

SQLDemoGit

June 24, 2019

1 Here is a quick run through of SQL using Python!

```
In [2]: %load_ext sql
```

```
In [3]: # Remember the connection string is of the format:
        # %sql ibm_db_sa://my-username:my-password@my-hostname:my-port/my-db-name
        # My data is housed in Db2 on the Cloud database
        %sql ibm_db_sa: DELETED
```

```
Out[3]: 'Connected: pfv38745@BLUDB'
```

1.1 The total number of crimes recorded in the CRIME dataframe

We have two sets of data to dive into regarding Chicago Crime and Chicago Public Schools. The data used in this demonstration is not the whole dataset as that dataset is very large, in the millions. For the purpose of this demonstration, we only need a small section to display techniques.

```
In [4]: # Rows in Crime table
        %sql select count (*) from CHICAGO_CRIME_DATA;

* ibm_db_sa://pfv38745:***@dashdb-txn-sbox-yp-dal09-04.services.dal.ibm.com:50000/BLUDB
Done.
```

```
Out[4]: [(Decimal('533'),)]
```

1.1.1 Let's check the first 10 rows to get an understanding of our data

```
In [5]: %sql select * from CHICAGO_CRIME_DATA limit 10;

* ibm_db_sa://pfv38745:***@dashdb-txn-sbox-yp-dal09-04.services.dal.ibm.com:50000/BLUDB
Done.
```

```
Out[5]: [(3512276, 'HK587712', '08/28/2004 05:50:56 PM', '047XX S KEDZIE AVE', '890', 'THEFT', 'FROM BU
(3406613, 'HK456306', '06/26/2004 12:40:00 PM', '009XX N CENTRAL PARK AVE', '820', 'THEFT', '$5
(8002131, 'HT233595', '04/04/2011 05:45:00 AM', '043XX S WABASH AVE', '820', 'THEFT', '$500 AND
(7903289, 'HT133522', '12/30/2010 04:30:00 PM', '083XX S KINGSTON AVE', '840', 'THEFT', 'FINANC
(10402076, 'HZ138551', '02/02/2016 07:30:00 PM', '033XX W 66TH ST', '820', 'THEFT', '$500 AND UN
```

```
(7732712, 'HS540106', '09/29/2010 07:59:00 AM', '006XX W CHICAGO AVE', '810', 'THEFT', 'OVER $5000', '10769475, 'HZ534771', '11/30/2016 01:15:00 AM', '050XX N KEDZIE AVE', '810', 'THEFT', 'OVER $5000', '4494340, 'HL793243', '12/16/2005 04:45:00 PM', '005XX E PERSHING RD', '860', 'THEFT', 'RETAIL THEFT', '3778925, 'HL149610', '01/28/2005 05:00:00 PM', '100XX S WASHTENAW AVE', '810', 'THEFT', 'OVER $5000', '3324217, 'HK361551', '05/13/2004 02:15:00 PM', '033XX W BELMONT AVE', '820', 'THEFT', '$500 AND UNDER')
```

From our narrowed database, let's determine how many crimes resulted in an arrest

```
In [6]: %sql select count(*) from CHICAGO_CRIME_DATA where arrest=TRUE;
```

```
* ibm_db_sa://pfv38745:***@dashdb-txn-sbox-yp-dal09-04.services.dal.ibm.com:50000/BLUDB
Done.
```

```
Out[6]: [(Decimal('163'),)]
```

1.1.2 Now that we know how many crimes resulted in an arrest, let's see the specific types for specific locations! For example, at a residence and sidewalk!

```
In [7]: %sql select * from CHICAGO_CRIME_DATA where arrest=TRUE
```

```
* ibm_db_sa://pfv38745:***@dashdb-txn-sbox-yp-dal09-04.services.dal.ibm.com:50000/BLUDB
Done.
```

```
Out[7]: [(4494340, 'HL793243', '12/16/2005 04:45:00 PM', '005XX E PERSHING RD', '860', 'THEFT', 'RETAIL THEFT', '9902691, 'HX552797', '12/23/2014 02:15:00 PM', '076XX S CICERO AVE', '860', 'THEFT', 'RETAIL THEFT', '6866556, 'HR271603', '04/16/2009 05:30:00 PM', '089XX S STONY ISLAND AVE', '860', 'THEFT', 'RETAIL THEFT', '10046030, 'HY234744', '04/24/2015 07:55:00 PM', '008XX N MICHIGAN AVE', '860', 'THEFT', 'RETAIL THEFT', '11230490, 'JB151690', '02/14/2018 11:15:00 AM', '036XX S ARCHER AVE', '860', 'THEFT', 'RETAIL THEFT', '1516518, 'G256545', '05/04/2001 06:15:00 PM', '045XX S DAMEN AV', '820', 'THEFT', '$500 AND UNDER', '4718689, 'HM324025', '05/01/2006 03:20:00 PM', '0000X W ELM ST', '860', 'THEFT', 'RETAIL THEFT', '1845995, 'G662598', '11/03/2001 02:26:55 PM', '0000X N STATE ST', '820', 'THEFT', '$500 AND UNDER', '6855661, 'HR261581', '04/10/2009 05:00:00 PM', '017XX W CERMAK RD', '860', 'THEFT', 'RETAIL THEFT', '1340847, 'G040244', '01/19/2001 06:39:03 PM', '063XX N NAGLE AV', '820', 'THEFT', '$500 AND UNDER', '11143628, 'JA503725', '11/08/2017 10:38:00 AM', '058XX S ASHLAND AVE', '820', 'THEFT', '$500 AND UNDER', '5214424, 'HM803061', '12/31/2006 11:53:00 AM', '029XX N ASHLAND AVE', '860', 'THEFT', 'RETAIL THEFT', '6980726, 'HR385117', '06/20/2009 11:25:00 AM', '076XX S CICERO AVE', '860', 'THEFT', 'RETAIL THEFT', '1612358, 'G376790', '06/28/2001 12:24:00 PM', '0000X S STATE ST', '820', 'THEFT', '$500 AND UNDER', '2522757, 'HH869886', '12/31/2002 03:15:00 PM', '048XX W NORTH AVE', '820', 'THEFT', '$500 AND UNDER', '7646435, 'HS451246', '08/07/2010 09:45:00 PM', '023XX W ROSCOE ST', '460', 'BATTERY', 'SIMPLE BATTERY', '1353618, 'G056330', '01/27/2001 04:20:00 PM', '078XX S SAWYER AV', '460', 'BATTERY', 'SIMPLE BATTERY', '10179921, 'HY368284', '08/04/2015 04:20:00 AM', '024XX S TROY ST', '486', 'BATTERY', 'DOMESTIC BATTERY', '10879266, 'JA188596', '03/15/2017 09:58:00 PM', '013XX W 49TH PL', '454', 'BATTERY', 'AGG PO HARM', '4430638, 'HL725506', '11/09/2005 01:00:00 PM', '048XX N FRANCISCO AVE', '484', 'BATTERY', 'PROVOKING', '3434215, 'HK498590', '07/15/2004 10:35:00 PM', '011XX N LA SALLE DR', '486', 'BATTERY', 'DOMESTIC BATTERY', '8771351, 'HV445580', '08/24/2012 10:35:00 PM', '034XX N HALSTED ST', '460', 'BATTERY', 'SIMPLE BATTERY', '9337353, 'HW481295', '10/05/2013 07:14:00 PM', '016XX S ST LOUIS AVE', '486', 'BATTERY', 'DOMESTIC BATTERY', '3867425, 'HL240985', '03/18/2005 01:26:54 AM', '025XX N HALSTED ST', '460', 'BATTERY', 'SIMPLE BATTERY')]
```

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 (4965099, 'HM576559', '09/02/2006 01:19:42 AM', '087XX S ESCANABA AVE', '143A', 'WEAPONS VIOLAT
 (8681171, 'HV356389', '06/27/2012 10:31:00 PM', '046XX S LEAMINGTON AVE', '470', 'PUBLIC PEACE V
 (9551405, 'HX203242', '03/29/2014 12:45:00 PM', '063XX S EBERHART AVE', '470', 'PUBLIC PEACE V
 (1806896, 'G635735', '10/22/2001 03:36:05 PM', '0000X N HERMITAGE AV', '2850', 'PUBLIC PEACE V
 (5176248, 'HM768251', '12/11/2006 02:00:00 PM', '076XX S CAMPBELL AVE', '1751', 'OFFENSE INVO
 (3588432, 'HK677648', '10/10/2004 12:20:00 AM', '022XX N KOSTNER AVE', '281', 'CRIM SEXUAL AS
 (6906555, 'HR314298', '05/11/2009 07:37:00 AM', '007XX W 49TH PL', '1585', 'SEX OFFENSE', 'OTHE
 (8169210, 'HT404326', '07/18/2011 10:30:00 PM', '023XX N MASON AVE', '1562', 'SEX OFFENSE', 'AC
 (4072241, 'HL415544', '06/12/2005 11:12:00 AM', '031XX W FLOURNOY ST', '3750', 'INTERFERENCE
 (6183080, 'HP265256', '04/06/2008 06:50:00 PM', '013XX N HUDSON AVE', '1661', 'GAMBLING', 'GAM
 (6987751, 'HR392537', '06/24/2009 12:21:00 PM', '070XX S TALMAN AVE', '1661', 'GAMBLING', 'GAM
 (3987219, 'HL266884', '03/31/2005 07:30:00 PM', '024XX N CLARK ST', '2210', 'LIQUOR LAW VIOLAT
 (3266814, 'HK238408', '03/13/2004 10:30:00 PM', '093XX S STONY ISLAND AVE', '2230', 'LIQUOR LA
 (21149, 'HW519443', '11/03/2013 07:27:00 PM', '044XX S RICHMOND ST', '110', 'HOMICIDE', 'FIRST
 (11233321, 'JB155558', '02/16/2018 08:18:00 AM', '036XX W 81ST ST', '1540', 'OBSCENITY', 'OBSCEN
 (10270593, 'HY458571', '10/12/2015 01:21:00 AM', '059XX W CHICAGO AVE', '1480', 'CONCEALED C
 (10626372, 'HZ378869', '08/05/2016 04:10:00 AM', '008XX W 76TH ST', '1536', 'PUBLIC INDECENCY', 'S
 (9608166, 'HX258445', '05/12/2014 10:50:00 AM', '010XX N WELLS ST', '1900', 'OTHER NARCOTIC V
 (1326195, 'G021609', '01/11/2001 02:30:41 AM', '087XX S ESCANABA AV', '9901', 'DOMESTIC VIOLE

In []:

In [9]: %sql select distinct(PRIMARY_TYPE), location_description from CHICAGO_CRIME_DATA where loc

* ibm_db_sa://pfv38745:***@dashdb-txn-sbox-yp-dal09-04.services.dal.ibm.com:50000/BLUDB

Done.

```
Out[9]: [('ARSON', 'RESIDENCE'),
 ('ASSAULT', 'RESIDENCE'),
 ('BATTERY', 'RESIDENCE'),
 ('BURGLARY', 'RESIDENCE'),
 ('CRIMINAL DAMAGE', 'RESIDENCE'),
 ('CRIMINAL TRESPASS', 'RESIDENCE'),
 ('DECEPTIVE PRACTICE', 'RESIDENCE'),
 ('NON-CRIMINAL (SUBJECT SPECIFIED)', 'RESIDENCE'),
 ('OBSCENITY', 'RESIDENCE'),
 ('OFFENSE INVOLVING CHILDREN', 'RESIDENCE'),
 ('OTHER OFFENSE', 'RESIDENCE'),
 ('PROSTITUTION', 'RESIDENCE'),
 ('ROBBERY', 'RESIDENCE'),
 ('STALKING', 'RESIDENCE'),
 ('THEFT', 'RESIDENCE'),
 ('WEAPONS VIOLATION', 'RESIDENCE')]
```

```
In [10]: %sql select distinct(PRIMARY_TYPE), location_description from CHICAGO_CRIME_DATA where lo
* ibm_db_sa://pfv38745:***@dashdb-txn-sbox-yp-dal09-04.services.dal.ibm.com:50000/BLUDB
Done.
```

```
Out[10]: [('ASSAULT', 'SIDEWALK'),
 ('BATTERY', 'SIDEWALK'),
 ('CONCEALED CARRY LICENSE VIOLATION', 'SIDEWALK'),
 ('CRIMINAL DAMAGE', 'SIDEWALK'),
 ('GAMBLING', 'SIDEWALK'),
 ('NARCOTICS', 'SIDEWALK'),
 ('OTHER NARCOTIC VIOLATION', 'SIDEWALK'),
 ('OTHER OFFENSE', 'SIDEWALK'),
 ('PROSTITUTION', 'SIDEWALK'),
 ('PUBLIC INDECENCY', 'SIDEWALK'),
 ('PUBLIC PEACE VIOLATION', 'SIDEWALK'),
 ('ROBBERY', 'SIDEWALK'),
 ('THEFT', 'SIDEWALK'),
 ('WEAPONS VIOLATION', 'SIDEWALK')]
```

1.2 Great! We have the different types of crimes at each location! Now let's make an inquiry from our Chicago Public School Database (Not Included)

1.2.1 Let's start by taking a quick look at our dataset

```
In [13]: %sql select * from CHICAGO_PUBLIC_SCHOOLS LIMIT 10
```

```
* ibm_db_sa://pfv38745:***@dashdb-txn-sbox-yp-dal09-04.services.dal.ibm.com:50000/BLUDB
Done.
```

Out[13]: [(610038, 'Abraham Lincoln Elementary School', 'ES', '615 W Kemper Pl', 'Chicago', 'IL', 60614, '(773) 535-1590', 610281, 'Adam Clayton Powell Paideia Community Academy Elementary School', 'ES', '7511 S South St', 'Chicago', 'IL', 60625, '(773) 535-1590', 610185, 'Adlai E Stevenson Elementary School', 'ES', '8010 S Kostner Ave', 'Chicago', 'IL', 60652, '(773) 535-1590', 609993, 'Agustin Lara Elementary Academy', 'ES', '4619 S Wolcott Ave', 'Chicago', 'IL', 60609, '(773) 535-1590', 610513, 'Air Force Academy High School', 'HS', '3630 S Wells St', 'Chicago', 'IL', 60609, '(773) 535-1590', 610212, 'Albany Park Multicultural Academy', 'MS', '4929 N Sawyer Ave', 'Chicago', 'IL', 60625, '(773) 535-1590', 609720, 'Albert G Lane Technical High School', 'HS', '2501 W Addison St', 'Chicago', 'IL', 60618, '(773) 535-1590', 610342, 'Albert R Sabin Elementary Magnet School', 'ES', '2216 W Hirsch St', 'Chicago', 'IL', 60622, '(773) 535-1590', 610524, 'Alcott High School for the Humanities', 'HS', '2957 N Hoyne Ave', 'Chicago', 'IL', 60618, '(773) 535-1590', 610209, 'Alessandro Volta Elementary School', 'ES', '4950 N Avers Ave', 'Chicago', 'IL', 60625, '(773) 535-1590']

1.3 FANTASTIC! Let's imagine that we have a family who wants to send their child to a decent school. One of the deciding values might be whether the school is healthy school certified or not. Also lets narrow the area to schools in Community Areas 10-15

In [16]: %sql select NAME_OF_SCHOOL from CHICAGO_PUBLIC_SCHOOLS where HEALTHY_SCHOOL_CERTIFIED = 1

* ibm_db_sa://pfv38745:***@dashdb-txn-sbox-yp-dal09-04.services.dal.ibmcloud.com:50000/BLUDB
Done.

Out[16]: [('Rufus M Hitch Elementary School',)]

1.3.1 With those parameters we have narrowed the search to one result! Rufus M Hitch Elementary School is the only school in Community Areas 10-15 that is healthy school certified. (Remember this is from a single segment of the overall data available)

1.3.2 But perhaps the family would like to take a look at more options. For example, by looking for the top areas with the highest college enrollment.

In [17]: %sql select COMMUNITY_AREA_NAME from CHICAGO_PUBLIC_SCHOOLS order by COLLEGE_ENROLLMENT

* ibm_db_sa://pfv38745:***@dashdb-txn-sbox-yp-dal09-04.services.dal.ibmcloud.com:50000/BLUDB
Done.

Out[17]: [('NORTH CENTER',),
('ARCHER HEIGHTS',),
('NORWOOD PARK',),
('BRIGHTON PARK',),
('IRVING PARK',)]

So there we have it! Some quick SQL queries through Python! Hope this helped!

1.4 Have a great day!