
A naturalist studying in the field enters their observations into a JSON document. Here is an example:

```json
{"Journal":
    {"Observations":
        [{"fish": {"type": "trout", "isFreshWater": "true"},
          "bird": {"type": "duck", "wingspan": 10},
          "dateSeen": "2016-12-01",
          "region": "Iowa"},
        {"fish": {"type": "tuna", "isFreshWater": "false"},
          "bird": [{"type": "seagull", "wingspan": 15},
                    {"type": "seagull", "wingspan": 11},
                    {"type": "albatross"}],
          "dateSeen": "2016-12-02",
          "region": "Newport"},
        {"fish": [{"type": "tuna", "isFreshWater": "false"},
                    {"type": "eel", "isFreshWater": "false"}],
          "dateSeen": "2016-12-03",
          "region": "Newport"},
        ...
    ]
}
```

Each observation may contain any number of birds and fish seen together in the same region on the same date. `isFreshWater` is an attribute of the type of fish, but the `wingspan` is an attribute of a particular observed bird and may or may not be recorded.

a) (3 points) Write a N1QL (Couchbase) query that lists the regions where a seagull has been observed.
b) The naturalist occasionally makes changes to the JSON document (e.g., making corrections, adding observations, etc.). Answer the following (1 point each).

i.  Are *insert* anomalies possible? Give one example or say none exist.

ii. Are *update* anomalies possible? Give one example or say none exist.

iii. Are *delete* anomalies possible? Give one example or say none exist.

c) (5 points) The analyst working with the naturalist wants to model the data so that it can be put into a database. Draw an E/R diagram that models the Observations data.

The diagram must:
- not be ambiguous
- not be more complicated than necessary
- include multiplicities (upper and lower bounds) on all edges using (min, max) notation
- underline attributes that are part of a key