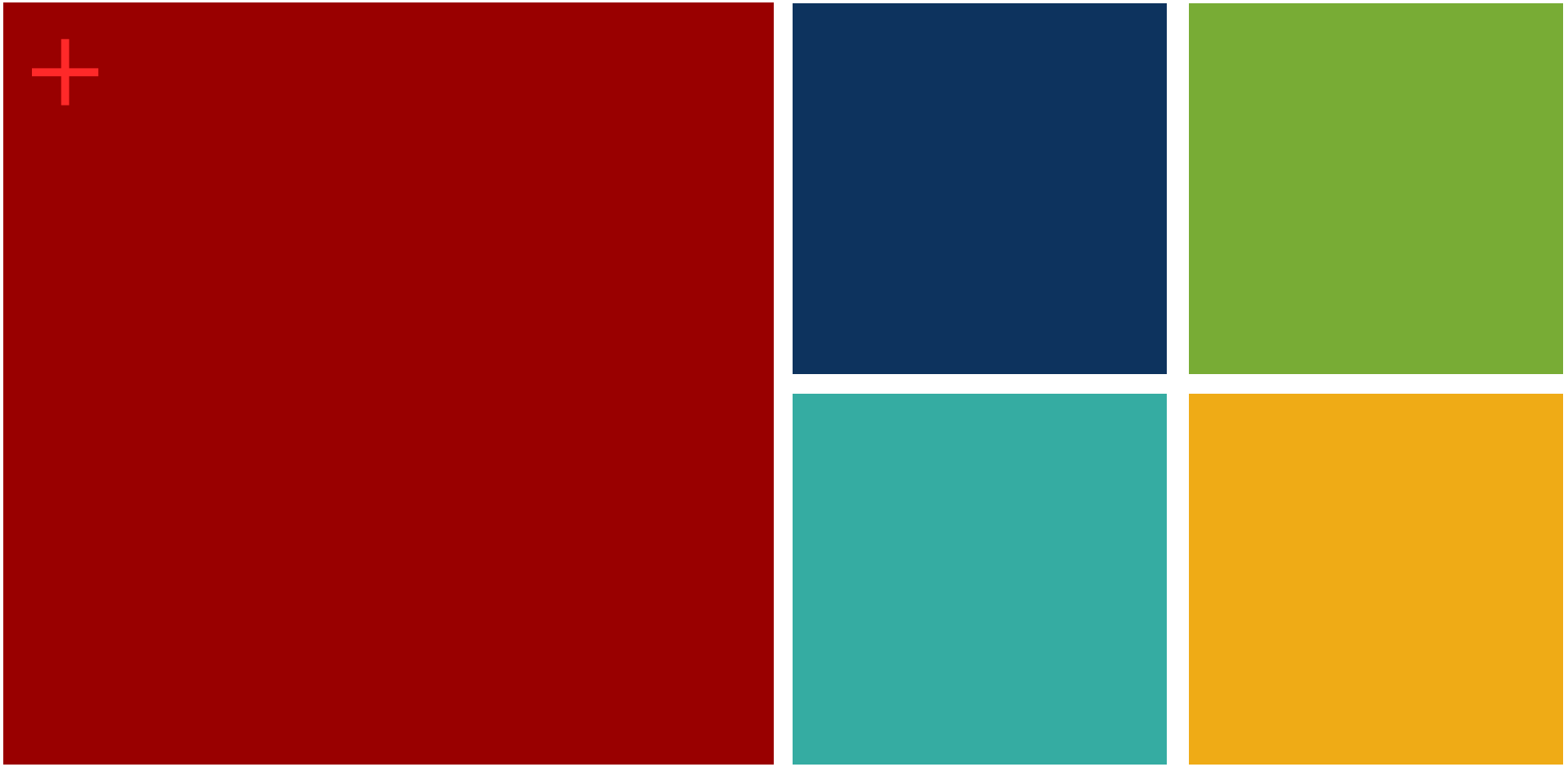

CSIT6000P Spatial and Multimedia Databases

2022 Spring

SDB Exercises

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+ Problem

Consider three types of data for an environmental protection agency:

1. one is about flora and fauna sightings which record the time and location (i.e., point) for a sighting of some species,
2. one is about the areas of all defined wetlands (as polygons), and
3. another is about the defined areas (as polygons) for state and national forest parks.

A point is recorded using latitude and longitude, and a polygon is defined as a closed sequence of points.

+ Q1

Design a database for these three types of data. You may choose to use spatial data types such as POINT, LINE and POLYGON. The tables you design should support at least the queries in Question 2 below. Your design can be simple tables with attributes and data types.

[*You can document any your design assumptions if necessary*].

+ Q2

Write three queries in an SQL-like query language,

1. to find the number of sightings of legless lizards in Pine Ridge Conservation Park.
2. to find all wetlands inside a state forest park.

[*Please define any non-standard SQL operations, relationships and functions you choose to use in a query*.]

+ Extra Task

- This exercise only considers the conceptual scheme with SQL-like queries, can you try to use a real DBMS to create the logical schema and using the SQL language supported by that system to write the SQL queries?
- You may consider Oracle or PostGIS
- You can also try to populate the tables and run the SQL queries with a real system

+ Sample Solutions

- sighting(id, time, location, name)
- wetland(id, area, name)
- park(id, area, level, name)

Sighting Table


```
CREATE TABLE sighting (
        id              number,
        time            date,
        location        point,
        name            varchar(200)
);
```

Wetland Table


```
CREATE TABLE wetland (
        id              number,
        area            polygon,
        name            varchar(200)
);
```

+ Park Table


```
CREATE TABLE park (
        id              number,
        area            polygon,
        type            enum('state', 'national'),
        name            varchar(200)
);
```

+ SQL Query 1

to find the number of sightings of legless lizards in Pine Ridge Conservation Park

```
SELECT   count(*)
FROM     sighting s, park p
WHERE.   inside(s.location, p.area) and
         upper(s.name) like “%LEGLESS LIZARD%” and
         upper(p.name) like “%PINE RIDGE CON%”;
```

sighting(id, time, location, name)

park(id, area, level, name)

+ SQL Query 2

to find all wetlands inside a state forest park


```
SELECT   w.name
FROM     wetland w, park p
WHERE.   inside(w.area, p.area) and
         p.type = 'state';
```

wetland(id, area, name)

park(id, area, level, name)