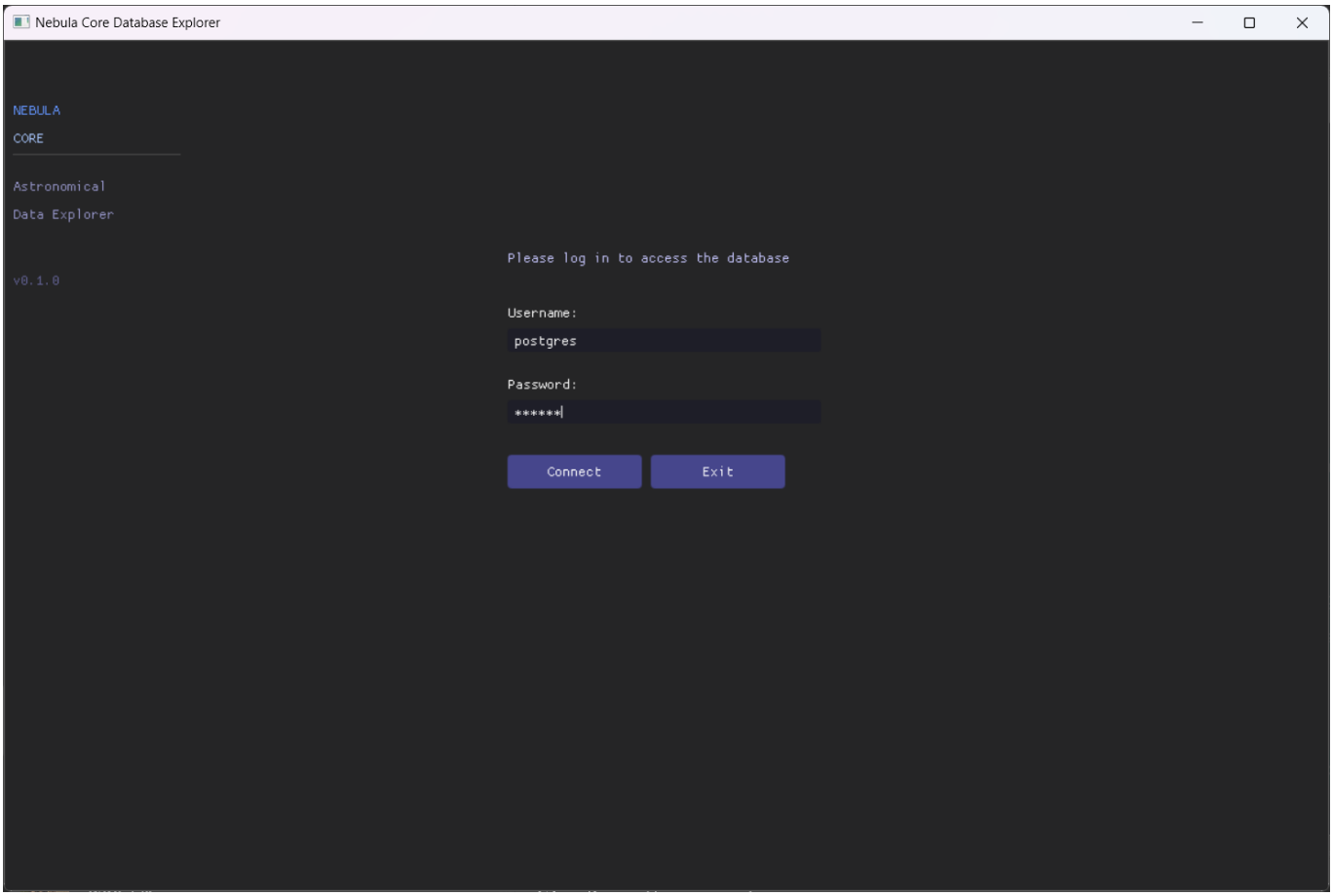
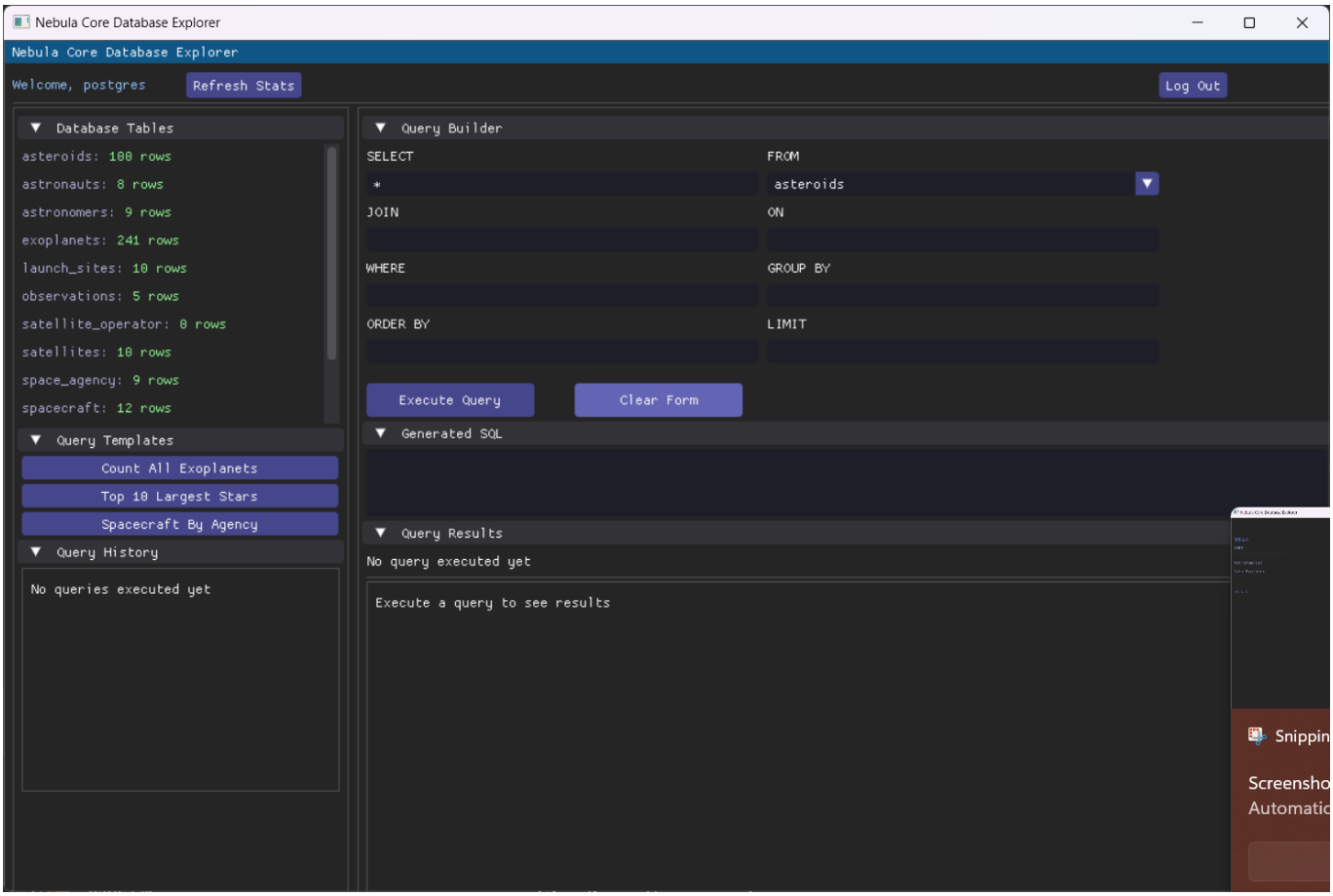
Queries

Welcome



Interface



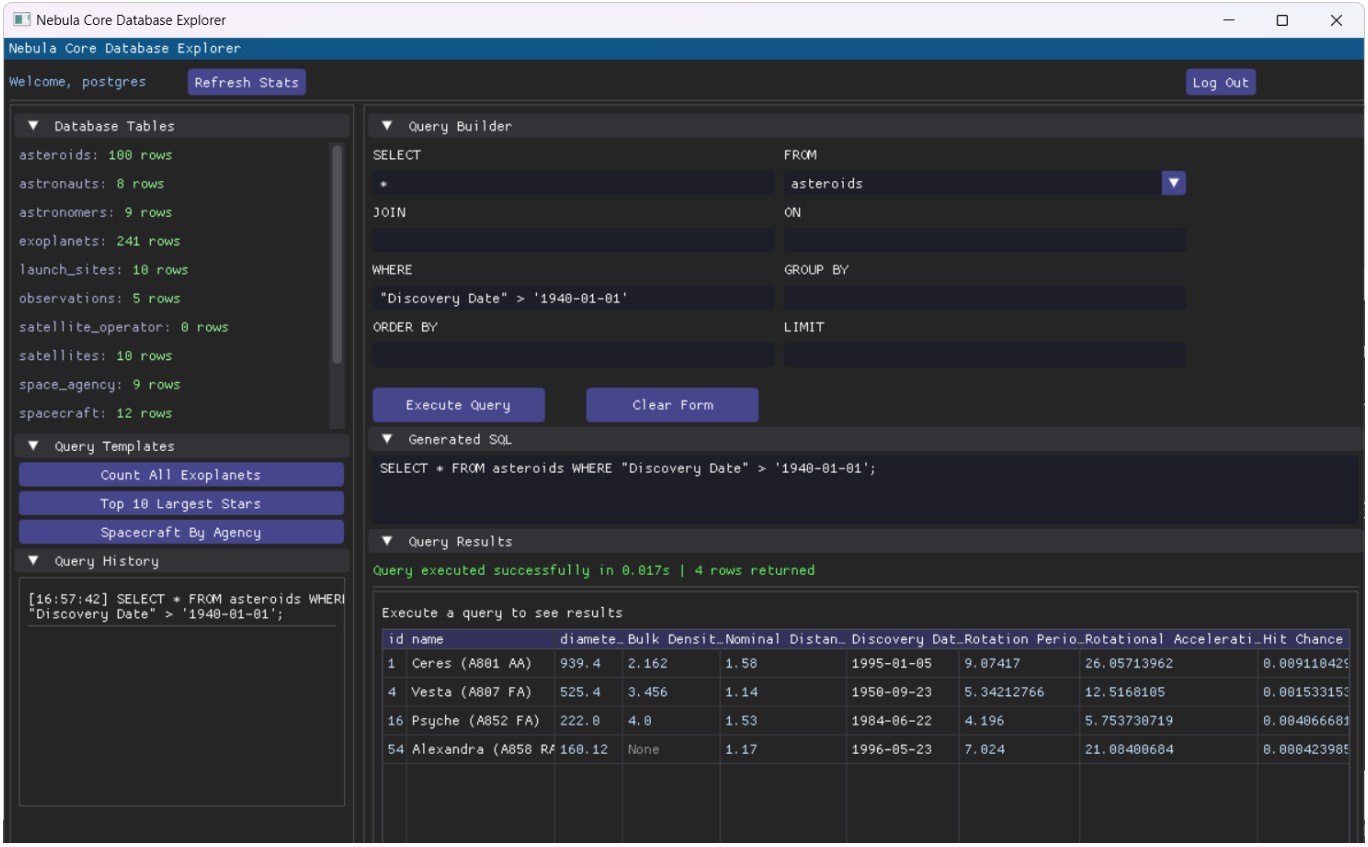
Query 1

A query to select all asteroids discovered after 1940

```sql
SELECT * FROM asteroids where "Discovery Date" > '1940-01-01';
```

```
Nebula Core=# select * from asteroids where "Discovery Date" > '1940-01-01';
 id |        name         | diameter | Bulk Density | Nominal Distance | Discovery Date | Rotation Period | Rotationa
l Acceleration | Hit Chance
----+---------------------+----------+--------------+------------------+----------------+-----------------+----------
--------------+------------
  1 | Ceres (A801 AA)     |    939.4 |        2.162 |             1.58 | 1995-01-05     |         9.07417 |
   26.05713962 | 0.009110429
  4 | Vesta (A807 FA)     |    525.4 |        3.456 |             1.14 | 1950-09-23     |      5.34212766 |
    12.5168105 | 0.001533153
 16 | Psyche (A852 FA)    |      222 |            4 |             1.53 | 1984-06-22     |           4.196 |
   5.753730719 | 0.004066681
 54 | Alexandra (A858 RA) |   160.12 |              |             1.17 | 1996-05-23     |           7.024 |
   21.08400684 | 0.000423985
(4 rows)


Nebula Core=#
```

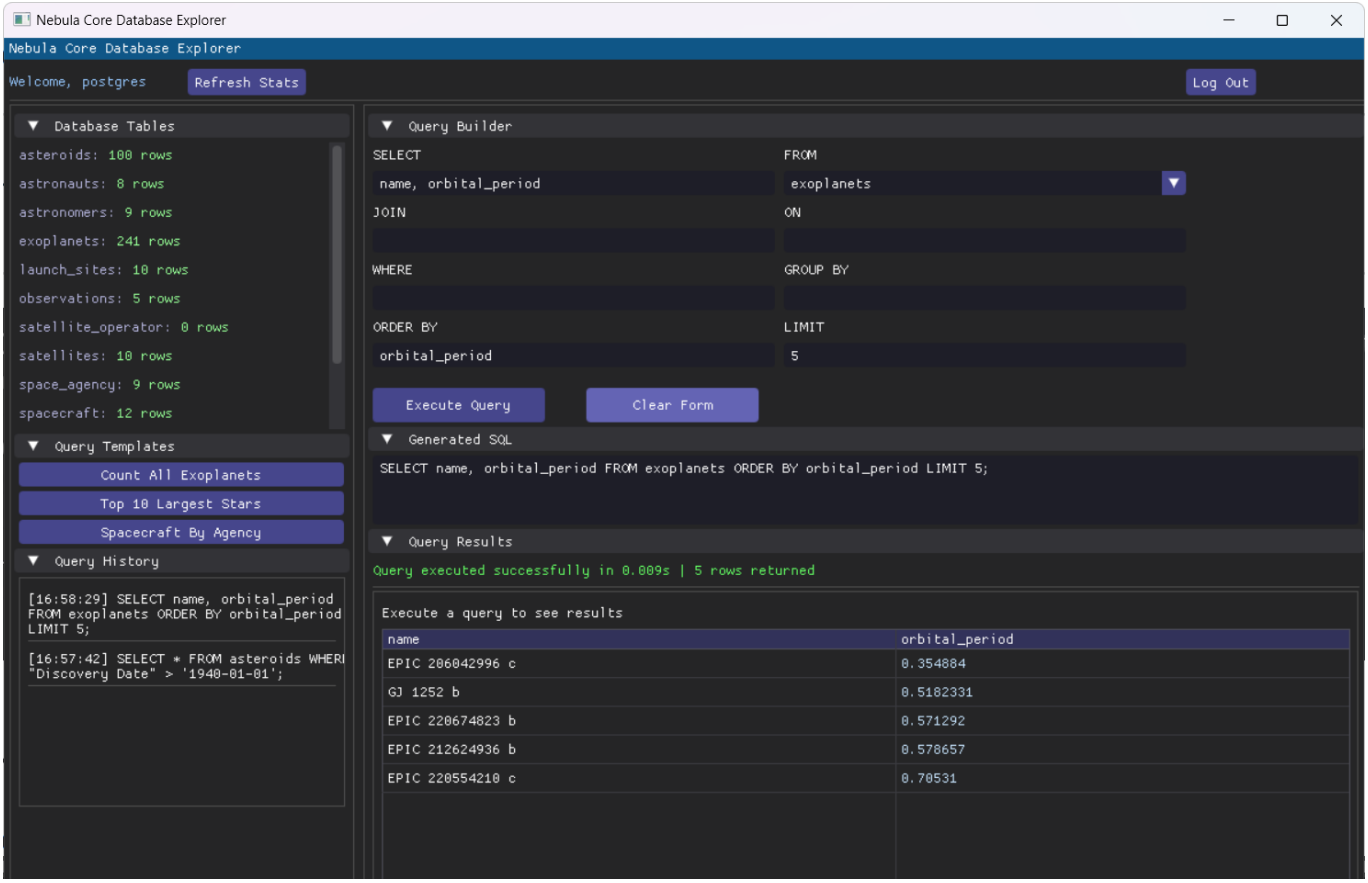


Query 2

A query to select the top 5 exoplanets with the longest orbital period

```
SELECT name, orbital_period FROM exoplanets ORDER BY orbital_period LIMIT 5;
```

```
Nebula Core=# select name, orbital_period from exoplanets order by orbital_period limit 5;
       name       | orbital_period
------------------+----------------
 EPIC 206042996 c |       0.354884
 GJ 1252 b        |      0.5182331
 EPIC 220674823 b |       0.571292
 EPIC 212624936 b |       0.578657
 EPIC 220554210 c |        0.70531
(5 rows)
```

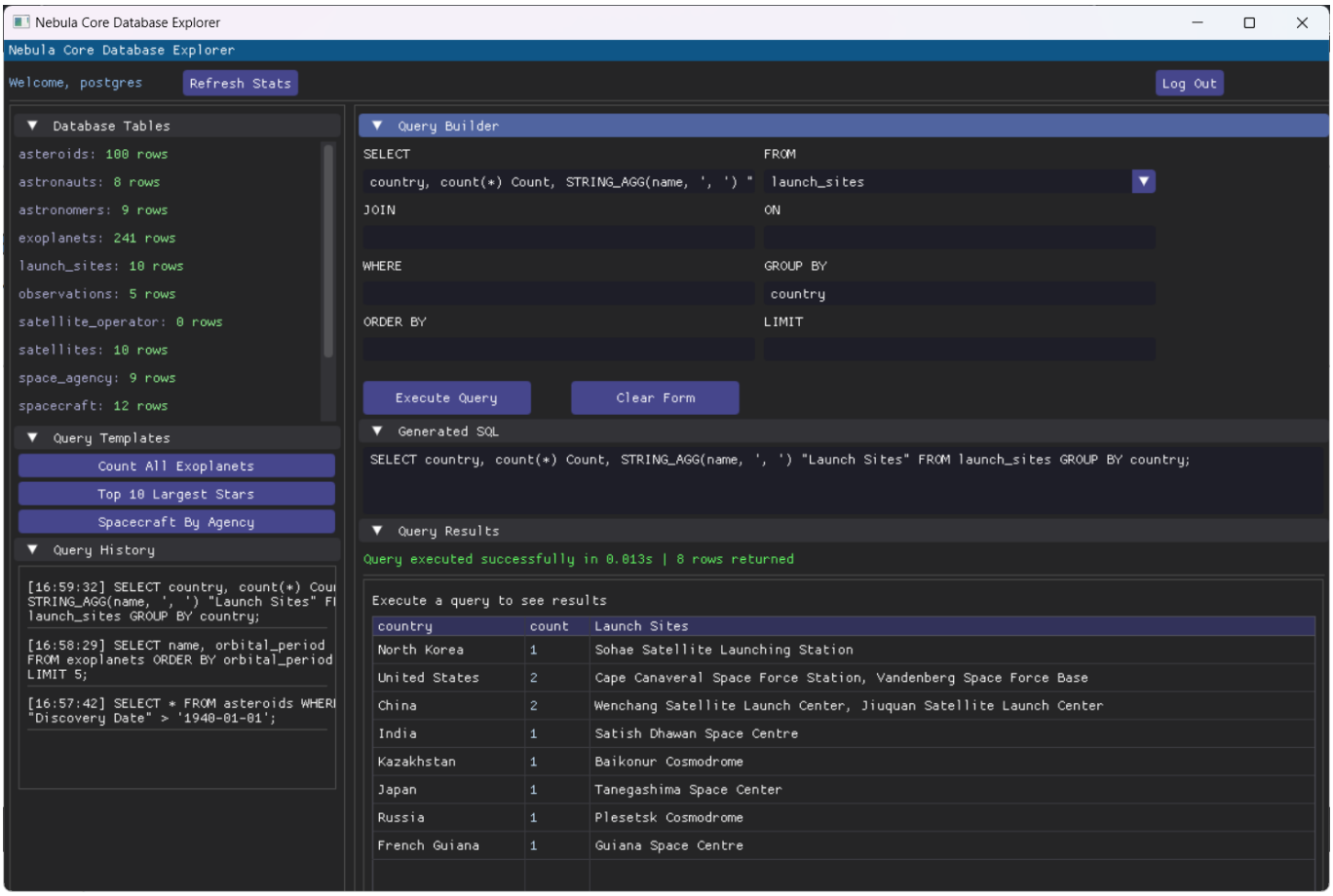


Query 3

A query to find all launch sites operated by a country (and their count)

```
SELECT country, count(*) Count, STRING_AGG(name, ', ') 'Launch Sites' FROM
launch_sites GROUP BY country;
```

```
Nebula Core=# SELECT country, count(*) Count, STRING_AGG(name, ', ') "Launch Sites" from launch_sites GROUP BY country;
    country    | count |                          Launch Sites
---------------+-------+-------------------------------------------------------------------
 North Korea   |     1 | Sohae Satellite Launching Station
 United States |     2 | Cape Canaveral Space Force Station, Vandenberg Space Force Base
 China         |     2 | Wenchang Satellite Launch Center, Jiuquan Satellite Launch Center
 India         |     1 | Satish Dhawan Space Centre
 Kazakhstan    |     1 | Baikonur Cosmodrome
 Japan         |     1 | Tanegashima Space Center
 Russia        |     1 | Plesetsk Cosmodrome
 French Guiana |     1 | Guiana Space Centre
(8 rows)
```

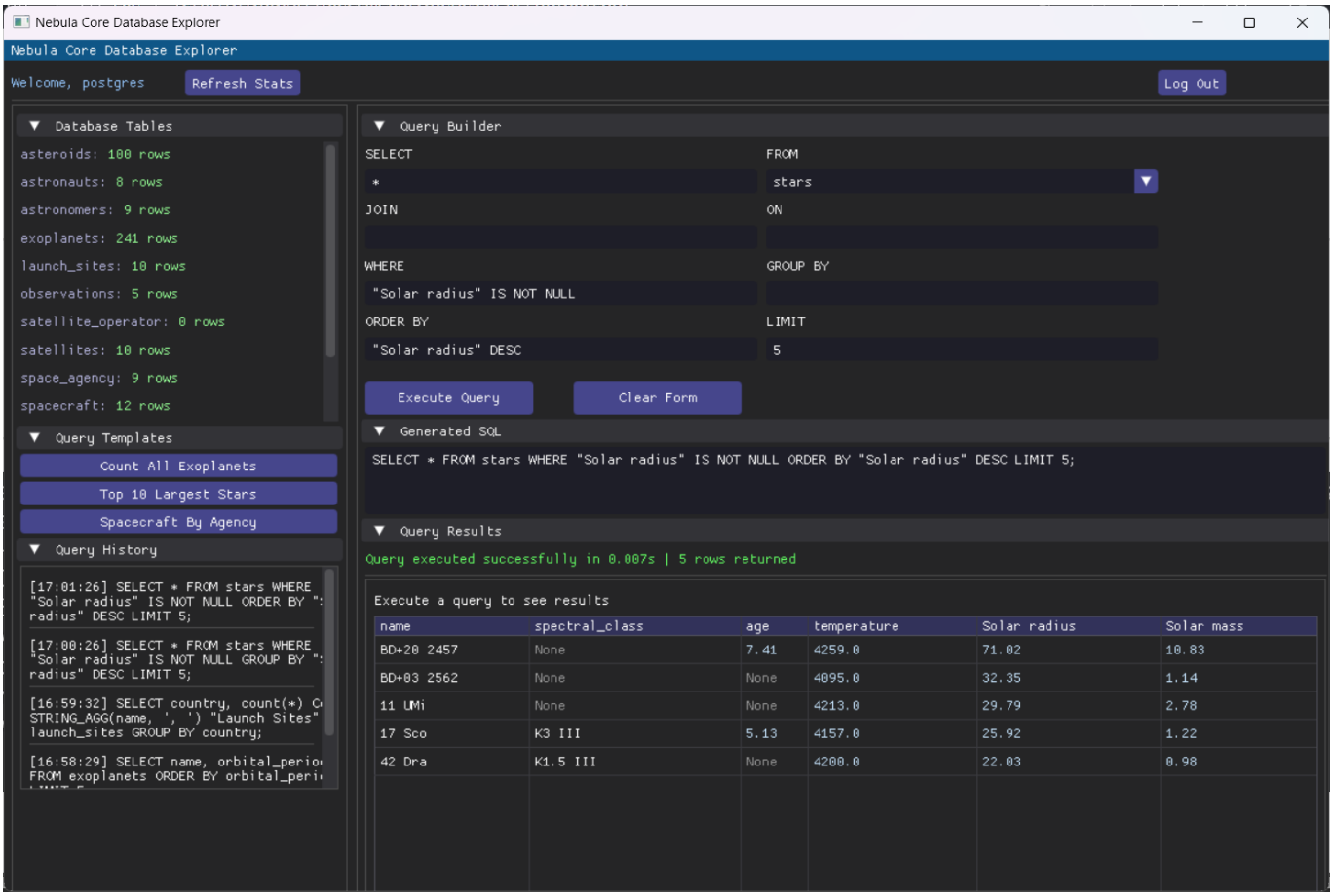


Query 4

Query to find the five biggest stars in terms of their radius

```
SELECT * FROM stars WHERE 'Solar radius' IS NOT NULL ORDER BY 'Solar radius' DESC
LIMIT 5;
```

```
Nebula Core=# select * from stars where "Solar radius" is not null order by "Solar radius" desc limit 5;
    name    | spectral_class | age  | temperature | Solar radius | Solar mass
------------+----------------+------+-------------+--------------+------------
 BD+20 2457 |                | 7.41 |        4259 |        71.02 |      10.83
 BD+03 2562 |                |      |        4095 |        32.35 |       1.14
 11 UMi     |                |      |        4213 |        29.79 |       2.78
 17 Sco     | K3 III         | 5.13 |        4157 |        25.92 |       1.22
 42 Dra     | K1.5 III       |      |        4200 |        22.03 |       0.98
(5 rows)
```

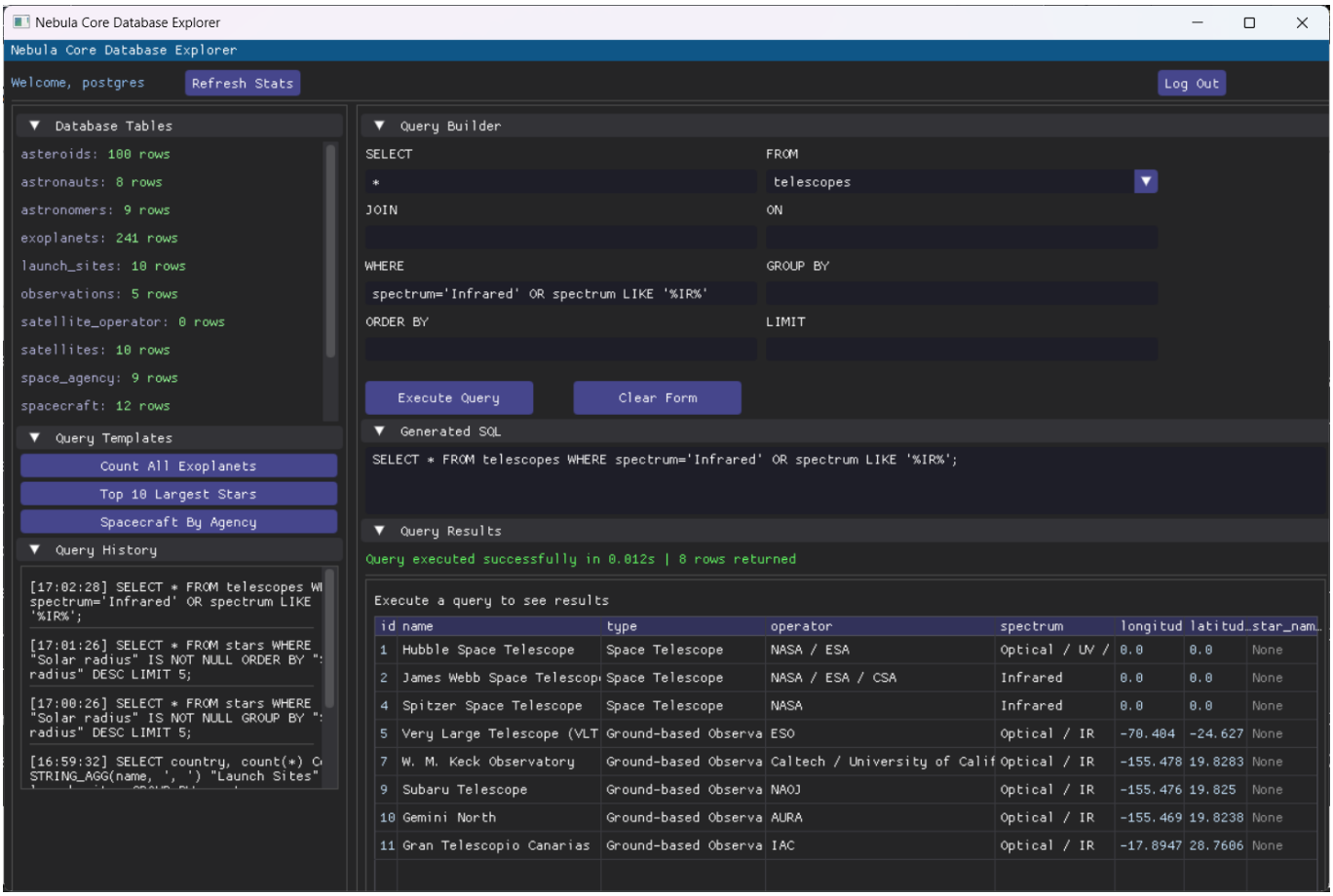


Query 5

Find all telescopes operating in the infrared spectrum

```sql
SELECT * FROM telescopes WHERE spectrum='Infrared' OR spectrum LIKE '%IR%';
```

```
Nebula Core=# select * from telescopes where spectrum='Infrared' or spectrum like '%IR%';
 id |              name              |          type           |              operator               |     spectrum      | longitude | latitude
| star_name
----+--------------------------------+-------------------------+-------------------------------------+-------------------+-----------+----------
+-----------
  1 | Hubble Space Telescope         | Space Telescope         | NASA / ESA                          | Optical / UV / IR |         0 |        0
|
  2 | James Webb Space Telescope     | Space Telescope         | NASA / ESA / CSA                    | Infrared          |         0 |        0
|
  4 | Spitzer Space Telescope        | Space Telescope         | NASA                                | Infrared          |         0 |        0
|
  5 | Very Large Telescope (VLT)     | Ground-based Observatory | ESO                                 | Optical / IR      |   -70.404 |  -24.627
|
  7 | W. M. Keck Observatory         | Ground-based Observatory | Caltech / University of California | Optical / IR      | -155.4783 |  19.8283
|
  9 | Subaru Telescope               | Ground-based Observatory | NAOJ                                | Optical / IR      |  -155.476 |   19.825
|
 10 | Gemini North                   | Ground-based Observatory | AURA                                | Optical / IR      | -155.4691 |  19.8238
|
 11 | Gran Telescopio Canarias (GTC) | Ground-based Observatory | IAC                                 | Optical / IR      |  -17.8947 |  28.7606
|
(8 rows)
```

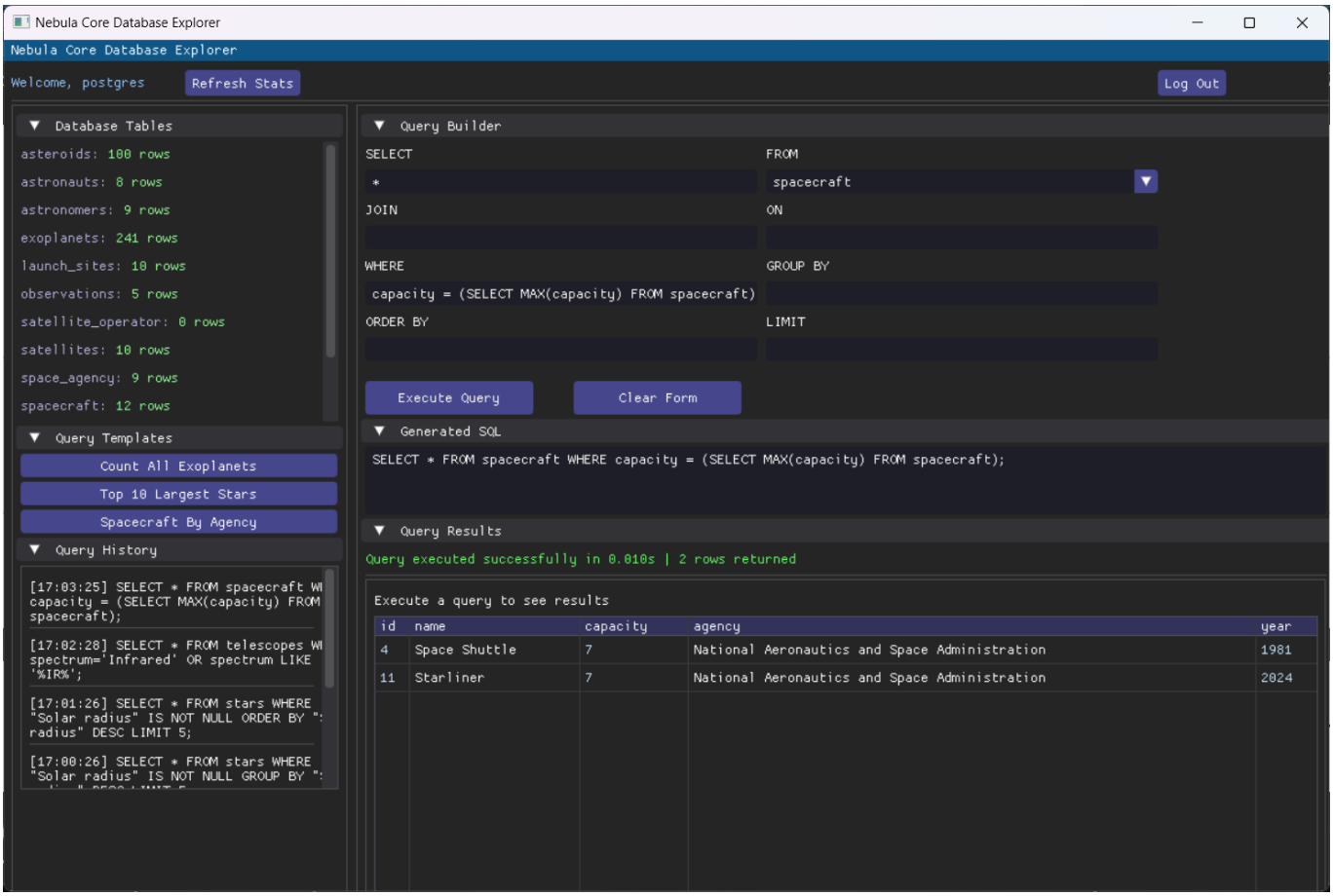


Query 6

Find the spacecraft with the maximum capacity

```
SELECT * FROM spacecraft WHERE capacity = (SELECT MAX(capacity) FROM spacecraft);
```

```
Nebula Core=# select * from spacecraft where capacity = (select MAX(capacity) from spacecraft);
 id |     name      | capacity |                    agency                     | year
----+---------------+----------+-----------------------------------------------+------
  4 | Space Shuttle |        7 | National Aeronautics and Space Administration | 1981
 11 | Starliner     |        7 | National Aeronautics and Space Administration | 2024
(2 rows)
```

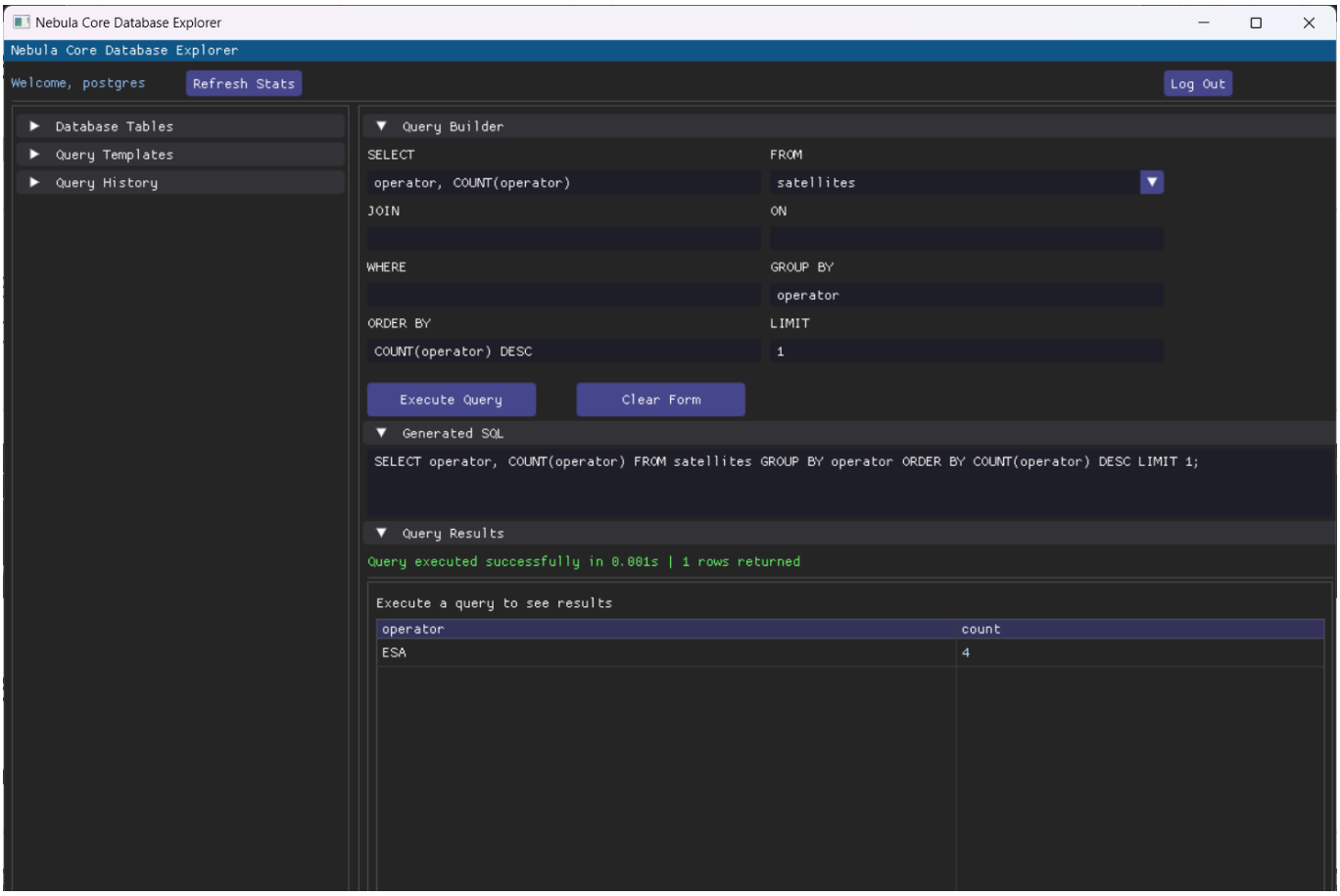


Query 7

Find the country with the most number of spacecraft

```
SELECT name, COUNT(operator) FROM satellites GROUP BY operator ORDER BY
COUNT(operator) DESC LIMIT 1;
```

```
Nebula Core=# select operator, count(operator) from satellites group by operator ORDER by count(operator) DESC LIMIT 1;
 operator | count
----------+-------
 ESA      |     4
(1 row)
```

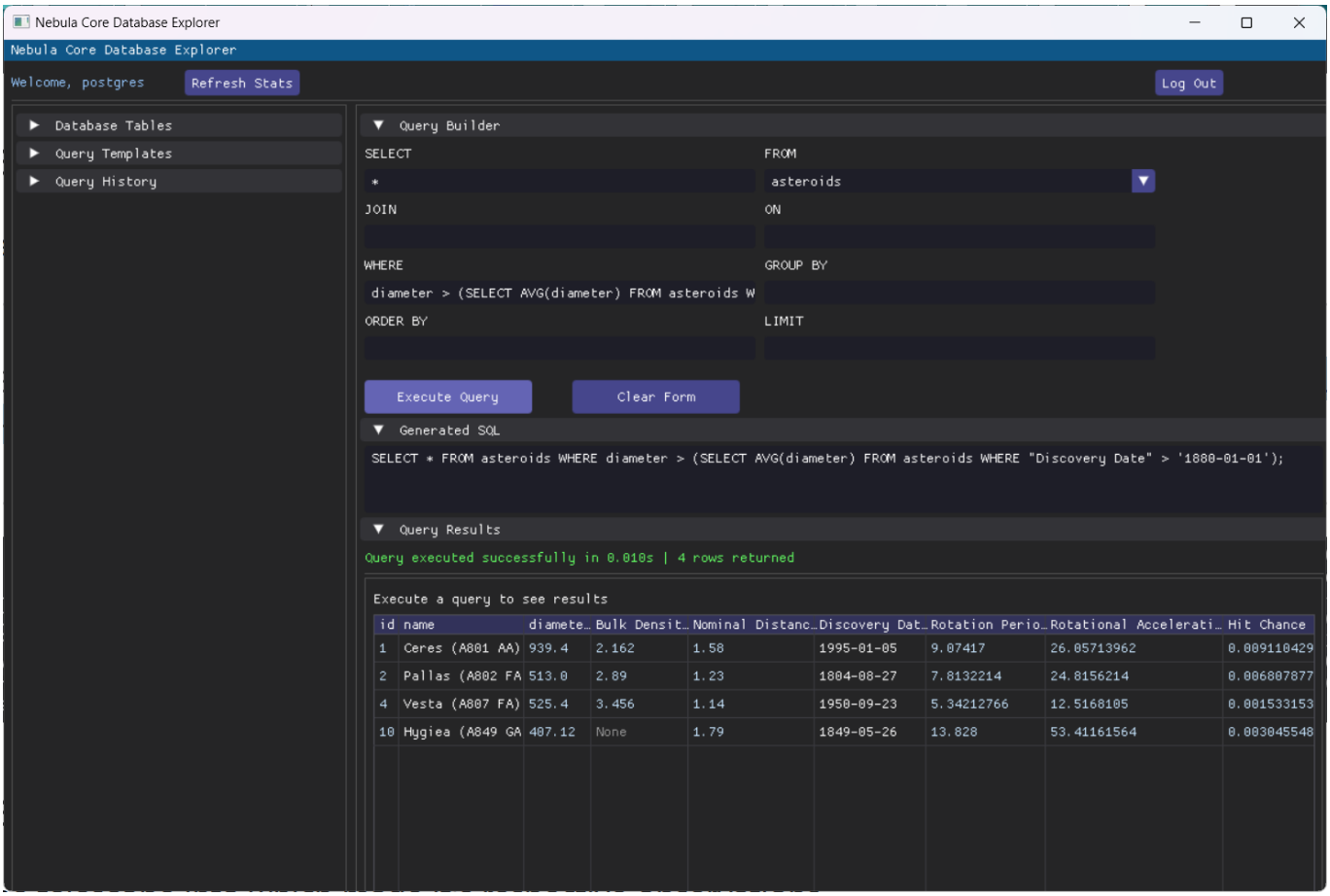


Query 8

Find all asteroids who diameter is larger than the average of all asteroids discovered after 1880

```sql
SELECT * FROM asteroids WHERE diameter > (SELECT AVG(diameter) FROM asteroids
WHERE 'Discovery Date' > '1880-01-01');
```

```
Nebula Core=# select * from asteroids where diameter > (select avg(diameter) from asteroids where "Discovery Date" > '1880-01-01');
 id |       name       | diameter | Bulk Density | Nominal Distance | Discovery Date | Rotation Period | Rotational Acceleration | Hit Chance
----+------------------+----------+--------------+------------------+----------------+-----------------+-------------------------+-------------
  1 | Ceres (A801 AA)  |    939.4 |        2.162 |             1.58 | 1995-01-05     |         9.07417 |              26.05713962 | 0.009110429
  2 | Pallas (A802 FA) |      513 |         2.89 |             1.23 | 1804-08-27     |       7.8132214 |               24.8156214 | 0.006807877
  4 | Vesta (A807 FA)  |    525.4 |        3.456 |             1.14 | 1950-09-23     |      5.34212766 |               12.5168105 | 0.001533153
 10 | Hygiea (A849 GA) |   407.12 |              |             1.79 | 1849-05-26     |          13.828 |              53.41161564 | 0.003045548
(4 rows)
```

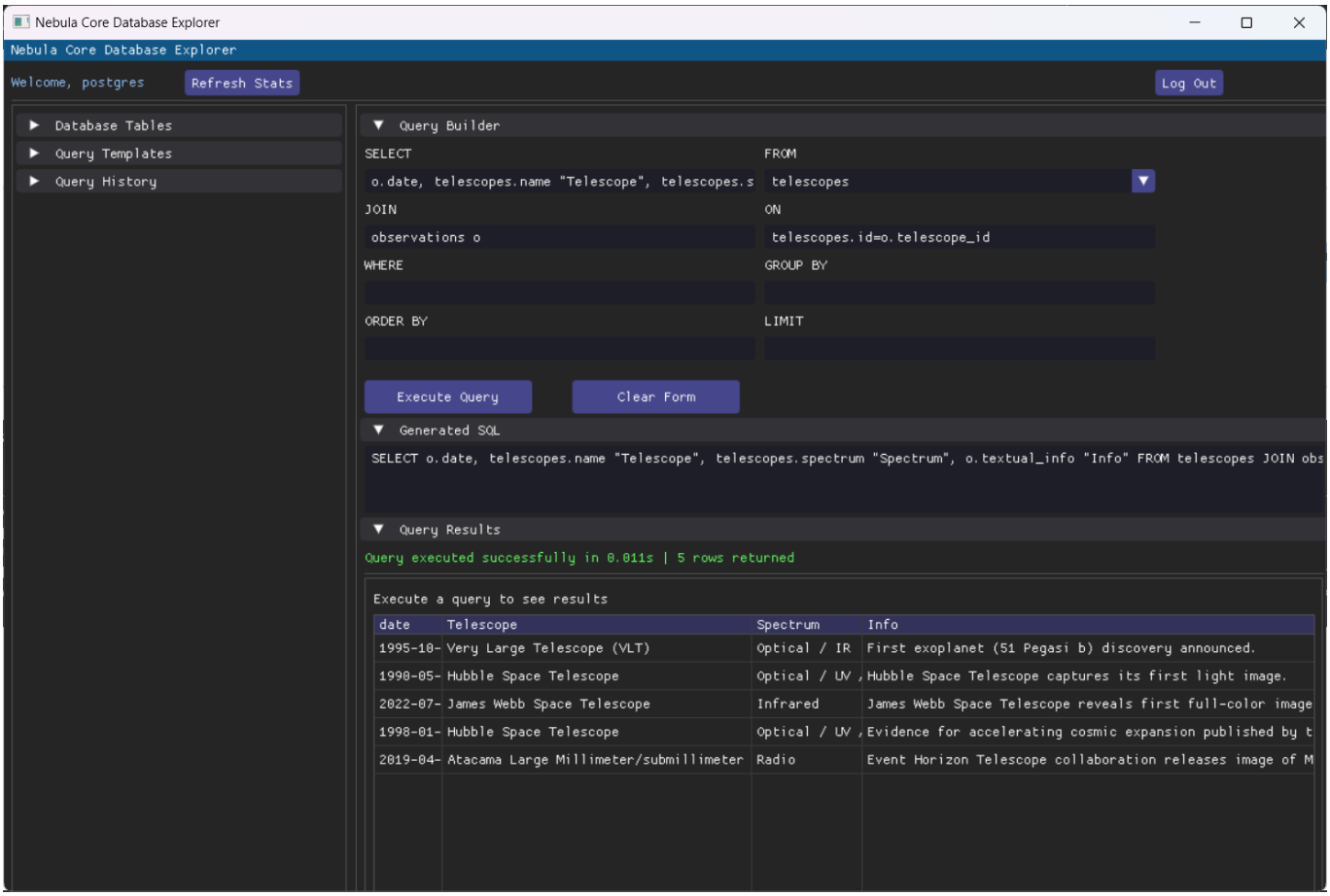


Query 9

Get the telescope info which made it's respective observations

```sql
SELECT o.date, t.name "Telescope", t.spectrum "Spectrum", o.textual_info "Info"
FROM telescopes t JOIN observations o ON t.id=o.telescope_id;
```

```
Nebula Core=# select o.date, t.name as "Telescope", t.spectrum, o.textual_info from telescopes t join observations o on t.id = o.telescope_id;
    date    |                  Telescope                  |     spectrum      |                                                textual_info
------------+---------------------------------------------+-------------------+-------------------------------------------------------------------------------------------
 1995-10-06 | Very Large Telescope (VLT)                  | Optical / IR      | First exoplanet (51 Pegasi b) discovery announced.
 1990-05-20 | Hubble Space Telescope                      | Optical / UV / IR | Hubble Space Telescope captures its first light image.
 2022-07-12 | James Webb Space Telescope                  | Infrared          | James Webb Space Telescope reveals first full-color images.
 1998-01-01 | Hubble Space Telescope                      | Optical / UV / IR | Evidence for accelerating cosmic expansion published by two research teams.
 2019-04-10 | Atacama Large Millimeter/submillimeter Array (ALMA) | Radio             | Event Horizon Telescope collaboration releases image of M87* black hole.
(5 rows)
```

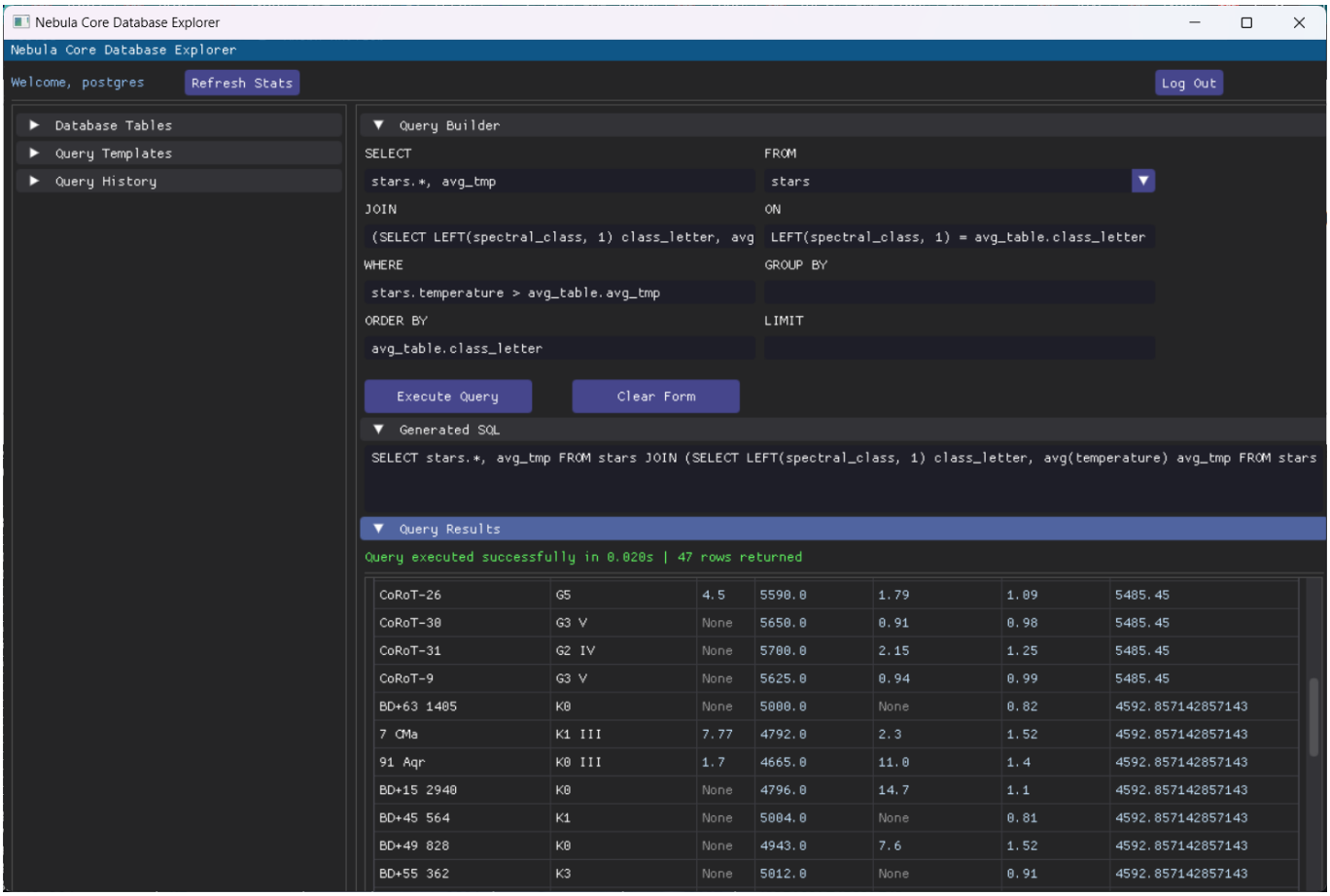


Query 10

Get the star data which has more than average temperature as per it's spectral class (also displaying the average temperature)

```
SELECT s.*, avg_tmp FROM stars s JOIN (
    SELECT LEFT(spectral_class, 1)  class_letter, avg(temperature) avg_tmp FROM
stars GROUP BY LEFT(spectral_class,1)
) AS avg_table ON LEFT(spectral_class, 1) = avg_table.class_letter  WHERE
s.temperature > avg_table.avg_tmp ORDER BY avg_table.class_letter;
```

```
Nebula Core=# select s.*, avg_tmp from stars s join (select left(spectral_class, 1)  class_letter, avg(temperature) avg_tmp from stars group by left(spectral_class,1)) as
 avg_table on left(spectral_class, 1) = avg_table.class_letter  where s.temperature > avg_table.avg_tmp order by avg_table.class_letter;
       name        | spectral_class |  age  | temperature | Solar radius | Solar mass |      avg_tmp
-------------------+----------------+-------+-------------+--------------+------------+--------------------
 30 Ari B          | F6 V           |       |        6300 |         1.13 |       1.16 |             6289.3
 CoRoT-35          | F6 V           |     1 |        6390 |         1.65 |       1.01 |             6289.3
 DMPP-2            | F5 V           |  2.01 |        6500 |         1.78 |       1.44 |             6289.3
 DMPP-4            | F5-F8 V        |     2 |        6400 |         1.38 |       1.25 |             6289.3
 CoRoT-36          | F3 V           |       |        6730 |         1.52 |       1.32 |             6289.3
 CoRoTID 223977153 | G0 VI          |     6 |        5970 |         0.79 |       1.08 |            5485.45
 GJ 3021           | G6 V           |       |        5540 |          0.9 |        0.9 |            5485.45
 61 Vir            | G5 V           |       |        5577 |         0.96 |       0.94 |            5485.45
 GJ 504            | G0 V           |   4.3 |        6234 |              |       1.22 |            5485.45
 CoRoT-1           | G0 V           |     2 |        5950 |         1.11 |       0.95 |            5485.45
 CoRoT-16          | G5 V           |   0.6 |        5650 |         1.19 |        1.1 |            5485.45
 CoRoT-23          | G0 V           |   3.3 |        5900 |         1.61 |       1.14 |            5485.45
 CoRoT-22          | G3 V           |   4.1 |        5939 |         1.14 |        1.1 |            5485.45
 CoRoT-26          | G5             |   4.5 |        5590 |         1.79 |       1.09 |            5485.45
 CoRoT-30          | G3 V           |       |        5650 |         0.91 |       0.98 |            5485.45
 CoRoT-31          | G2 IV          |       |        5700 |         2.15 |       1.25 |            5485.45
 CoRoT-9           | G3 V           |       |        5625 |         0.94 |       0.99 |            5485.45
 BD+63 1405        | K0             |       |        5000 |              |       0.82 | 4592.857142857143
 7 CMa             | K1 III         |  7.77 |        4792 |          2.3 |       1.52 | 4592.857142857143
 91 Aqr            | K0 III         |   1.7 |        4665 |           11 |        1.4 | 4592.857142857143
 BD+15 2940        | K0             |       |        4796 |         14.7 |        1.1 | 4592.857142857143
 BD+45 564         | K1             |       |        5004 |              |       0.81 | 4592.857142857143
 BD+49 828         | K0             |       |        4943 |          7.6 |       1.52 | 4592.857142857143
 BD+55 362         | K3             |       |        5012 |              |       0.91 | 4592.857142857143
 BD+60 1417        | K0             |  2.34 |        4993 |          0.8 |          1 | 4592.857142857143
 14 And            | K0 III         |       |        4813 |           11 |        2.2 | 4592.857142857143
 BD-08 2823        | K3 V           |   4.5 |        4746 |              |       0.74 | 4592.857142857143
 BD-17 63          | K5 V           |       |        4714 |         0.69 |       0.74 | 4592.857142857143
 CoRoT-24          | K1 V           |   5.4 |        4950 |         0.86 |       0.91 | 4592.857142857143
 GJ 15 A           | M1             |       |        3607 |         0.38 |       0.38 | 3395.1052631578946
 GJ 160.2          | M0 V           |       |        4347 |              |       0.69 | 3395.1052631578946
 GJ 251            | M3.0 V         |       |        3451 |         0.36 |       0.36 | 3395.1052631578946
 GJ 27.1           | M0.5 V         |       |        3542 |              |       0.53 | 3395.1052631578946
 GJ 1252           | M3             |       |        3458 |         0.39 |       0.38 | 3395.1052631578946
 GJ 3138           | M0             |       |        3717 |          0.5 |       0.68 | 3395.1052631578946
 GJ 328            | M1             |       |        3900 |              |       0.69 | 3395.1052631578946
 GJ 3293           | M2.5           |       |        3466 |          0.4 |       0.42 | 3395.1052631578946
```

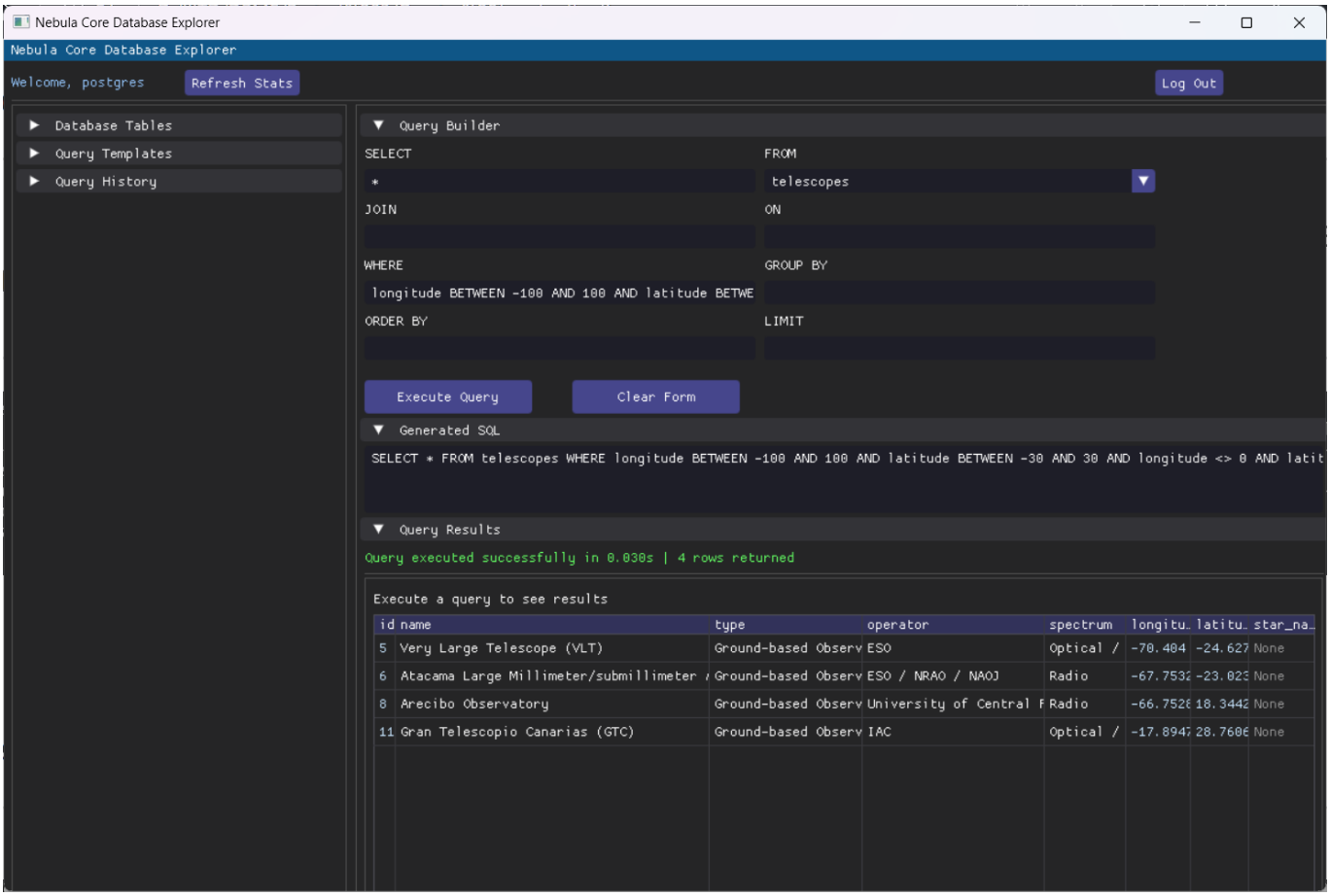


Query 11

Find all (ground based) telescopes located between -100 and 100 longitude and -30 and 30 latitude

```sql
SELECT * FROM telescopes WHERE longitude BETWEEN -100 AND 100 AND latitude BETWEEN
-30 AND 30 AND longitude <> 0 AND latitude <> 0;
```

```
Nebula Core=# select * from telescopes where longitude between -100 and 100 and latitude between -30 and 30 and longitude <> 0 and latitude <> 0;
 id |                      name                       |          type          |           operator           |   spectrum    | longitude | latitude |
----+-------------------------------------------------+------------------------+------------------------------+---------------+-----------+----------+
  5 | Very Large Telescope (VLT)                      | Ground-based Observatory | ESO                          | Optical / IR |   -70.404 |  -24.627 |
  6 | Atacama Large Millimeter/submillimeter Array (ALMA) | Ground-based Observatory | ESO / NRAO / NAOJ            | Radio        |   -67.7532 | -23.0235 |
  8 | Arecibo Observatory                             | Ground-based Observatory | University of Central Florida | Radio        |   -66.7528 |  18.3442 |
 11 | Gran Telescopio Canarias (GTC)                  | Ground-based Observatory | IAC                          | Optical / IR |   -17.8947 |  28.7606 |
(4 rows)
```

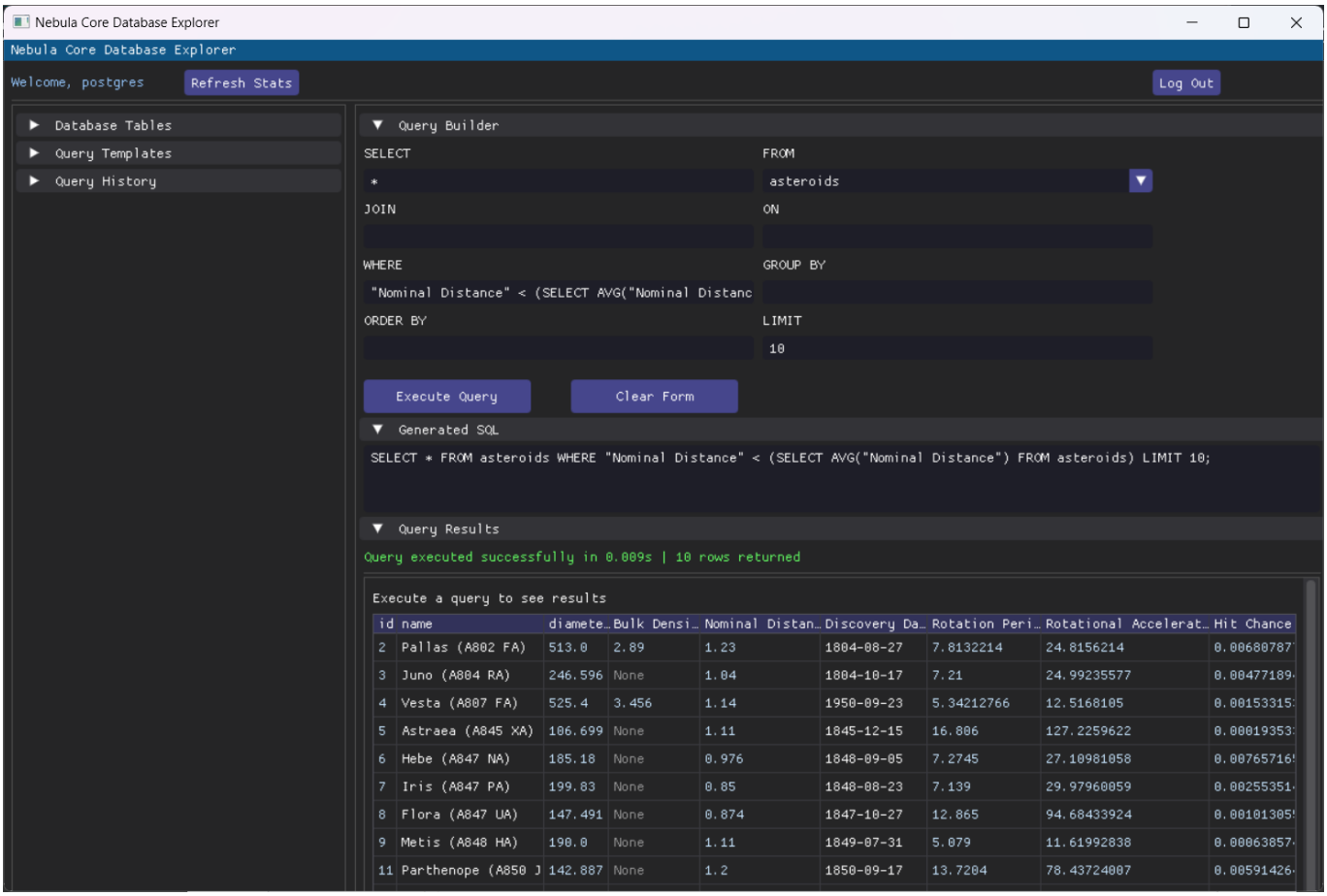


Query 12

Find all asteroids who have been closer to earth than the average

```sql
SELECT * FROM asteroids WHERE "Nominal Distance" < (SELECT AVG("Nominal Distance")
FROM asteroids) LIMIT 10;
```

```
Nebula Core=# select * from asteroids where "Nominal Distance" < (select AVG("Nominal Distance") from asteroids) limit 10;
 id |         name         | diameter | Bulk Density | Nominal Distance | Discovery Date | Rotation Period | Rotational Acceleration | Hit Chance
----+----------------------+----------+--------------+------------------+----------------+-----------------+-------------------------+------------
  2 | Pallas (A802 FA)     |      513 |         2.89 |             1.23 | 1804-08-27     |       7.8132214 |              24.8156214 | 0.006807877
  3 | Juno (A804 RA)       |  246.596 |              |             1.04 | 1804-10-17     |            7.21 |              24.99235577 | 0.004771894
  4 | Vesta (A807 FA)      |    525.4 |        3.456 |             1.14 | 1950-09-23     |      5.34212766 |               12.5168105 | 0.001533153
  5 | Astraea (A845 XA)    |  106.699 |              |             1.11 | 1845-12-15     |          16.806 |              127.2259622 | 0.000193533
  6 | Hebe (A847 NA)       |   185.18 |              |            0.976 | 1848-09-05     |          7.2745 |              27.10981058 | 0.007657165
  7 | Iris (A847 PA)       |   199.83 |              |             0.85 | 1848-08-23     |           7.139 |              29.97960059 | 0.002553514
  8 | Flora (A847 UA)      |  147.491 |              |            0.874 | 1847-10-27     |          12.865 |              94.68433924 | 0.001013055
  9 | Metis (A848 HA)      |      190 |              |             1.11 | 1849-07-31     |           5.079 |              11.61992838 | 0.000638574
 11 | Parthenope (A850 JA) |  142.887 |              |              1.2 | 1850-09-17     |          13.7204 |              78.43724007 | 0.005914264
 12 | Victoria (A850 RA)   |  115.087 |              |            0.826 | 1850-09-18     |          8.6599 |              45.39580388 | 0.007870583
(10 rows)
```

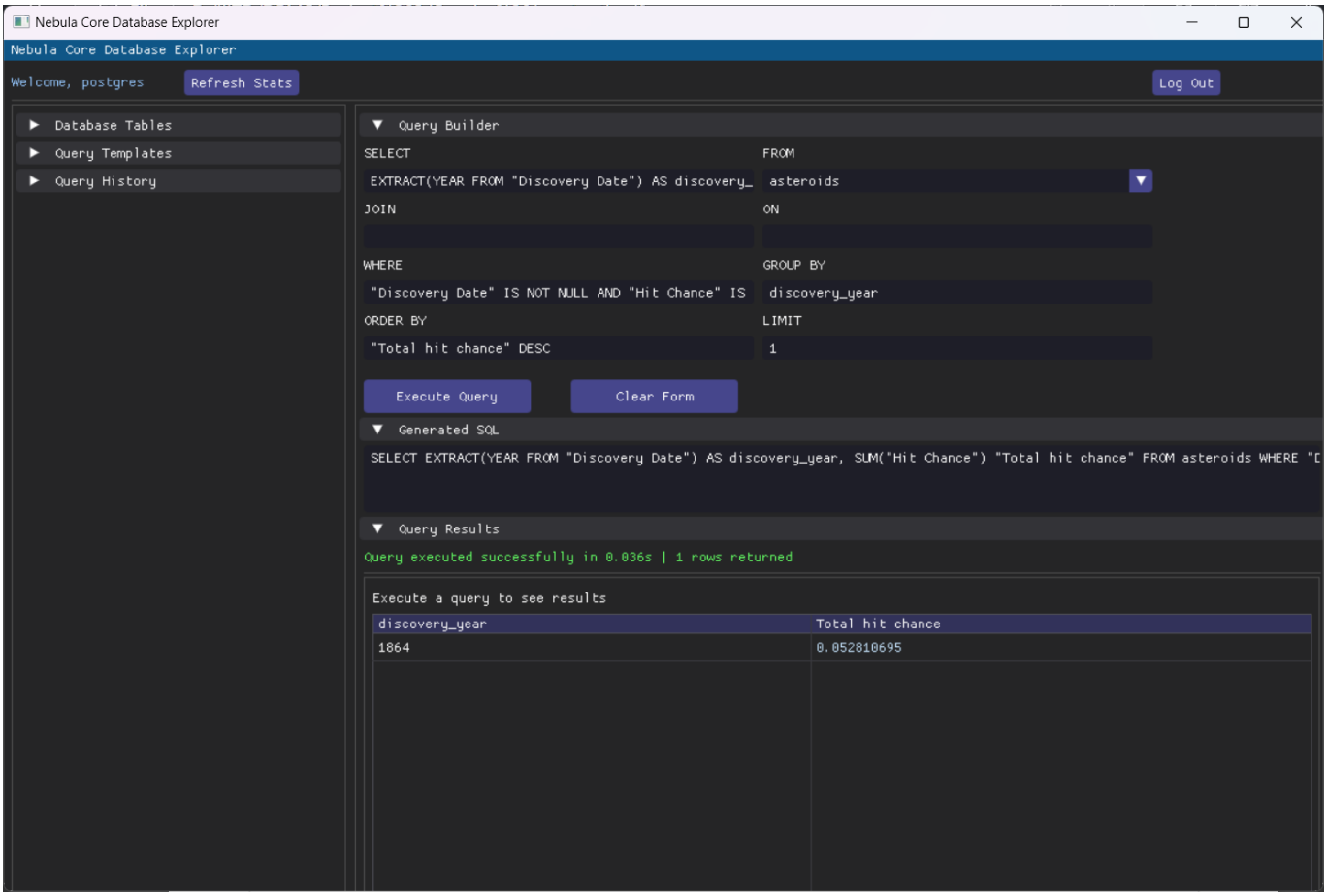


Query 13

Find the year with highest total probability of an asteroid hit

```sql
SELECT
    EXTRACT(YEAR FROM "Discovery Date") AS discovery_year, SUM("Hit Chance")
"Total hit chance"
FROM asteroids
WHERE
    "Discovery Date" IS NOT NULL AND "Hit Chance" IS NOT NULL
GROUP BY
    discovery_year
ORDER BY
    "Total hit chance" DESC
LIMIT 1;
```

```
Nebula Core=# select extract(year from "Discovery Date")  as year, sum("Hit Chance") "Total hit probability" from asteroids group by year having sum("Hit Chance") = (sele
ct max(total_hit) from (select extract(year from "Discovery Date") as Year, sum("Hit Chance") as total_hit from asteroids group by year) subquery ) order by "Total hit pr
obability" DESC;
 year | Total hit probability
------+-----------------------
 1864 |           0.052810695
(1 row)
```

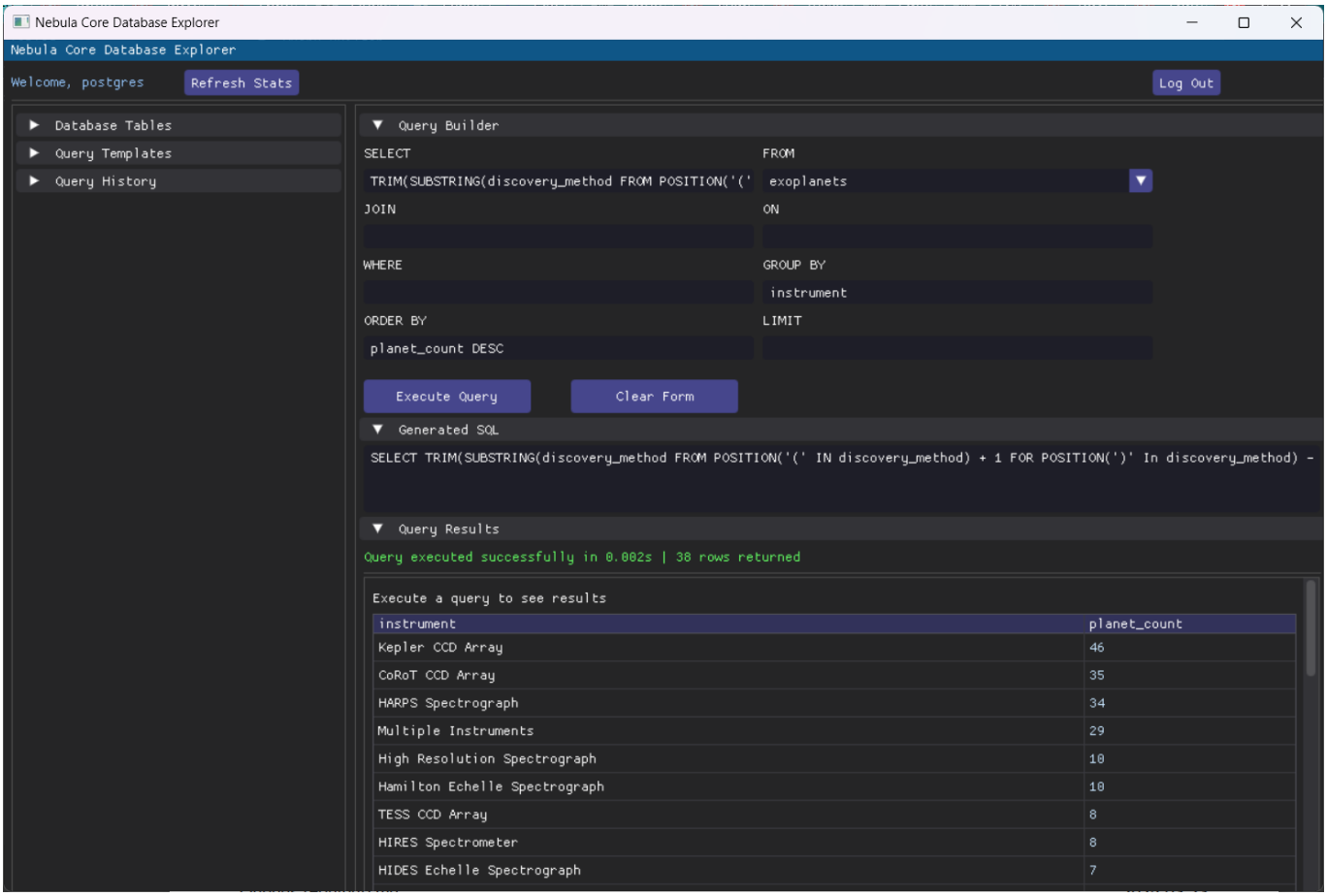


Query 14

Find the number of exoplanets discovered by each instrument

```
SELECT
  TRIM(SUBSTRING(discovery_method FROM POSITION('(' IN discovery_method) + 1 FOR
POSITION(')' IN discovery_method) - POSITION('(' IN discovery_method) - 1)) AS
instrument,
  COUNT(*) AS planet_count
FROM exoplanets
GROUP BY instrument;
```

```
Nebula Core-# ORDER BY planet_count DESC;
                instrument                 | planet_count
-------------------------------------------+--------------
 Kepler CCD Array                          |           46
 CoRoT CCD Array                           |           35
 HARPS Spectrograph                        |           34
 Multiple Instruments                      |           29
 High Resolution Spectrograph              |           10
 Hamilton Echelle Spectrograph             |           10
 TESS CCD Array                            |            8
 HIRES Spectrometer                        |            8
 HIDES Echelle Spectrograph                |            7
 CARMENES                                  |            6
 Coude Echelle Spectrograph                |            5
 Gaia CCD array                            |            5
 NACO Camera                               |            4
 HARPS-N Spectrograph                      |            4
 SOPHIE Spectrograph                       |            3
 NIRC2 Camera                              |            3
 Apogee CCD Sensor                         |            2
 CORALIE Spectrograph                      |            2
 WIRCam                                    |            1
 SpeX                                      |            1
 SPHERE                                    |            1
 SIMON Near-Infrared Spectroimager         |            1
 NIRI Camera                               |            1
 6K CCD Mosaic                             |            1
 CIAO Camera                               |            1
 IRAC Infrared Array Camera                |            1
 BOES Echelle Spectrograph                 |            1
 UCLES Spectrograph                        |            1
 ESPRESSO                                  |            1
 WFC3 Camera                               |            1
 ELODIE Spectrograph                       |            1
 WFPC2 Camera                              |            1
 FORS2 Spectrograph                        |            1
 HgCdTe and Si:As 1K Infrared Detectors    |            1
 Infrared Camera and Spectrograph (IRCS    |            1
 Gemini Planet Imager                      |            1
 ACS Camera                                |            1
 Subaru Coronagraphic Extreme Adaptive Opti |            1
(38 rows)
```



Disclaimer, some queries are a little bit wrong, but I lack the bandwidth and the willpower to fix them, take a look at the queries seen in the output to see the correct one.