HW4 Template

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1.

A) The data type for topics is an array of strings.

B) The data type for education is an array of object

C) The data type for name is an object.

D) The data type for duration is number.

2.

A) Results of user query after creating index:

```
[
 {
   "users": {
     "email": "troytaylor@ucla.edu",
     "isinstructor": false,
     "isstudent": true,
     "name": {
       "first_name": "Jennifer",
       "last_name": "Kim"
     },
     "occupation": "Retail manager",
     "user_id": "133"
   }
 }
]
```

B)

    a. Query:

```
SELECT meeting_id, meeting_name
FROM Swoosh.Swoosh.meetings
WHERE meeting_name LIKE '%Communications%' AND recurr_id = '0'
ORDER BY meeting_id
LIMIT 10;
```

    b. Time to execute without index: 144.3 ms
    c. Time to execute with index: 40.6 ms
    d. Create index statement:

CREATE INDEX adv_recurr_id_meeting_name ON
`default`.`Swoosh`.`Swoosh`.`meetings`(`recurr_id`,`meeting_name`);

    e. Results of query:

```
[
 {
   "meeting_id": "0",
   "meeting_name": "Communications 1011"
 },
 {
   "meeting_id": "1",
   "meeting_name": "Communications 1012"
 },
```

```json
{
  "meeting_id": "10",
  "meeting_name": "Communications 10111"
},
{
  "meeting_id": "11",
  "meeting_name": "Communications 10112"
},
{
  "meeting_id": "12",
  "meeting_name": "Communications 10113"
},
{
  "meeting_id": "13",
  "meeting_name": "Communications 10114"
},
{
  "meeting_id": "14",
  "meeting_name": "Communications 10115"
},
{
  "meeting_id": "15",
  "meeting_name": "Communications 10116"
},
{
  "meeting_id": "16",
  "meeting_name": "Communications 10117"
},
{
  "meeting_id": "17",
  "meeting_name": "Communications 10118"
}
]
```

C)

    a. Query:

```
SELECT VALUE {
    p1.body,
    "post_topics": p1.topics,
    "replied_to_post_topic": p2.topics}
FROM Swoosh.Swoosh.posts AS p1 JOIN Swoosh.Swoosh.posts AS p2 ON p1.replied_to_post_id = p2.post_id
WHERE 'homework2' IN p1.topics AND p1.created_at > '2020-07-01 00:00' AND p2.post_type = 'note'
ORDER BY p1.created_at DESC;
```

    b. Results of query:

```
[
 {
   "body": "Always seven dream happy first message. Instead month great consider view. Politics but beat once. Six sing beyond lay.",
    "post_topics": [
     "finalexam",
     "homework2"
    ],
    "replied_to_post_topic": [
     "module1"
    ]
  },
  {
    "body": "Benefit group arrive. Travel power bill stop tax. Size chair respond including PM stock. Nothing discussion cell share brother. Age else civil its structure. Room time himself game close scene all.",
    "post_topics": [
     "finalproject",
     "module2",
     "homework2"
    ],
    "replied_to_post_topic": ""
  },
  {
    "body": "Receive college kitchen choice goal model under. Agency everything country partner. Talk common almost military door I. Note their participant population. Suggest most federal me.",
    "post_topics": [
     "homework2",
     "homework1",
```

```
      "project4"
    ],
    "replied_to_post_topic": [
     "finalexam",
     "homework5",
     "module4"
    ]
  },
  {
      "body": "By southern step. Skill young beyond foreign cut never best. Recognize
involve myself near wife explain police accept. Democratic lose become her. We strong
air rest special.",
    "post_topics": [
     "logistics",
     "homework2"
    ],
    "replied_to_post_topic": ""
  },
  {
    "body": "Thought reality war line there talk. Political final traditional so serve. Simply
peace nation school let many.",
    "post_topics": [
     "homework2",
     "homework3"
    ],
    "replied_to_post_topic": ""
  },
  {
      "body": "Single ten article up. Yeah against building people leader positive school.
Finally strong scientist local lead.",
    "post_topics": [
     "project1",
     "lectures",
     "homework2"
    ],
    "replied_to_post_topic": [
     "logistics",
     "module1"
    ]
  },
  {
    "body": "Which summer minute style present economic. My project new them oil
```

```
against. Pretty involve offer less. Song small meeting music. Generation dream since kind
up.",
    "post_topics": [
     "logistics",
     "finalexam",
     "homework2"
    ],
    "replied_to_post_topic": ""
 },
 {
     "body": "Matter  manage  place  check.  Idea  month  tell  certain  than  discover  skill.
Foreign participant government because weight help.",
    "post_topics": [
     "homework4",
     "homework2"
    ],
    "replied_to_post_topic": [
     "lectures"
    ]
 },
 {
    "body": "Others painting TV produce experience experience. Note state option. Center
unit range receive its.",
    "post_topics": [
     "homework2"
    ],
    "replied_to_post_topic": [
     "midterm2",
     "homework3",
     "finalexam"
    ]
 }
]
```

D)

a. Select Query:

```sql
SELECT *
FROM Swoosh.Swoosh.posts AS p
WHERE p.post_type = "";
```

b. Results of query:

```
[
 {
   "p": {
     "body": "Lay analysis environmental note determine listen. Toward prevent hospital claim mind. Whether available short.",
     "created_at": "2020-11-17 22:32:48",
     "meeting_id": "1447",
     "post_id": "271",
     "post_type": "",
     "replied_to_post_id": "",
     "topics": "",
     "user_id": "487"
   }
 },
 {
   "p": {
     "body": "Order three all unit. Seven peace toward represent. Poor my head its officer garden. For why kitchen.",
     "created_at": "2020-08-29 12:37:59",
     "meeting_id": "522",
     "post_id": "272",
     "post_type": "",
     "replied_to_post_id": "",
     "topics": "",
     "user_id": "106"
   }
 },
 {
   "p": {
     "body": "Find provide upon single half create. Foot remember develop above. Impact grow important life positive interesting significant still.",
     "created_at": "2020-06-24 11:11:53",
```

      "meeting_id": "575",
      "post_id": "279",
      "post_type": "",
      "replied_to_post_id": "225",
      "topics": [
       "homework4",
       "project4",
       "project1"
      ],
      "user_id": "355"
    }
   }
  ]

c. Update Query:

```
UPDATE Swoosh.Swoosh.posts
UNSET post_type
WHERE post_type = "";
```

d. Results of query:

```
{
  "results": []
}
```

e. Select Query to Verify changes:

```
SELECT *
FROM Swoosh.Swoosh.posts AS p
WHERE p.post_type IS MISSING;
```

f. Results of query:

```
[
 {
   "p": {
      "body": "Lay analysis environmental note determine listen. Toward prevent hospital claim mind. Whether available short.",
      "created_at": "2020-11-17 22:32:48",
```

      "meeting_id": "1447",
      "post_id": "271",
      "replied_to_post_id": "",
      "topics": "",
      "user_id": "487"
    }
  },
  {
    "p": {
      "body": "Find provide upon single half create. Foot remember develop above. Impact grow important life positive interesting significant still.",
      "created_at": "2020-06-24 11:11:53",
      "meeting_id": "575",
      "post_id": "279",
      "replied_to_post_id": "225",
      "topics": [
        "homework4",
        "project4",
        "project1"
      ],
      "user_id": "355"
    }
  },
  {
    "p": {
      "body": "Order three all unit. Seven peace toward represent. Poor my head its officer garden. For why kitchen.",
      "created_at": "2020-08-29 12:37:59",
      "meeting_id": "522",
      "post_id": "272",
      "replied_to_post_id": "",
      "topics": "",
      "user_id": "106"
    }
  }
]

E) [For this question just show the results of query (first 5)]

    a. Before update Query and Result:

```
SELECT *
FROM Swoosh.Swoosh.posts AS p
WHERE p.topics = ""
LIMIT 5;
```

```
[
 {
  "p": {
      "body": "Fire them mean support. Go grow citizen recent. Fall later light foreign coach. This thus drug become billion voice focus.",
      "created_at": "2020-12-23 4:35:34",
      "meeting_id": "825",
      "post_id": "331",
      "post_type": "question",
      "replied_to_post_id": "293",
      "topics": "",
      "user_id": "265"
   }
 },
 {
  "p": {
      "body": "Treat decade its sit. Culture happen work candidate research final. Also foreign through machine special after lawyer various. Operation blue successful out computer outside.",
      "created_at": "2020-03-19 11:00:48",
      "meeting_id": "1351",
      "post_id": "47",
      "post_type": "note",
      "replied_to_post_id": "",
      "topics": "",
      "user_id": "481"
   }
 },
 {
  "p": {
      "body": "Catch fact toward and. Thus mission couple record dark itself. Always financial despite. Senior first they cultural executive democratic way.",
      "created_at": "2020-09-23 23:32:02",
      "meeting_id": "353",
```

```
      "post_id": "307",
      "post_type": "question",
      "replied_to_post_id": "299",
      "topics": "",
      "user_id": "165"
    }
  },
  {
    "p": {
      "body": "Yard follow citizen report tonight. Check themselves pull leg tough gun gas.
Eight various maintain generation close.",
      "created_at": "2020-03-23 12:24:25",
      "meeting_id": "717",
      "post_id": "744",
      "post_type": "question",
      "replied_to_post_id": "424",
      "topics": "",
      "user_id": "399"
    }
  },
  {
    "p": {
      "body": "That sense company activity owner feel. Week day each thus I sure many.
General car add. History scene these clearly.",
      "created_at": "2020-07-30 16:54:50",
      "meeting_id": "835",
      "post_id": "108",
      "post_type": "question",
      "replied_to_post_id": "",
      "topics": "",
      "user_id": "183"
    }
  }
]
```

b. Update Query:
UPDATE Swoosh.Swoosh.posts
UNSET topics
WHERE topics = "";

```
{
  "results": []
}
```

c. Select Query and Result:

```
SELECT *
FROM Swoosh.Swoosh.posts AS p
WHERE p.topics IS MISSING
LIMIT 5;
```

```
[
 {
   "p": {
      "body": "Fire them mean support. Go grow citizen recent. Fall later light foreign
coach. This thus drug become billion voice focus.",
      "created_at": "2020-12-23 4:35:34",
      "meeting_id": "825",
      "post_id": "331",
      "post_type": "question",
      "replied_to_post_id": "293",
      "user_id": "265"
   }
 },
 {
   "p": {
      "body": "Treat decade its sit. Culture happen work candidate research final. Also
foreign through machine special after lawyer various. Operation blue successful out
computer outside.",
      "created_at": "2020-03-19 11:00:48",
      "meeting_id": "1351",
      "post_id": "47",
      "post_type": "note",
      "replied_to_post_id": "",
      "user_id": "481"
   }
 },
 {
   "p": {
      "body": "Catch fact toward and. Thus mission couple record dark itself. Always
financial despite. Senior first they cultural executive democratic way.",
```

```
      "created_at": "2020-09-23 23:32:02",
      "meeting_id": "353",
      "post_id": "307",
      "post_type": "question",
      "replied_to_post_id": "299",
      "user_id": "165"
    }
  },
  {
    "p": {
      "body": "Yard follow citizen report tonight. Check themselves pull leg tough gun gas.
Eight various maintain generation close.",
      "created_at": "2020-03-23 12:24:25",
      "meeting_id": "717",
      "post_id": "744",
      "post_type": "question",
      "replied_to_post_id": "424",
      "user_id": "399"
    }
  },
  {
    "p": {
      "body": "That sense company activity owner feel. Week day each thus I sure many.
General car add. History scene these clearly.",
      "created_at": "2020-07-30 16:54:50",
      "meeting_id": "835",
      "post_id": "108",
      "post_type": "question",
      "replied_to_post_id": "",
      "user_id": "183"
    }
  }
]
```

F)

   a. Query:

```
SELECT p.post_id, ARRAY_COUNT(p.topics) AS topic_count
FROM Swoosh.Swoosh.posts AS p
WHERE p.post_type = "note" AND ARRAY_COUNT(p.topics) > 1
ORDER BY p.post_id
LIMIT 10;
```
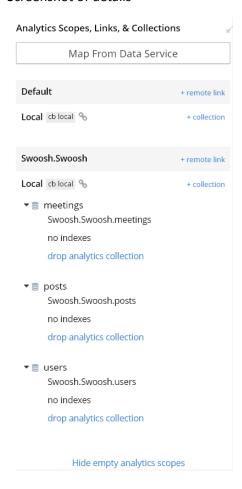
   b. Results of query:

post_id topic_count

"10"	3
"105"	3
"114"	3
"125"	3
"131"	2
"133"	2
"134"	3
"136"	3
"139"	2
"140"	3

G)

    a.   Screenshot of details

H)

   a. Query:

```
WITH temp AS (
  SELECT u.user_id, u.email, edu.major
  FROM Swoosh.Swoosh.users AS u UNNEST u.education AS edu
),
user_info AS (
  SELECT t.user_id, t.email, ARRAY_AGG(DISTINCT t.major) AS graduate_major
  FROM temp AS t
  GROUP BY t.user_id, t.email
),
instructor_course AS (
  SELECT t.user_id, COUNT(t.course_id) AS course_count
  FROM Swoosh.Swoosh.teaches AS t
  GROUP BY t.user_id
  ORDER BY COUNT(t.course_id) DESC
),
instructor_rank AS (
    SELECT i.user_id, i.course_count, DENSE_RANK() OVER (ORDER BY i.course_count
DESC) AS rank
  FROM instructor_course AS i
)
SELECT i.user_id, i.course_count, u.graduate_major, u.email
FROM instructor_course AS i JOIN user_info AS u ON i.user_id = u.user_id
ORDER BY i.course_count DESC
LIMIT 10;
```

   b. Results of query:

```
[
 {
   "course_count": 10,
   "email": "mchristian@uci.edu",
   "graduate_major": [
     "Mechanical Engineering"
   ],
   "user_id": "486"
 },
 {
   "course_count": 6,
   "email": "tracy86@ucr.edu",
   "graduate_major": [
     "Mechanical Engineering",
     "Performing Arts",
     "Public Relations"
   ],
   "user_id": "347"
```

```
    },
    {
     "course_count": 6,
     "email": "coledunn@berkeley.edu",
     "graduate_major": [
      "Biometry",
      "English",
      "Literature",
      "Public Relations"
     ],
     "user_id": "300"
    },
    {
     "course_count": 6,
     "email": "steinjanet@ucsd.edu",
     "graduate_major": [
      "Computer Science"
     ],
     "user_id": "223"
    },
    {
     "course_count": 6,
     "email": "oscar54@virginia tech.edu",
     "graduate_major": [
      "Biology",
      "Biometry",
      "Chemical Engineering",
      "Computer Science",
      "Public Relations"
     ],
     "user_id": "366"
    },
    {
     "course_count": 6,
     "email": "rachelleach@umass.edu",
     "graduate_major": [
      "History",
      "Mechanical Engineering"
     ],
     "user_id": "100"
    },
    {
     "course_count": 6,
     "email": "carlsonholly@mit.edu",
     "graduate_major": [
      "Business Management",
      "History",
      "Mathematics",
```

```
      "Mechanical Engineering",
      "Nursing"
    ],
    "user_id": "426"
  },
  {
    "course_count": 6,
    "email": "alexisperry@mit.edu",
    "graduate_major": [
      "Biology",
      "Chemistry",
      "Computer Science"
    ],
    "user_id": "492"
  },
  {
    "course_count": 6,
    "email": "hthompson@ucsd.edu",
    "graduate_major": [
      "Biometry",
      "Literature"
    ],
    "user_id": "474"
  },
  {
    "course_count": 5,
    "email": "pamela18@university of maryland.edu",
    "graduate_major": [
      "Computer Science",
      "Mechanical Engineering"
    ],
    "user_id": "40"
  }
]
```

I)

    a.   Query:

          WITH qualified_number AS (
            SELECT e.course_id, COUNT(e.user_id)
            FROM Swoosh.Swoosh.enrolledin AS e
            GROUP BY e.course_id
            HAVING COUNT(e.user_id) >= 20),
          user_occupation AS (
            SELECT DISTINCT e.course_id
            FROM Swoosh.Swoosh.users AS u JOIN Swoosh.Swoosh.enrolledin AS e ON u.user_id =
          e.user_id
            WHERE u.occupation LIKE '%engineer%' AND e.course_id IN (
                                  SELECT VALUE qn.course_id
                                  FROM qualified_number AS qn)),
          user_post AS (
            SELECT DISTINCT e.course_id
            FROM Swoosh.Swoosh.enrolledin AS e JOIN Swoosh.Swoosh.posts AS p ON e.user_id =
          p.user_id
            WHERE e.course_id IN (SELECT VALUE uo.course_id
                       FROM user_occupation AS uo)),
          qualified_courses AS (
            SELECT c.course_id, c.course_name
            FROM user_post AS up JOIN Swoosh.Swoosh.courses AS c ON up.course_id = c.course_id)
          SELECT qc.course_id, qc.course_name, COUNT(e.user_id) AS count
          FROM qualified_courses AS qc JOIN Swoosh.Swoosh.enrolledin AS e ON qc.course_id =
          e.course_id
          GROUP BY qc.course_id, qc.course_name
          ORDER BY qc.course_name

    c.   Results of query:

```
[
 {
   "count": 22,
   "course_id": "13",
   "course_name": "Calculus I"
 }
]
```

J) Extra Credit:

    a.   Query [1–OFFSET]:

```
WITH temp AS (
  SELECT u.user_id, u.email, edu.major
  FROM Swoosh.Swoosh.users AS u UNNEST u.education AS edu
),
user_info AS (
  SELECT t.user_id, t.email, ARRAY_AGG(DISTINCT t.major) AS graduate_major
  FROM temp AS t
  GROUP BY t.user_id, t.email
),
instructor_course AS (
  SELECT t.user_id, COUNT(t.course_id) AS course_count
  FROM Swoosh.Swoosh.teaches AS t
  GROUP BY t.user_id
  ORDER BY COUNT(t.course_id) DESC
),
instructor_rank AS (
    SELECT i.user_id, i.course_count, DENSE_RANK() OVER (ORDER BY i.course_count
DESC) AS rank
  FROM instructor_course AS i
)
SELECT i.user_id, i.course_count, u.graduate_major, u.email
FROM instructor_course AS i JOIN user_info AS u ON i.user_id = u.user_id
ORDER BY i.course_count DESC
LIMIT 10;
```

    b.   Results of query:

```
[
 {
   "course_count": 10,
   "email": "mchristian@uci.edu",
   "graduate_major": [
     "Mechanical Engineering"
   ],
   "user_id": "486"
 },
 {
   "course_count": 6,
   "email": "tracy86@ucr.edu",
   "graduate_major": [
     "Mechanical Engineering",
     "Performing Arts",
     "Public Relations"
   ],
   "user_id": "347"
```

```
    },
    {
     "course_count": 6,
     "email": "coledunn@berkeley.edu",
     "graduate_major": [
      "Biometry",
      "English",
      "Literature",
      "Public Relations"
     ],
     "user_id": "300"
    },
    {
     "course_count": 6,
     "email": "steinjanet@ucsd.edu",
     "graduate_major": [
      "Computer Science"
     ],
     "user_id": "223"
    },
    {
     "course_count": 6,
     "email": "oscar54@virginia tech.edu",
     "graduate_major": [
      "Biology",
      "Biometry",
      "Chemical Engineering",
      "Computer Science",
      "Public Relations"
     ],
     "user_id": "366"
    },
    {
     "course_count": 6,
     "email": "rachelleach@umass.edu",
     "graduate_major": [
      "History",
      "Mechanical Engineering"
     ],
     "user_id": "100"
    },
    {
     "course_count": 6,
     "email": "carlsonholly@mit.edu",
     "graduate_major": [
      "Business Management",
      "History",
      "Mathematics",
```

```
      "Mechanical Engineering",
      "Nursing"
    ],
    "user_id": "426"
  },
  {
    "course_count": 6,
    "email": "alexisperry@mit.edu",
    "graduate_major": [
      "Biology",
      "Chemistry",
      "Computer Science"
    ],
    "user_id": "492"
  },
  {
    "course_count": 6,
    "email": "hthompson@ucsd.edu",
    "graduate_major": [
      "Biometry",
      "Literature"
    ],
    "user_id": "474"
  },
  {
    "course_count": 5,
    "email": "pamela18@university of maryland.edu",
    "graduate_major": [
      "Computer Science",
      "Mechanical Engineering"
    ],
    "user_id": "40"
  }
]
```

c. Query [2–RANK() OVER]:

```
WITH temp AS (
  SELECT u.user_id, u.email, edu.major
  FROM Swoosh.Swoosh.users AS u UNNEST u.education AS edu
),
user_info AS (
  SELECT t.user_id, t.email, ARRAY_AGG(DISTINCT t.major) AS graduate_major
  FROM temp AS t
  GROUP BY t.user_id, t.email
),
instructor_course AS (
  SELECT t.user_id, COUNT(t.course_id) AS course_count
```

```
        FROM Swoosh.Swoosh.teaches AS t
        GROUP BY t.user_id
        ORDER BY COUNT(t.course_id) DESC
    ),
    instructor_rank AS (
        SELECT i.user_id, i.course_count, DENSE_RANK() OVER (ORDER BY i.course_count
    DESC) AS rank
        FROM instructor_course AS i
    )
    SELECT i.user_id, i.course_count, u.graduate_major, u.email
    FROM instructor_rank AS i JOIN user_info AS u ON i.user_id = u.user_id
    WHERE i.rank <= 5
    ORDER BY i.course_count DESC;
```

d.   Results of query:
```
        [
         {
          "course_count": 10,
          "email": "mchristian@uci.edu",
          "graduate_major": [
           "Mechanical Engineering"
          ],
          "user_id": "486"
         },
         {
          "course_count": 6,
          "email": "tracy86@ucr.edu",
          "graduate_major": [
           "Mechanical Engineering",
           "Performing Arts",
           "Public Relations"
          ],
          "user_id": "347"
         },
         {
          "course_count": 6,
          "email": "oscar54@virginia tech.edu",
          "graduate_major": [
           "Biology",
           "Biometry",
           "Chemical Engineering",
           "Computer Science",
           "Public Relations"
          ],
          "user_id": "366"
         },
         {
```

```
  "course_count": 6,
  "email": "hthompson@ucsd.edu",
  "graduate_major": [
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  "email": "steinjanet@ucsd.edu",
  "graduate_major": [
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  "email": "carlsonholly@mit.edu",
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  {
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    "Nursing"
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    "email": "jennaarnold@ucla.edu",
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{
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  "email": "jennifer28@ucsf.edu",
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{
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  {
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    "course_count": 3,
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      "Mathematics",
      "Pre-Medicine"
    ],
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  },
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    "course_count": 3,
    "email": "joeanderson@ucsf.edu",
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