1.
```
A) [ads] Type for 'item_id': string
B) [pictures] Type for 'url': string
C) [users] Type(s) for 'categories': array of strings
D) [ratings] Type for 'quality': number
```

2.

A) Results of query after creating index:

```
[
 {
   "users": {
     "_oid": "5d146dcc-cb2a-8262-10e5-1be9e73dc8ee",
     "categories": [
       "Meat & Seafood",
       "Pet Care",
       "Fruits & Vegetables",
       "Cookies, Snacks, & Candy",
       "Breakfast & Cereal",
       "Personal Care & Health",
       "Canned Goods & Soups"
     ],
     "email": "Christopher0342@gmail.com",
     "is_buyer": true,
     "is_seller": false,
     "joined_date": "2022-01-06",
     "name": {
       "first": "Christopher",
       "last": "Craig"
     },
     "phone": [
```

      {
        "kind": "mobile",
        "number": "001-195-007-0704"
      },
      {
        "kind": "home",
        "number": "001-828-273-9061"
      }
    ],
    "user_id": "NEI16"
  }
 }
]

B)

    a.   Query:

```
SELECT seller.user_id, ad_id, seller.placed_date
FROM ads
WHERE plan = "platinum" and seller.placed_date = "2022-01-10"
LIMIT 5;
```

    b.   Results of query:

    [
     {
       "ad_id": "AMTLK",
       "placed_date": "2022-01-10",
       "user_id": "3I68A"
     },
     {
       "ad_id": "V57KK",

    "placed_date": "2022-01-10",

    "user_id": "ISPDE"

   },

   {

    "ad_id": "UIMSD",

    "placed_date": "2022-01-10",

    "user_id": "9ZP9F"

   },

   {

    "ad_id": "VGJIW",

    "placed_date": "2022-01-10",

    "user_id": "XWXLZ"

   },

   {

    "ad_id": "T7KRV",

    "placed_date": "2022-01-10",

    "user_id": "QWK5C"

   }

  ]

C)

    a. Query:

       FROM ratings

       WHERE delivery = 5 and pricing = 5 and quality = 5

       SELECT seller_id, buyer_id;

    b. Results of query:

buyer_id	seller_id
"ZMEIK"	"4L0BA"
"6QFD3"	"LZLDV"
"WLPL6"	"E9K7C"

D)

a. Query:

SELECT item_id, name, price

FROM items

WHERE category = 'Home & Kitchen' AND price > 1000

ORDER BY price

LIMIT 10;

b. Time to execute without index:

116 ms

c. Time to execute with index:

3.9 ms

d. Create index statement:

CREATE INDEX adv_category_price ON items('category', 'price')

e. Results of query:

item_id	name	price
"79CF6"	"Knives"	1000.66
"RGD8Z"	"Mats"	1001.68
"K7GOF"	"Salad Spinner"	1003.28
"MWXAT"	"Salad Spinner"	1005.59
"NLVHM"	"Knives"	1010.35
"PH8O6"	"Bowls"	1010.39
"OW7KV"	"Knives"	1010.42
"VZJPN"	"Knives"	1015.92
"I5AIS"	"Can Opener"	1018.93
"R8D0Z"	"Spoons"	1020.1

E)

    a.   Query:

        SELECT p.pic_num, p.item_id, ad.ad_id, ad.plan

        FROM pictures AS p

        JOIN ads AS ad USE HASH(build) ON p.item_id = ad.item_id

        WHERE p.format = "mp4" AND p.url LIKE "https://picsum.photos%"

        ORDER BY p.item_id ASC

        LIMIT 5;

    b.   Results of query:

ad_id	item_id	pic_num	plan
"X731M"	"00E5T"	1	"other"
"F67QI"	"04AG5"	1	"silver"
"45TPY"	"050LI"	2	"gold"
"RXCHE"	"05H6L"	2	"other"
"FK01L"	"07OKK"	2	"other"

F)

    a.   Query:

        SELECT u.user_id, array_length(u.categories) as num_categories, u.email

        FROM users AS u

        WHERE array_length(u.categories)>1 AND u.email LIKE "%@gmail.com%"

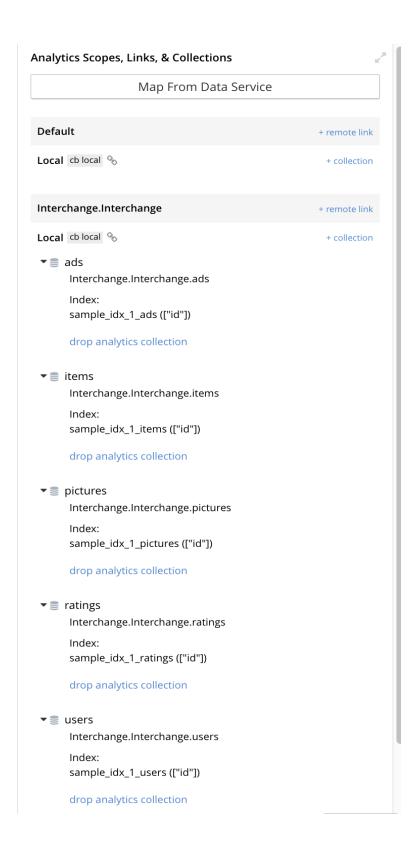   ORDER BY array_length(u.categories) DESC

        LIMIT 10;

    b.   Results of query:

email	num_categories	user_id
"03Jordanpatricia91782@gmail.com"	13	"WTZ2U"
"donovandestiny36@gmail.com"	13	"NEDMB"
"smith.Nicholas@gmail.com"	13	"LQDA2"
"And416@gmail.com"	13	"X7OBY"
"kev_ramirez@gmail.com"	13	"P8UM4"
"dia70@gmail.com"	13	"P8E5N"
"katJacobs@gmail.com"	13	"W2FN3"
"592price8728@gmail.com"	12	"SREI0"
"diaznicole0461@gmail.com"	12	"UJG56"
"926washington791@gmail.com"	12	"0KWBK"

G) Screenshots:

Analytics Scopes, Links, & Collections

⤢

Map From Data Service

Default   + remote link

Local cb local 🔗   + collection

Interchange.Interchange   + remote link

Local cb local 🔗   + collection

▼ 🗄 ads

Interchange.Interchange.ads

no indexes

drop analytics collection

▼ 🗄 items

Interchange.Interchange.items

no indexes

drop analytics collection

▼ 🗄 users

Interchange.Interchange.users

no indexes

drop analytics collection

Hide empty analytics scopes

H) Screenshots:

Analytics Scopes, Links, & Collections

Map From Data Service

Default   + remote link

Local cb local   + collection

Interchange.Interchange   + remote link

Local cb local   + collection

▼ 🗄 ads
    Interchange.Interchange.ads

    Index:
    sample_idx_1_ads (["id"])

    drop analytics collection

▼ 🗄 items
    Interchange.Interchange.items

    Index:
    sample_idx_1_items (["id"])

    drop analytics collection

▼ 🗄 pictures
    Interchange.Interchange.pictures

    Index:
    sample_idx_1_pictures (["id"])

    drop analytics collection

▼ 🗄 ratings
    Interchange.Interchange.ratings

    Index:
    sample_idx_1_ratings (["id"])

    drop analytics collection

▼ 🗄 users
    Interchange.Interchange.users

    Index:
    sample_idx_1_users (["id"])

    drop analytics collection

I)

a. Query:

SELECT u.email, u.name, COUNT(*) as sold_item_count

FROM users AS u

JOIN items AS i ON i.seller.user_id = u.user_id

WHERE i.category = 'Toys & Games' AND u.is_seller = TRUE AND i.buyer IS NOT MISSING

GROUP BY u.user_id, u.name, u.email

ORDER BY COUNT(*) DESC

LIMIT 5;

b. Results of query:

email	name.first	name.last	sold_item_count
"mel60@yahoo.com"		"Schaefer"	2
"Melinda8934@gmail.com"	"Melinda"	"Gilbert"	2
"Douglasflores@gmail.com"	"Douglas"	"Flores"	2
"861delgado62750@gmail.com"	"Meghan"	"Delgado"	2
"rosario42149@gmail.com"	"Sara"	"Rosario"	2

J)

a. Query:

SELECT u.name, u.email, count(*) as item_count

FROM ads as a, users as u

WHERE a.seller.user_id = u.user_id and a.seller.user_id in (SELECT VALUE ad.seller.user_id FROM ads as ad, items as it WHERE ad.item_id = it.item_id and ad.plan = "platinum" and it.price > 1000)

GROUP BY u.name, u.email

HAVING COUNT(*) >= 15

ORDER BY item_count DESC;

b. Results of query:

email	item_count	name.first	name.last
"ellislis@gmail.com"	19	"Lisa"	"Ellis"
"petersryan@gmail.com"	18	"Ryan"	"Peters"
"lopez77@gmail.com"	17	"Mary"	"Lopez"
"William06@gmail.com"	17	"William"	"Mckinney"

"torresbrian41517@gmail.com" 16 "Brian" "Torres"

"Smith93573@gmail.com"	16	"Christopher"	"Smith"

"johnson_darren@gmail.com"	16	"Darren"	"Johnson"

"daw.anderson345@gmail.com"	16	"Dawn"	"Anderson"

"chapman956@gmail.com"	16	"Gina"	"Chapman"

"reid5299@gmail.com"	16	"James"	"Reid"

"morgan.levine@gmail.com"	16	"Morgan"	"Levine"

"nguyenRobert632@gmail.com"	16	"Robert"	"Nguyen"

"smithrobert81145@hotmail.com"	16	"Robert"	"Smith"

"steven_shah@gmail.com"	16	"Steven"	"Shah"

"81968maldonado_tammy24@gmail.com"	16	"Tammy"	"Maldonado"

"tonya1345@gmail.com"	16	"Tonya"	"Beck"

"King764@gmail.com"	16	"King"

"thomas.heather@gmail.com"	15	"Heather"	"Thomas"

"Jacob895@gmail.com"	15	"Jacob"	"Strong"

"james8329@yahoo.com"	15	"James"	"Norton"

"kelleyleonard@gmail.com"	15	"Leonard"	"Kelley"

"95279lindseyhill@yahoo.com"	15	"Lindsey"	"Hill"

"Nic5484@hotmail.com"	15	"Nichole"	"Collier"

"SanchezRobin76@yahoo.com"	15	"Robin"	"Sanchez"

"edd_lewis39854@gmail.com"	15	"Lewis"

"kathrynlucero@aol.com"	15	"Lucero"

"561tracy55@yahoo.com"	15	"Stone"

K)

   a. Query:

WITH monthly_metrics AS (

 SELECT

  DATE_PART_STR(seller.list_date, 'month') as month,

  SUM(price) as curr_month_sales

 FROM items

WHERE seller.user_id = "P0JA5"

GROUP BY DATE_PART_STR(seller.list_date, 'month')

)

SELECT month,

ROUND(curr_month_sales,2) as curr_month_sales,

ROUND(LAG(curr_month_sales) OVER(ORDER BY month), 2) as prev_month_sales,

ROUND(curr_month_sales - LAG(curr_month_sales) OVER(ORDER BY month),2) as MOM_diff

FROM monthly_metrics;

b. Results of query:

MOM_diff	curr_month_sales	month	prev_month_sales
	4118.19	1	
-1975.24	2142.95	2	4118.19
2088.22	4231.17	4	2142.95
-448.03	3783.14	5	4231.17
-1583.64	2199.5	6	3783.14
2041.2	4240.7	7	2199.5
-2017.59	2223.11	9	4240.7
698.71	2921.82	10	2223.11