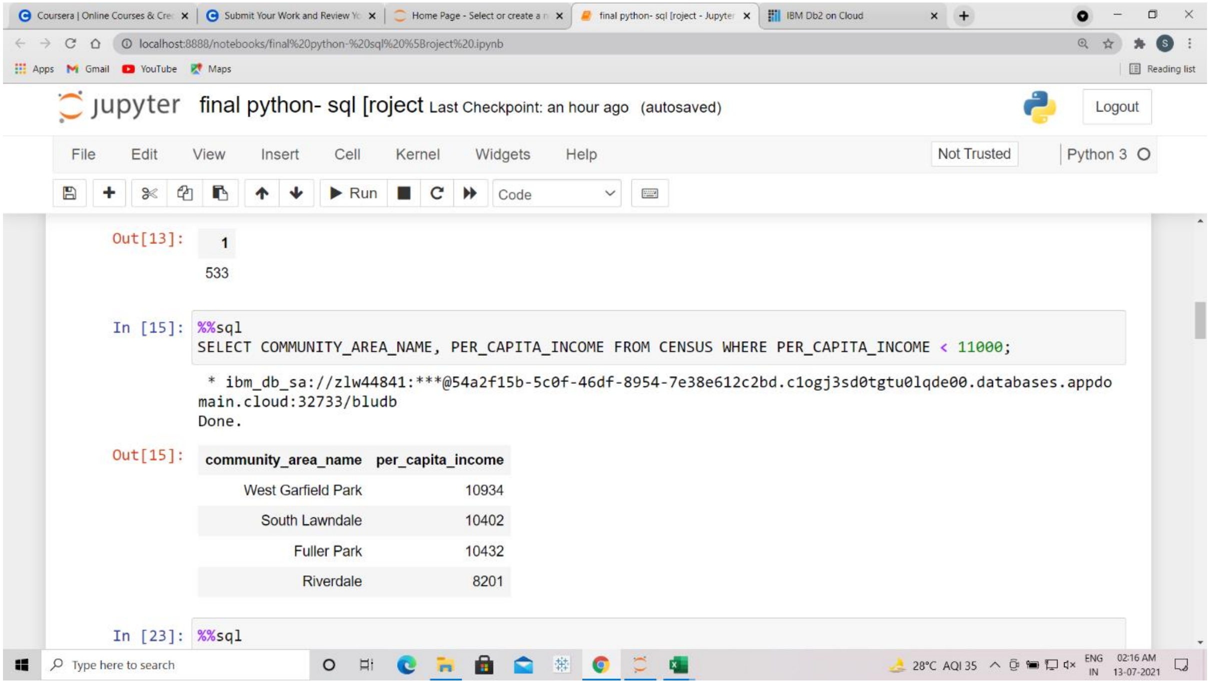

2) List the community area with per capita income less than 11000?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Out[13]:

1
533

In [15]:

```
%%sql
SELECT COMMUNITY_AREA_NAME, PER_CAPITA_INCOME FROM CENSUS WHERE PER_CAPITA_INCOME < 11000;
```

```
 * ibm_db_sa://zlw44841:***@54a2f15b-5c0f-46df-8954-7e38e612c2bd.c1ogj3sd0tgtu0lqde00.databases.appdo
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Done.
```

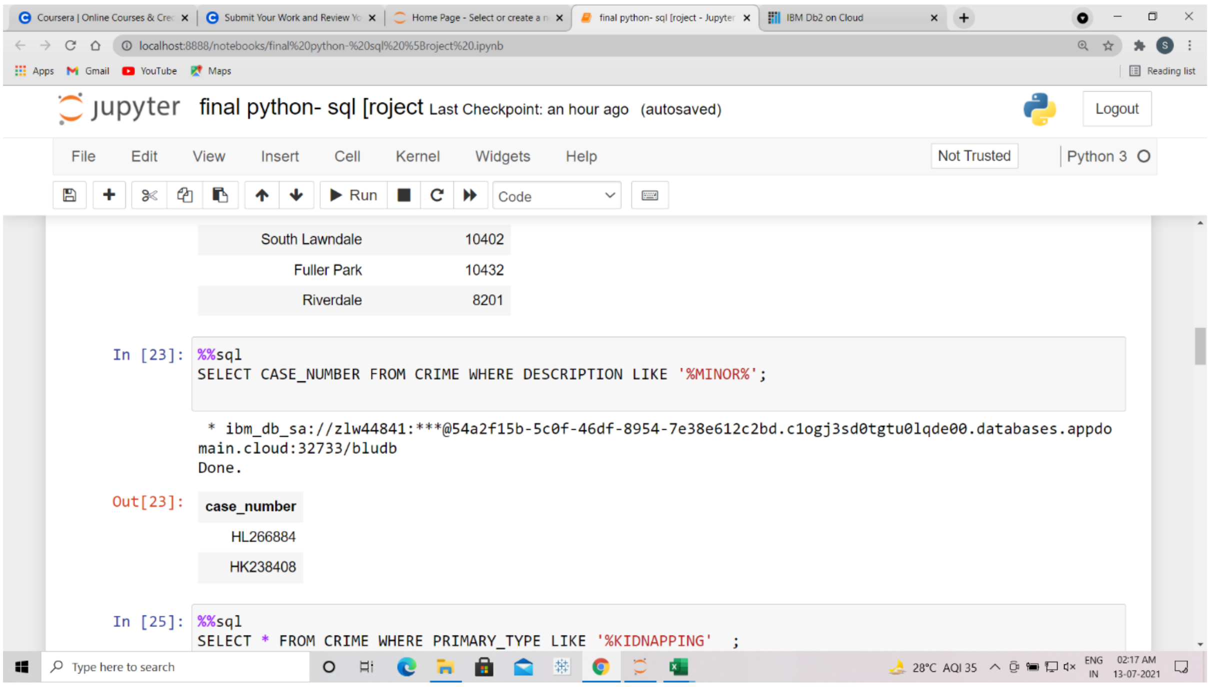
Out[15]:

community_area_name	per_capita_income
West Garfield Park	10934
South Lawndale	10402
Fuller Park	10432
Riverdale	8201

In [23]:

```
%%sql
```

3) List all case numbers for crimes involving minors? (children are not considered minors for the purposes of crime analysis)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South Lawndale	10402
Fuller Park	10432
Riverdale	8201

In [23]:

```
%%sql
SELECT CASE_NUMBER FROM CRIME WHERE DESCRIPTION LIKE '%MINOR%';
```

```
 * ibm_db_sa://zlw44841:***@54a2f15b-5c0f-46df-8954-7e38e612c2bd.c1ogj3sd0tgtu0lqde00.databases.appdo
main.cloud:32733/bludb
Done.
```

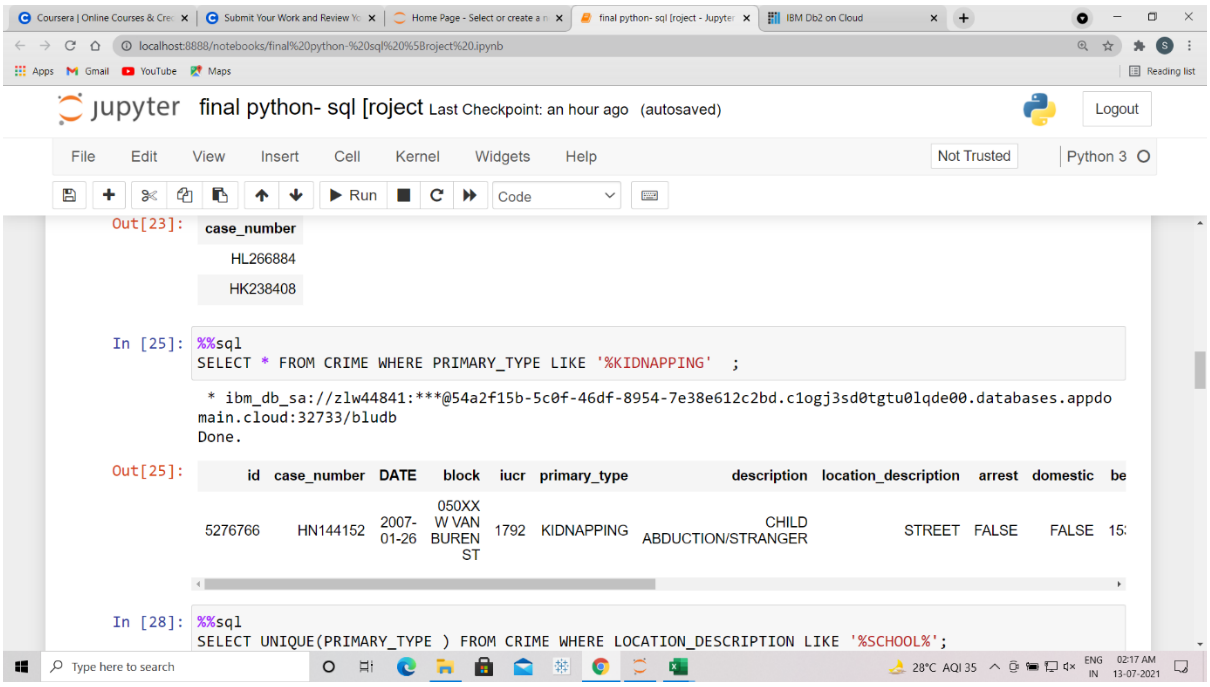
Out[23]:

case_number
HL266884
HK238408

In [25]:

```
%%sql
SELECT * FROM CRIME WHERE PRIMARY_TYPE LIKE '%KIDNAPPING'  ;
```

4) List all kidnapping crimes involving a child?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Out[23]:

case_number
HL266884
HK238408

```
In [25]: %%sql
SELECT * FROM CRIME WHERE PRIMARY_TYPE LIKE '%KIDNAPPING'  ;
```

```
 * ibm_db_sa://zlw44841:***@54a2f15b-5c0f-46df-8954-7e38e612c2bd.c1ogj3sd0tgtu0lqde00.databases.appdo
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Done.
```
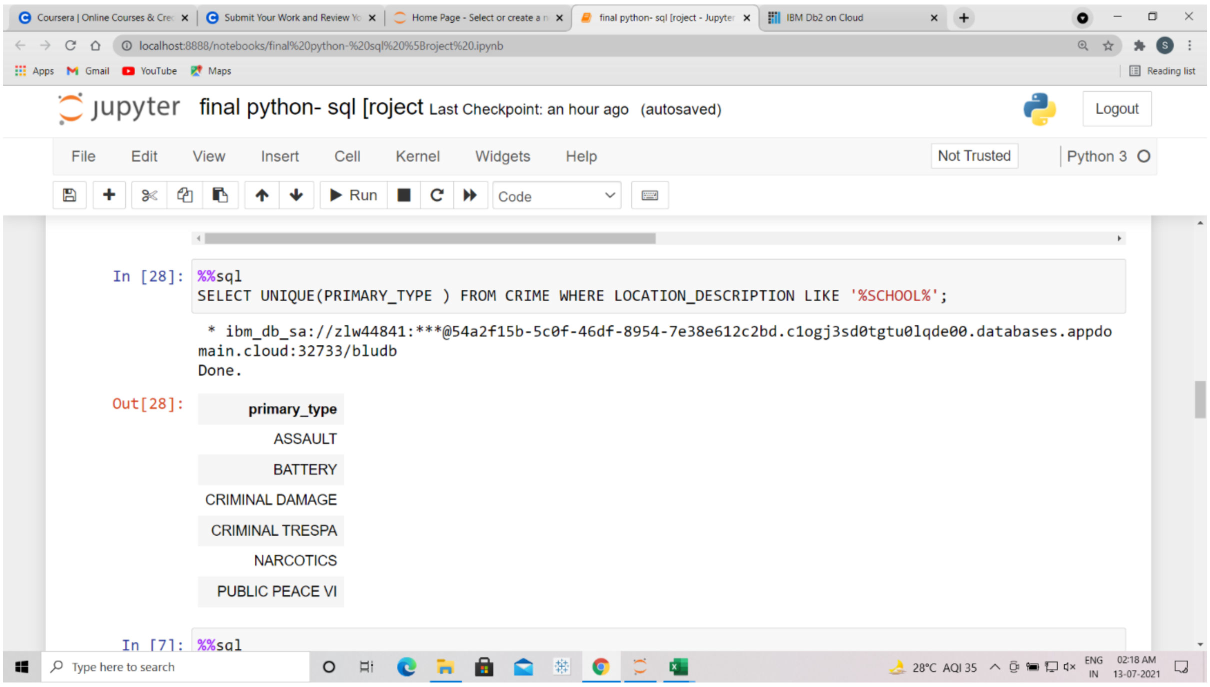

Out[25]:

id	case_number	DATE	block	iucr	primary_type	description	location_description	arrest	domestic	be
5276766	HN144152	2007-01-26	050XX W VAN BUREN ST	1792	KIDNAPPING	CHILD ABDUCTION/STRANGER	STREET	FALSE	FALSE	15:

```
In [28]: %%sql
SELECT UNIQUE(PRIMARY_TYPE ) FROM CRIME WHERE LOCATION_DESCRIPTION LIKE '%SCHOOL%';
```

5) What kind of crimes were recorded at schools?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```
In [28]: %%sql
SELECT UNIQUE(PRIMARY_TYPE ) FROM CRIME WHERE LOCATION_DESCRIPTION LIKE '%SCHOOL%';
```

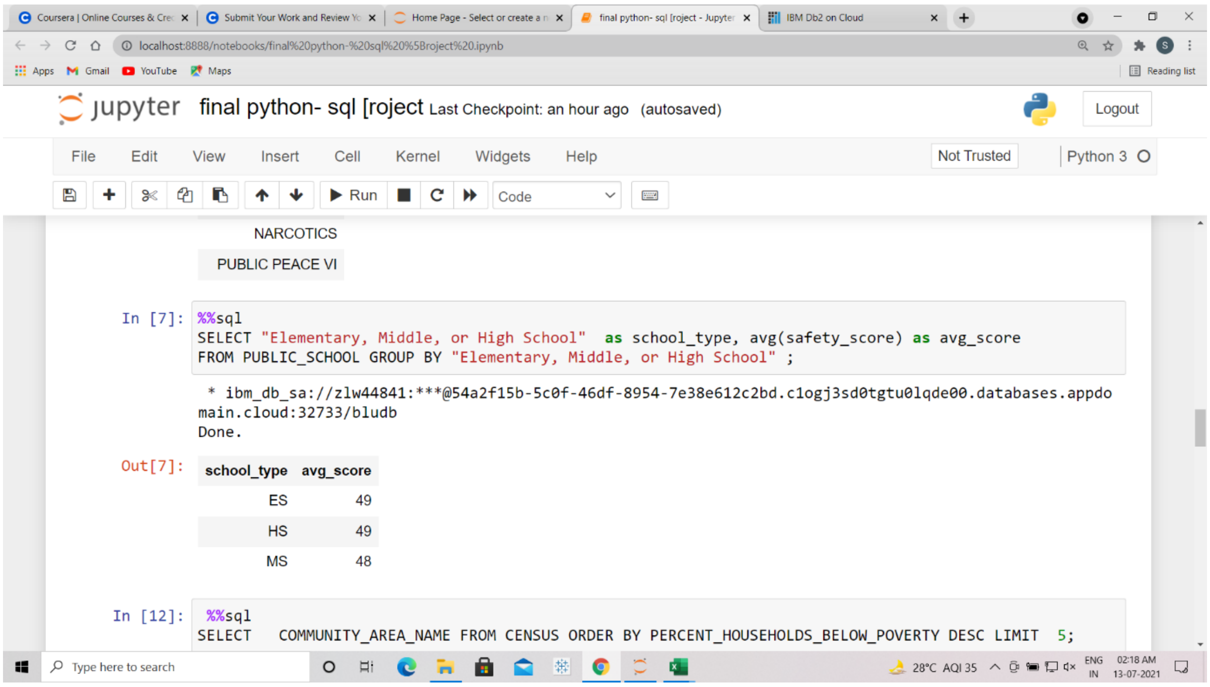
```
 * ibm_db_sa://zlw44841:***@54a2f15b-5c0f-46df-8954-7e38e612c2bd.c1ogj3sd0tgtu0lqde00.databases.appdo
main.cloud:32733/bludb
Done.
```

Out[28]:

primary_type
ASSAULT
BATTERY
CRIMINAL DAMAGE
CRIMINAL TRESPA
NARCOTICS
PUBLIC PEACE VI

```
In [7]: %%sql
```

6) List the average safety score for all types of schools?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NARCOTICS

PUBLIC PEACE VI

In [7]:
```
%%sql
SELECT "Elementary, Middle, or High School"  as school_type, avg(safety_score) as avg_score
FROM PUBLIC_SCHOOL GROUP BY "Elementary, Middle, or High School" ;
```

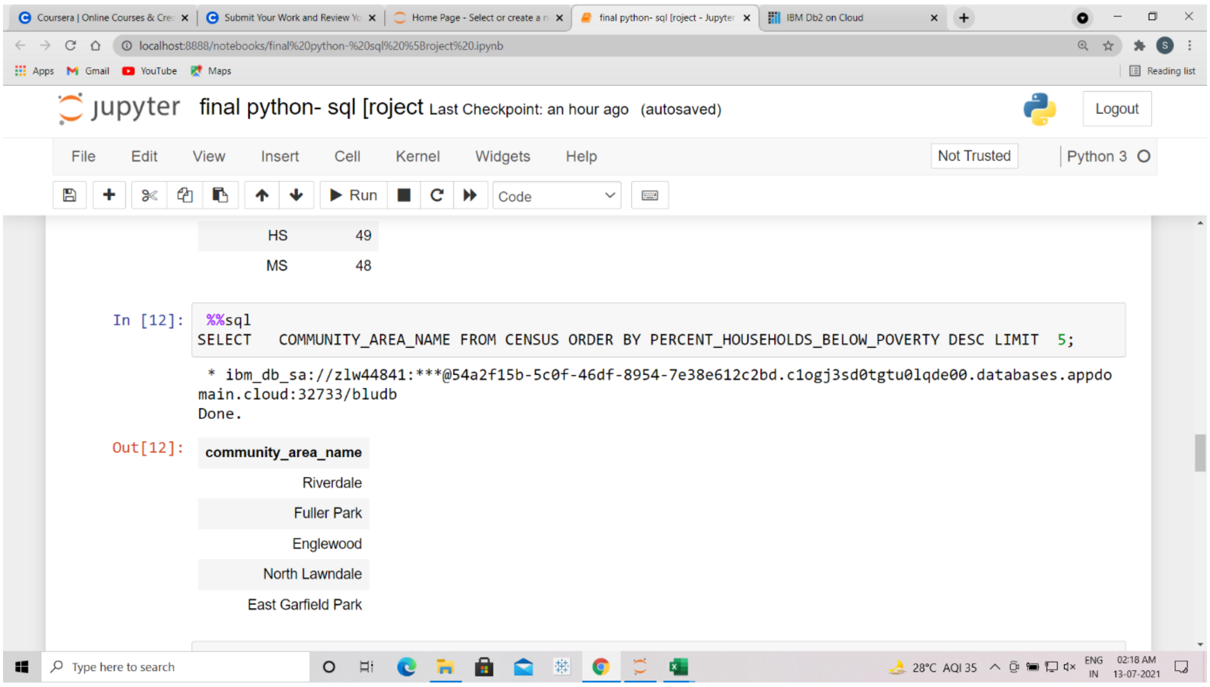
```
 * ibm_db_sa://zlw44841:***@54a2f15b-5c0f-46df-8954-7e38e612c2bd.c1ogj3sd0tgtu0lqde00.databases.appdo
main.cloud:32733/bludb
Done.
```

Out[7]:

school_type	avg_score
ES	49
HS	49
MS	48

In [12]:
```
%%sql
SELECT   COMMUNITY_AREA_NAME FROM CENSUS ORDER BY PERCENT_HOUSEHOLDS_BELOW_POVERTY DESC LIMIT  5;
```

7) List 5 community areas with highest % of households below poverty line?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HS	49
MS	48

In [12]:
```
%%sql
SELECT   COMMUNITY_AREA_NAME FROM CENSUS ORDER BY PERCENT_HOUSEHOLDS_BELOW_POVERTY DESC LIMIT  5;
```

```
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Done.
```
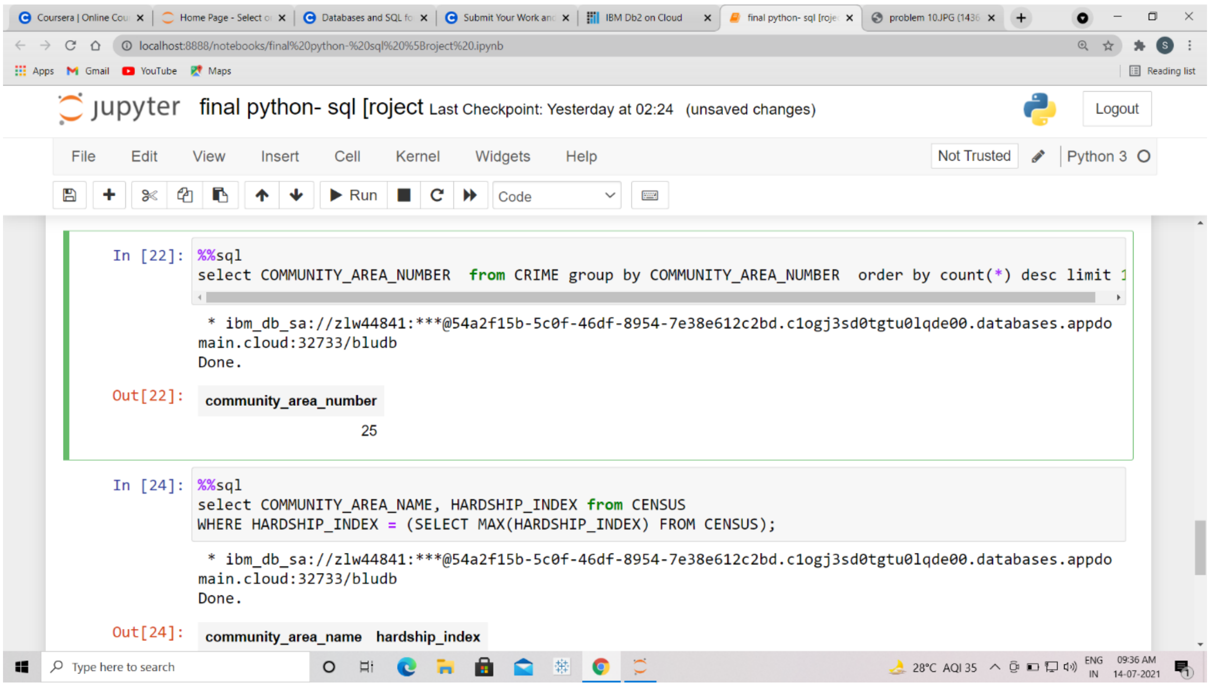

Out[12]:

community_area_name
Riverdale
Fuller Park
Englewood
North Lawndale
East Garfield Park

8) Which community area(number) is most crime prone?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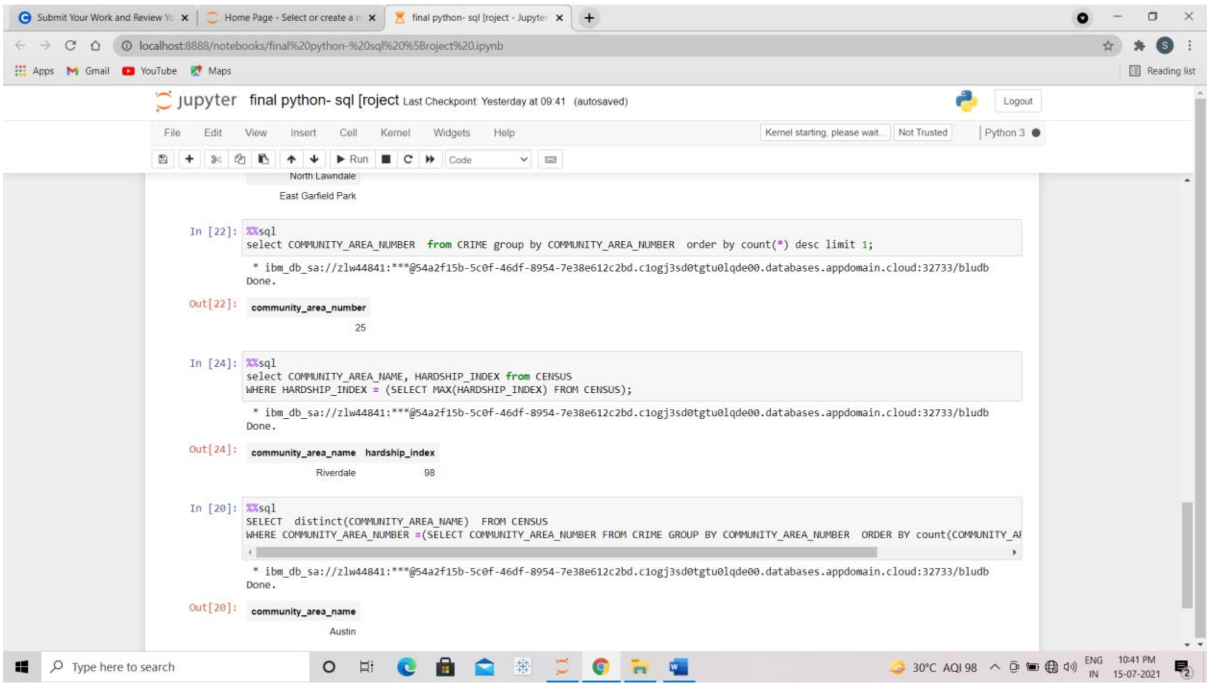
```
In [22]: %%sql
         select COMMUNITY_AREA_NUMBER  from CRIME group by COMMUNITY_AREA_NUMBER  order by count(*) desc limit 1

          * ibm_db_sa://zlw44841:***@54a2f15b-5c0f-46df-8954-7e38e612c2bd.c1ogj3sd0tgtu0lqde00.databases.appdo
         main.cloud:32733/bludb
         Done.

Out[22]: community_area_number
                            25

In [24]: %%sql
         select COMMUNITY_AREA_NAME, HARDSHIP_INDEX from CENSUS
         WHERE HARDSHIP_INDEX = (SELECT MAX(HARDSHIP_INDEX) FROM CENSUS);

          * ibm_db_sa://zlw44841:***@54a2f15b-5c0f-46df-8954-7e38e612c2bd.c1ogj3sd0tgtu0lqde00.databases.appdo
         main.cloud:32733/bludb
         Done.

Out[24]: community_area_name  hardship_index
```

9) Use a sub-query to find the name of the community area with highest hardship index?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Python 3
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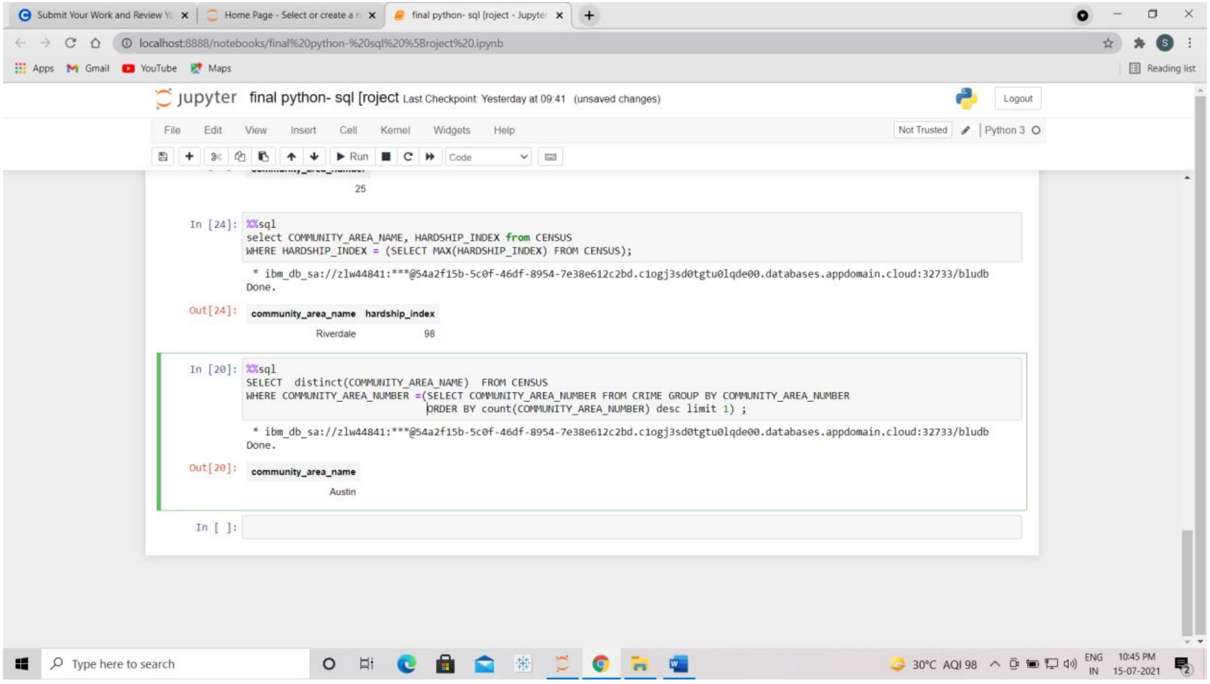
```
             North Lawndale
           East Garfield Park

In [22]: %%sql
         select COMMUNITY_AREA_NUMBER  from CRIME group by COMMUNITY_AREA_NUMBER  order by count(*) desc limit 1;

          * ibm_db_sa://zlw44841:***@54a2f15b-5c0f-46df-8954-7e38e612c2bd.c1ogj3sd0tgtu0lqde00.databases.appdomain.cloud:32733/bludb
         Done.

Out[22]: community_area_number
                            25

In [24]: %%sql
         select COMMUNITY_AREA_NAME, HARDSHIP_INDEX from CENSUS
         WHERE HARDSHIP_INDEX = (SELECT MAX(HARDSHIP_INDEX) FROM CENSUS);

          * ibm_db_sa://zlw44841:***@54a2f15b-5c0f-46df-8954-7e38e612c2bd.c1ogj3sd0tgtu0lqde00.databases.appdomain.cloud:32733/bludb
         Done.

Out[24]: community_area_name  hardship_index
                   Riverdale              98

In [20]: %%sql
         SELECT  distinct(COMMUNITY_AREA_NAME)  FROM CENSUS
         WHERE COMMUNITY_AREA_NUMBER =(SELECT COMMUNITY_AREA_NUMBER FROM CRIME GROUP BY COMMUNITY_AREA_NUMBER  ORDER BY count(COMMUNITY_AI

          * ibm_db_sa://zlw44841:***@54a2f15b-5c0f-46df-8954-7e38e612c2bd.c1ogj3sd0tgtu0lqde00.databases.appdomain.cloud:32733/bludb
         Done.

Out[20]: community_area_name
                      Austin
```

10) **Use a sub-query to determine the Community Area Name with most number of crimes?**



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```
25

In [24]: %%sql
         select COMMUNITY_AREA_NAME, HARDSHIP_INDEX from CENSUS
         WHERE HARDSHIP_INDEX = (SELECT MAX(HARDSHIP_INDEX) FROM CENSUS);

          * ibm_db_sa://zlw44841:***@54a2f15b-5c0f-46df-8954-7e38e612c2bd.c1ogj3sd0tgtu0lqde00.databases.appdomain.cloud:32733/bludb
         Done.

Out[24]: community_area_name  hardship_index
                   Riverdale              98

In [20]: %%sql
         SELECT  distinct(COMMUNITY_AREA_NAME)  FROM CENSUS
         WHERE COMMUNITY_AREA_NUMBER =(SELECT COMMUNITY_AREA_NUMBER FROM CRIME GROUP BY COMMUNITY_AREA_NUMBER
                                      ORDER BY count(COMMUNITY_AREA_NUMBER) desc limit 1) ;

          * ibm_db_sa://zlw44841:***@54a2f15b-5c0f-46df-8954-7e38e612c2bd.c1ogj3sd0tgtu0lqde00.databases.appdomain.cloud:32733/bludb
         Done.

Out[20]: community_area_name
                      Austin

In [ ]:
```

Acknowledge:

I would like to thank of YouTube to help me wherever I stuck and IBM too.