

IS-664 Database Programming

Fall 2022

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HW

Homework 3

STORED PROGRAMS FOR THE ASTEROIDS DATABASE

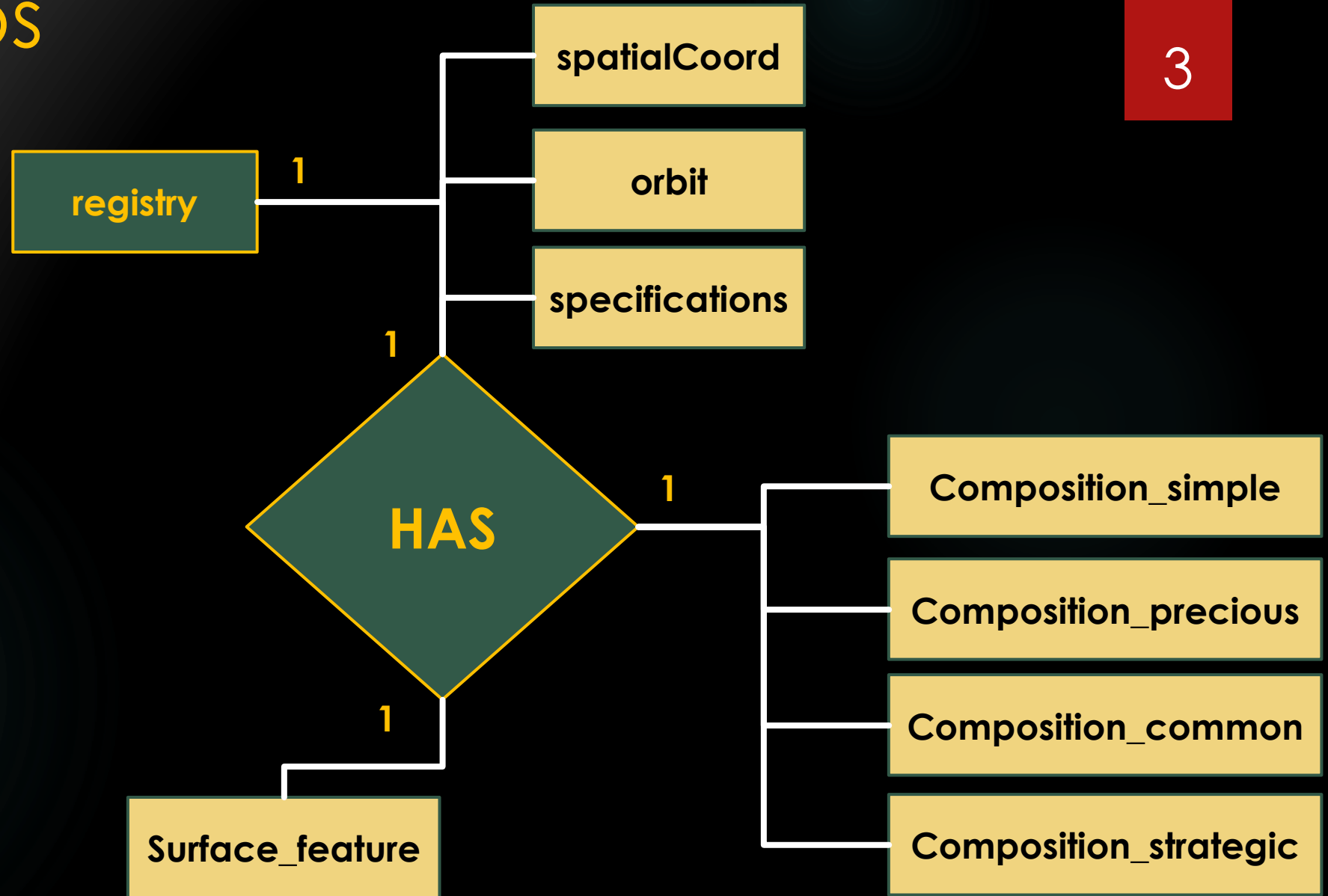
Professor HG Locklear

Asteroids

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- ▶ **C-Type** (Carbonaceous) asteroids are the most common variety, forming around 75% of known asteroids. They are volatile-rich and distinguished by a very low albedo because their composition includes a large amount of carbon, in addition to rocks and minerals. They occur most frequently at the outer edge of the asteroid belt, 3.5 AU from the Sun, where 80% of the asteroids are of this type, whereas only 40% of asteroids at 2 AU from the Sun are C-type.
- ▶ **S-Type** (Siliceous) asteroids are asteroids with a spectral type that is indicative of a siliceous (i.e., stony) mineralogical composition. They are dominant in the inner part of the asteroid belt within 2.2 AU, common in the central belt within about 3 AU, but become rare farther out.
- ▶ **M-Type** (Metallic) asteroids are a spectral class of asteroids which appear to contain higher concentrations of metal phases (e.g., iron-nickel) than other asteroid classes, and are widely thought to be the source of iron meteorites.

Relationships



Relations

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registry

<u>Designation</u>	AType	Country	DDate
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spatialCoord

<u>Designation</u>	X	Y	Z
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specifications

<u>Designation</u>	Diameter	Mass	Density	Inclination	Rotation
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surface_feature

<u>Designation</u>	Surface	Water
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orbit

<u>Designation</u>	Aphelion	Perihelion	Eccentricity	Period_Orbit	Radius_Orbit
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composition_simple

<u>Designation</u>	Content_Rock	Content_Metal
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composition_common

<u>Designation</u>	Nickel	Molybdenum	Iron	Zinc
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composition_precious

<u>Designation</u>	Gold	Silver	Platinum	Palladium	Rhodium	Ruthenium	Iridium	Osmium
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composition_strategic

<u>Designation</u>	Chromium	Cobalt	Tungsten	Uranium
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Units of Measure

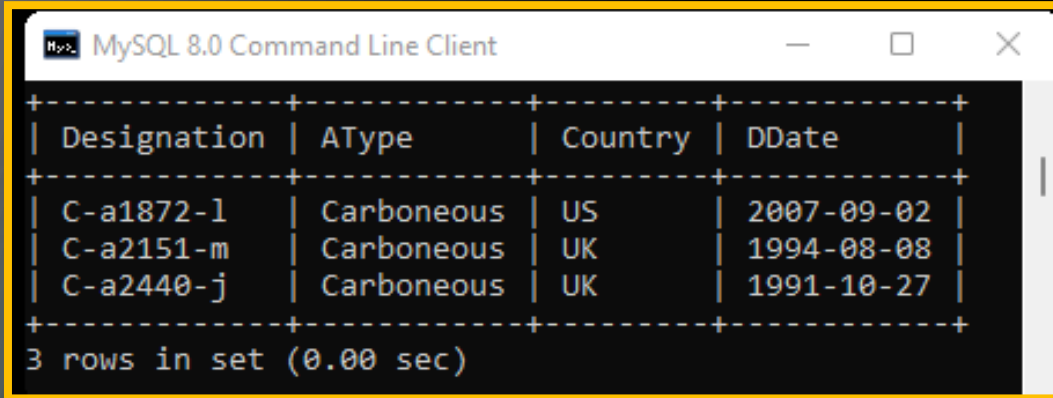
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Attribute	Unit of Measure
Diameter	Meters
Mass	Kilograms
Density	Kilograms per Cubic Meter
Inclination	Degrees
Rotation	Hours
Aphelion	Astronomical Units
Perihelion	Astronomical Units
Eccentricity	Ratio
Period_Orbit	Years
Radius Orbit	Astronomical Units
X,Y, and Z	Number (Ordinate)
All Composition Attributes	Percentages of Mass
Water and Rock	Percentages

Stored Procedure 1

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Create the Stored Procedure **showType** which accepts an Asteroid Type (**T**) and an integer (**C**) as its parameters and returns the data about the specified number (**C**) of asteroids of that type (**T**) in the format shown below.



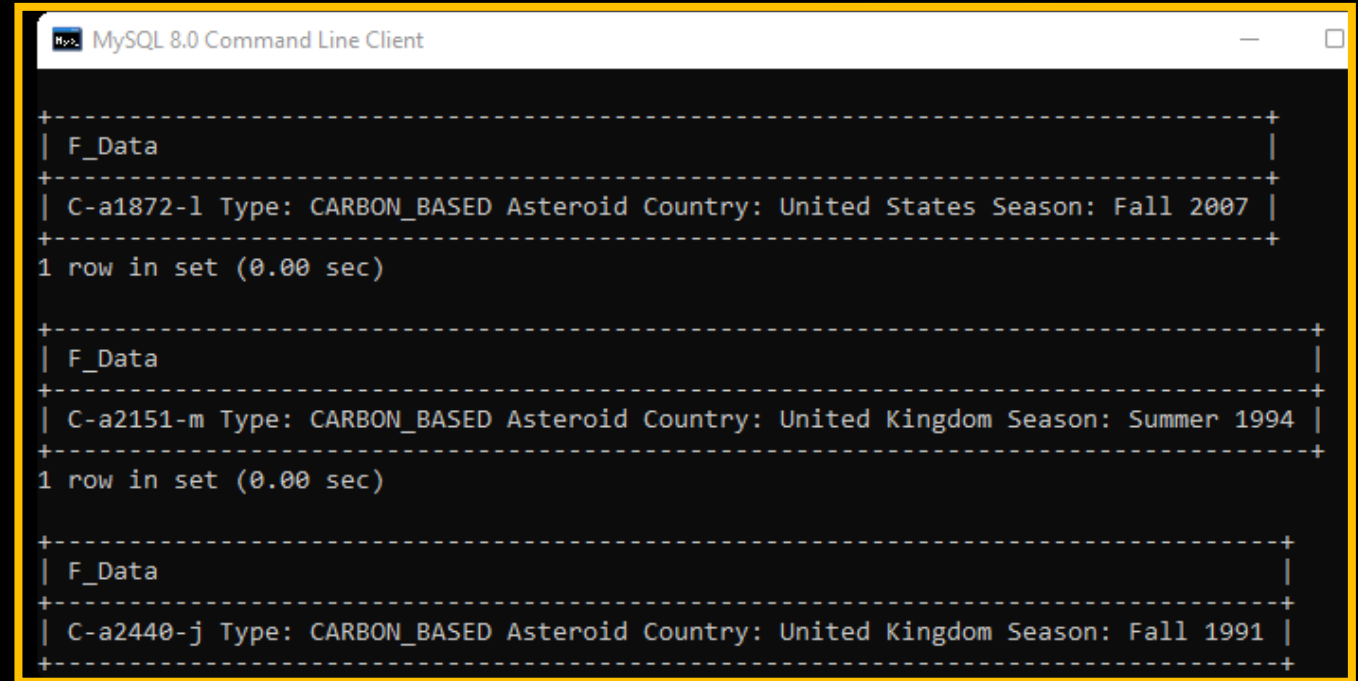
```
MySQL 8.0 Command Line Client
```

Designation	AType	Country	DDate
C-a1872-l	Carboneous	US	2007-09-02
C-a2151-m	Carboneous	UK	1994-08-08
C-a2440-j	Carboneous	UK	1991-10-27

3 rows in set (0.00 sec)

US = 'United States'
UK = 'United Kingdom'
RUSSIA = 'Russian Federation'
CHINA = 'People's Republic of China'

Carboneous = 'CARBON_BASED'
Metallic = 'METAL_BASED'
Silicaceous = 'SILICON_BASED'



```
MySQL 8.0 Command Line Client
```

```
+-----+  
| F_Data                                     |  
+-----+  
| C-a1872-l Type: CARBON_BASED Asteroid Country: United States Season: Fall 2007 |  
+-----+  
1 row in set (0.00 sec)
```

```
+-----+  
| F_Data                                     |  
+-----+  
| C-a2151-m Type: CARBON_BASED Asteroid Country: United Kingdom Season: Summer 1994 |  
+-----+  
1 row in set (0.00 sec)
```

```
+-----+  
| F_Data                                     |  
+-----+  
| C-a2440-j Type: CARBON_BASED Asteroid Country: United Kingdom Season: Fall 1991 |  
+-----+
```

November – March = 'Winter'
April – May = 'Spring'
June – August = 'Summer'
September – October = 'Fall'

Stored Procedure 2

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Create the Stored Procedure **showValue** which accepts an Asteroid Designation (**A**) and calculates the total value of its strategic metals and displays the total value in the format shown below.

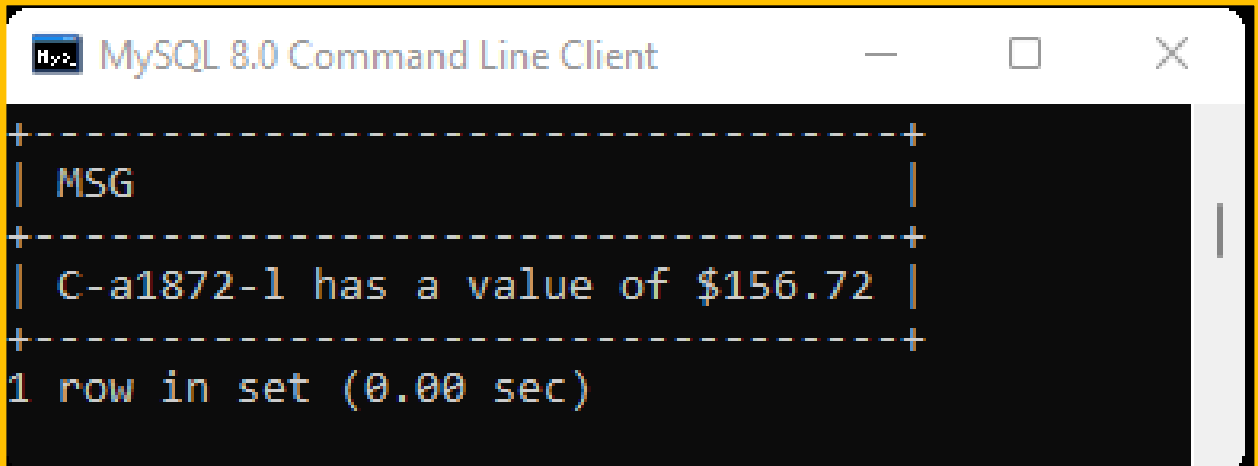
Chromium = \$12.50 per kg

Cobalt = \$9.25 per kg

Tungsten = \$7.75 per kg

Uranium = \$10.00 per kg

The **Total Value** of an asteroids strategic metals is the sum of the values of each of the metals based on their percentage of the mass of the asteroid.



```
MySQL 8.0 Command Line Client
+-----+
| MSG   |
+-----+
| C-a1872-1 has a value of $156.72 |
+-----+
1 row in set (0.00 sec)
```

Stored Procedure 3

8

Create the Stored Procedure **showAllValues** which accepts a JSON Array (**of any length**) of Asteroid Designations (**A**) and calculates the total value of each of their strategic metals and displays the total values in the format shown below.

Chromium = \$12.50 per kg

Cobalt = \$9.25 per kg

Tungsten = \$7.75 per kg

Uranium = \$10.00 per kg

The **Total Value** of an asteroids strategic metals is the sum of the values of each of the metals based on their percentage of the mass of the asteroid.

```
MySQL 8.0 Command Line Client
+-----+
| Total Strategic Value |
+-----+
| C-a1872-l has a value of $156.72 |
+-----+
1 row in set (0.00 sec)

+-----+
| Total Strategic Value |
+-----+
| M-a1166-j has a value of $1942.18 |
+-----+
1 row in set (0.00 sec)

+-----+
| Total Strategic Value |
+-----+
| S-e4734-n has a value of $81.96 |
+-----+
```