IS-664 Database Programming
Fall 2022
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Class Exercise 1

STORED PROGRAMS FOR THE ASTEROIDS DATABASE

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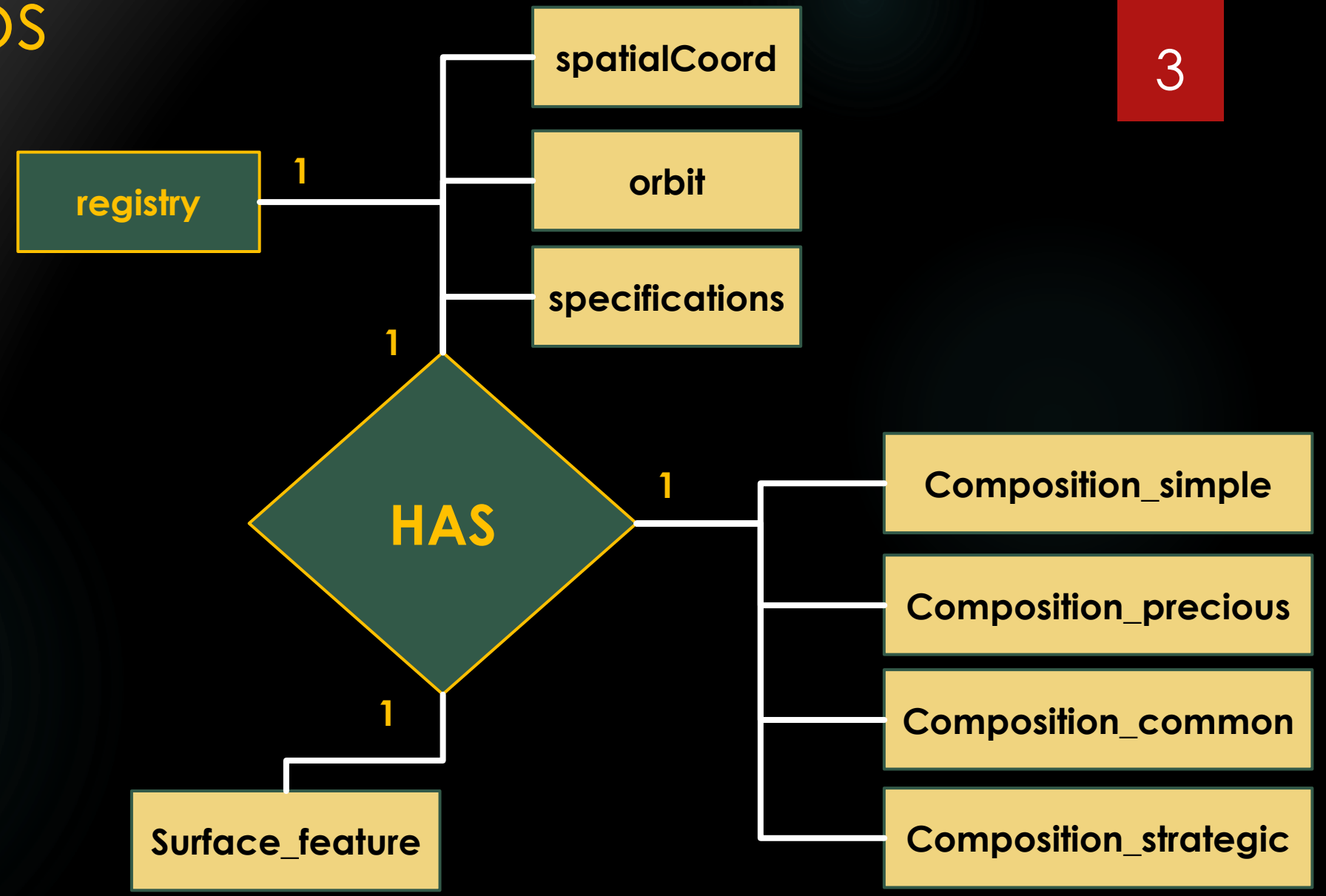
Asteroids

- **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

registry			
Designation	AType	Country	DDate

spatialCoord			
Designation	X	Y	Z

specifications					
Designation	Diameter	Mass	Density	Inclination	Rotation

surface_feature		
Designation	Surface	Water

orbit					
Designation	Aphelion	Perihelion	Eccentricity	Period_Orbit	Radius_Orbit

composition_simple		
Designation	Content_Rock	Content_Metal

composition_common				
Designation	Nickel	Molybdenum	Iron	Zinc

composition_precious							
Designation	Gold	Silver	Platinum	Palladium	Rhodium	Ruthenium	Iridium	Osmium

composition_strategic				
Designation	Chromium	Cobalt	Tungsten	Uranium

Units of Measure

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

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)
```

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 |
+-----------------------------------------------------------------------------+
```

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

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

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

Stored Procedure 2

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.