4 SFU | BEEDIE SCHOOL OF BUSINESS
SIMON FRASER UNIVERSITY

BUS 464-D100 MIDTERM EXAM

Date: Oct 13, 2015 Name:__________________________

Instructor: Nilesh Saraf Student Number: _______________

Instructions (read these now):

- Write your name and student number above in the spaces provided.
- Write your student number at the bottom of all pages in this exam.
- At your desk you may have: pens, pencils, eraser, correcting fluid, bottle of water. No cell phones or any electronic devices are allowed. *This exam is closed books, closed notes.*
- This exam ends at 4:40 pm.
- The marks allotted to each question are shown. You should budget your time accordingly.
- Write each answer legibly in the answer booklet. You are allowed to scribble on the exam itself using a pen or pencil. For every answer make it very clear to me where to find your answer.
- If you do not understand a question, make reasonable assumptions, and write them down and work from there. Invigilators may not help you interpret questions.
- You are allowed to separate the papers in the exam but the entire exam needs to be returned. Tuck the exam inside your answer booklet.

Caution: In accordance with the Academic Honesty Policy (T10.02), academic dishonesty in any form will not be tolerated. Prohibited acts include, but are not limited to, the following:

- making use of any books, papers, electronic devices or memoranda, other than those authorized by the examiners;
- speaking or communicating with other students who are writing examinations; copying from the work of other candidates or purposely exposing written papers to the view of other candidates.

	Section	Max Marks	Marks
TOTAL	1	5	
	2a	10	
	2b	5	
TOTAL	2	15	
	3a	5	
	3b	5	
	3c	5	
TOTAL	3	15	
	4a(3)	3	
	4b(2)	2	
TOTAL	4	5	
EXAM TOTAL		40	

- In your SQL queries feel free to abbreviate the following statements as follows:

```
SELECT  - SE
FROM    - FR
WHERE   - WH
```

- Feel free to use abbreviations for fields too – empname or ename instead of EmployeeName.
- You can create a subquery separately and call it, say Query1. Then you can simply write the outer query as:

```
Select *
from Table1, (Query1) as X
WHERE <JOIN Table1 & Query1>
```

Question 1 (5 points) Multiple Choice Questions:

1. The main point(s) in the nytimes article "For big data scientists janitor work is key hurdle to insights" is (check any one):
   a) The growing demand for computer scientists
   b) Minimize data analytic efforts
   c) The impending redundancy of computer scientists
   d) The multiplicity of data sources
   e) That janitor work will soon be eliminated because of sophisticated tools.
2. In a table, an update anomaly can occur when
   a) inserting data
   b) deleting data
   c) inserting or deleting data
   d) All of the above
   e) None of the above
3. Any M:M relationship can be thought of as
   a) One 1:M relationship and one 0:M relationship
   b) Unary relationship
   c) Binary relationship
   d) One 1:M and one ternary relationship
   e) Two 1:M relationships
4. Unlike 1:M relationship a ____ relationship does not require a foreign key.
   a) M:1
   b) M:M
   c) 1:M
   d) 1:1
   e) None of the above
5. MySQL Workbench is a ____.
   a) Computer
   b) Client
   c) Cloud
   d) Query processor
   e) Server

Question 1 (1 points)

Consider the following database:

Customer(Custid, custName) # has 200 customers only some of who have placed orders
Order (OrderID, Custid, orderdate) #has 5000 orders

I need to find the "number of customers in Customer whose orders appear in the Order table". How will you modify the following <u>faulty</u> query by adding just ONE word to the SQL? (2 pts)

```
# This query gives the answer '5000'
select count(c.custid)
from customer c, order o
where c.custid= o.custid;
```

Question 1 (1 points)

This question is about Referential Integrity Constraints (RICs). Consider the following schemas. The two tables, Customer and Order are currently empty.

Customer (CustomerID (PK), Custname)

Order (OrderID (PK), OrderDt, CustomerID (FK))

I have also created two temporary tables called Table A and Table B and filled them with the following data – they have no RICs.

Table A

CustomerID	CustName
1	John Wayne
2	Ingrid Bergman
3	Bruce Lee
5	Omar Sharif
6	Samuel Jackson

Table B

OrderID	OrderDate	CustomerID
101	01-Jan	1
102	04-Jan	5
103	04-Jan	6
104	05-Jan	3
105	06-Jan	7

Using Tables A & B, I would like to populate Customer and Order tables by running the following queries.

*Insert into Customer select * from A;*

*Insert into Order select * from B;*

Explain what will be the result and why?

Question 2 (15 points)

a) Consider the data model for data about donations. (10 pts)

Donor: donorid (PK), dlname, dfname, dphone, dstate, dcity
Gift: donorid (PK, FK), year (PK, FK), amount
Year: year(PK), yeargoal

Create four queries as follows (2.5 pts each):

i. List the donor names who give more than twice the average.

```
select dlname, dfname, d.donorno, g.amount, AVGDon
from donor as d, gift as g,
(select avg(amount) as AVGDon, year as YearDon
from gift group by year) as X
where d.donorno = g.donorno
and g.year = X.yearDon
and amount > 2*Avgdon;
```

ii. In which years did the total donated exceed the goal for the year?

select yeargoal, y1.year, TotDon from year as y1, (select sum(amount) as TotDon, year from gift group by year) as x where TotDon > yeargoal and y1.year = X.year;	*select year from year as Y1 where exists (select * from gift where gift.year = Y1.year having sum(amount) > Y1.yeargoal);*

iii. List only those donors (last and first names) who gave more in year 2000 than they did in 1999. (Hint: Either you could use donor table twice with different aliases, or use EXISTS).

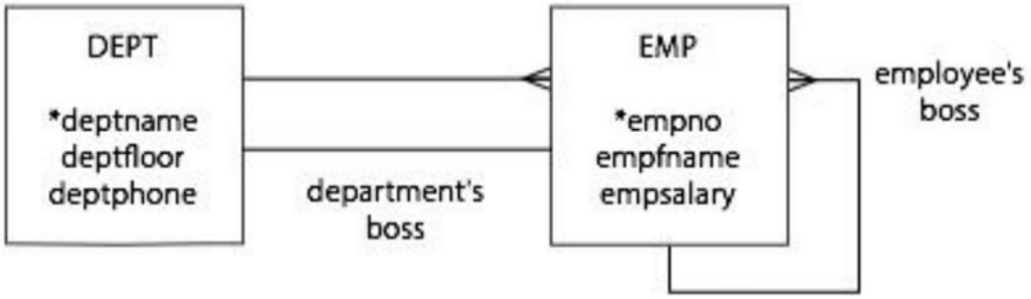
*Select dlname, dfname from donor as d1, gift as g1 where year = 1999 and d1.donorno = g1.donorno and exists (select * from gift as g2 where g2.donorno = d1.donorno and year =2000 and amount < g1.amount);*	*select dlname, dfname from donor where donorno in (select g1.donorno from gift as g1, gift as g2 where g1.donorno = g2.donorno and g1.year = 1999 and g2.year = 2000 and g1.amount > g2.amount) ;*

iv. List the total amount donated by each donor for years 1999 and 2000. The query result should list the donor names.

```
Select dfname, dlname, sum(amount)
From gift as g, donor as d
Where g.donorno = d.donordo
And g.year = 1999 or g.year = 2000
Group by donorno;
```

b) Queries – Recursive (5 points)

A data model illustrating a recursive 1:m relationship



The three RICs are:

Table Dept has empno (FK) as Department's Boss
Table Emp has deptname (FK) as Department's name
Table Emp has Bossno (FK) linked to empno (PK) in Table Emp

i. List the departments where the average salary of the employees, excluding the department's boss, is greater than $ 25,000. (2 pts)

```
select avg(empsalary) as AvgSal, deptname from emp
where empno not in (Select empno
from dept)
group by deptname
having AvgSal > 25000;
```

ii. Find the names of employees who are in the same department as their boss (i.e., the Employee's boss). (3 pt)

```
Select a.empfname
From emp a, emp b
Where a.bossno = b.empno
And a.deptname = b.deptname;
```

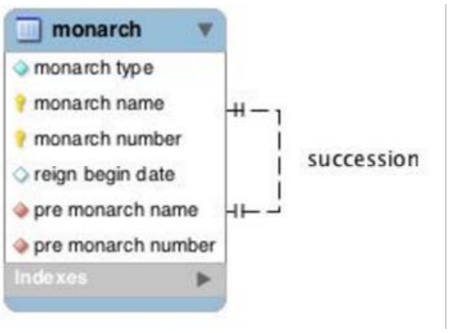
OR

```
Select empfname from emp where exists
(select * from emp as e1 where e1.empno = emp.bossno and e1.deptname = emp.deptname);
```

Question 2c (3 points)

a) (1 points)

Consider the following data model – you may use suitable abbreviation for its fields – e.g., reign begin date = regbn



i. How many kings are there in the table? (Hint: monarch_type (or montype) can be either King or Queen) (1 pts)

```
Select count(*) from monarch where montype = 'King';
```

ii. Which monarch had the shortest reign? (2 pts) Assume reign_begin date (regbn) is a field of "Date" type. Hint: Find the monarch who has the minimum difference between his/her regbn and the successor's regbn. The SQL command to find the number of days between any two dates is datediff(date1, date2).

```
select m2.monname,m2.monnum, m1.rgnbeg, m2.rgnbeg,
datediff(m1.rgnbeg, m2.rgnbeg)/365 as ReignDurYears
from monarch m1, monarch m2
where m1.premonname = m2.monname
and m1.premonnum = m2.monnum
order by ReignDurYears;
```

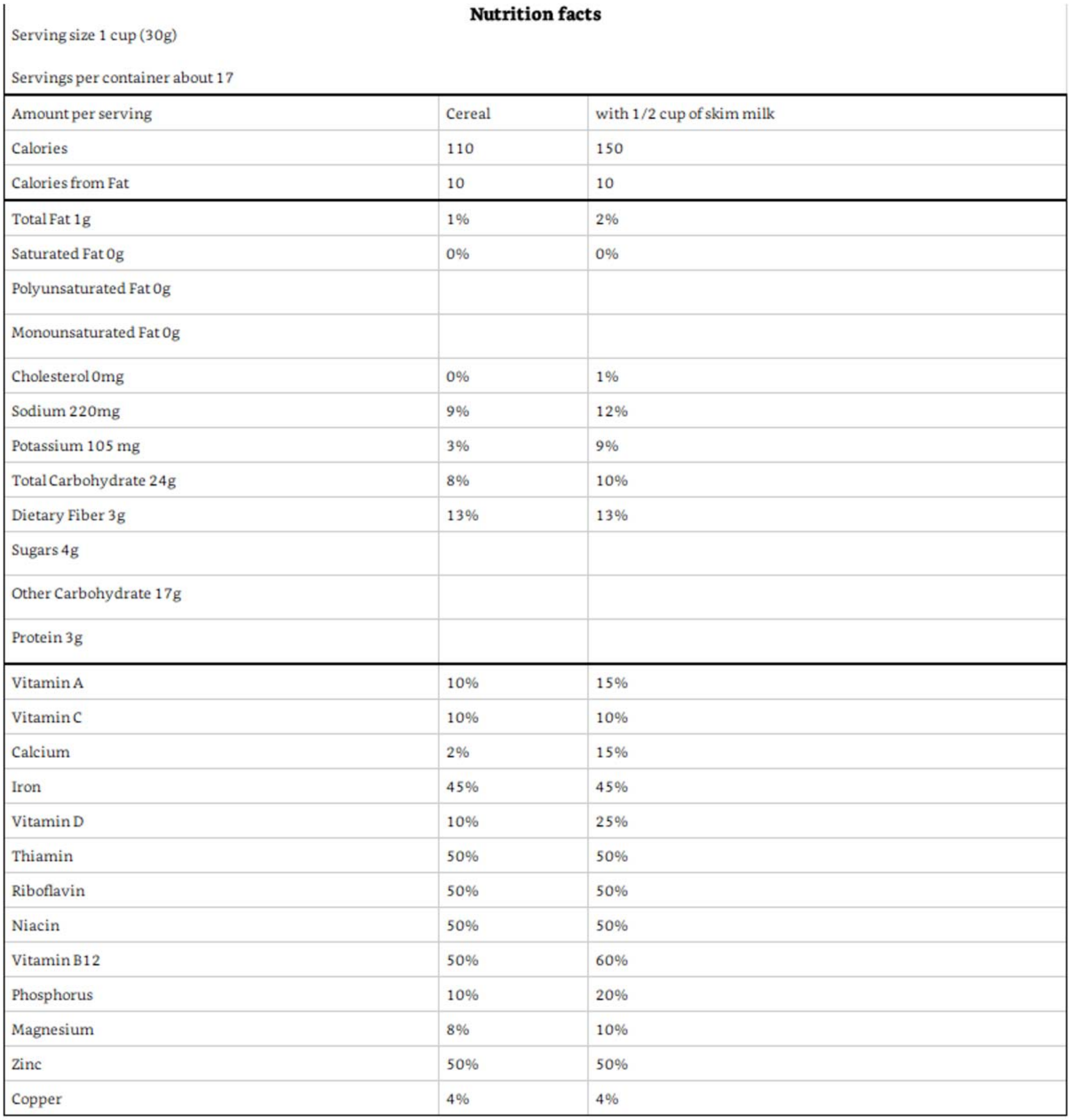
Question 3 – Data Modelling: Create the physical data models, meaning table schemas that show the entities, attributes, primary keys and foreign keys. You may answer either by listing the table schemas as in Q2a or by drawing the entities and fields as in Q3a.

a) The table in Appendix A records data found on the side of a breakfast cereal carton. Use these data as a guide to develop a data model to record nutrition facts for a meal. In this case, a meal is a cup of cereal and 1/ 2 cup of skim milk. **(5 pts)**

b) A travel agency is frequently asked questions about tourist destinations. For example, customers want to know details of the climate for a particular month, the population of the city, and other geographic facts. Sometimes they request the flying time and distance between two cities. The manager has asked you to create a database to maintain these facts. (5 points)

c) Model the facebook data described in the para below. (5 points)
A user can invite more than one user to be a friend. A user can have many friends. The gender, name, birthdate and location of each user is captured. A user can create many posts at various date and times. A user can 'like' one or more posts of other users. A user can also comment on someone else's post. For each of the above events, the date-time is always captured (dttime) using which the Facebook data analysts develop statistical models of human behavior.

Appendix A



Nutrition facts

Serving size 1 cup (30g)

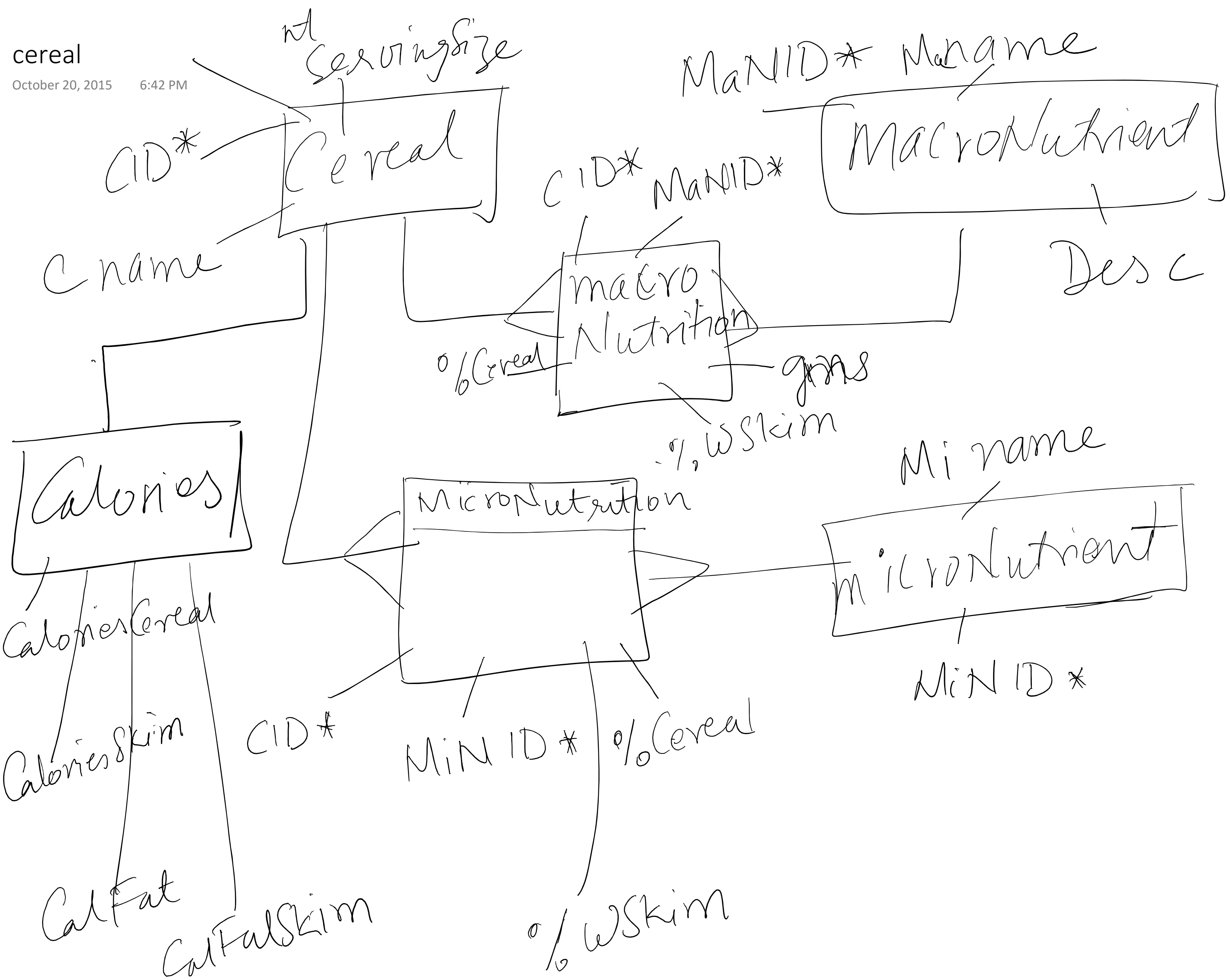
Servings per container about 17

Amount per serving	Cereal	with 1/2 cup of skim milk
Calories	110	150
Calories from Fat	10	10
Total Fat 1g	1%	2%
Saturated Fat 0g	0%	0%
Polyunsaturated Fat 0g		
Monounsaturated Fat 0g		
Cholesterol 0mg	0%	1%
Sodium 220mg	9%	12%
Potassium 105 mg	3%	9%
Total Carbohydrate 24g	8%	10%
Dietary Fiber 3g	13%	13%
Sugars 4g		
Other Carbohydrate 17g		
Protein 3g		
Vitamin A	10%	15%
Vitamin C	10%	10%
Calcium	2%	15%
Iron	45%	45%
Vitamin D	10%	25%
Thiamin	50%	50%
Riboflavin	50%	50%
Niacin	50%	50%
Vitamin B12	50%	60%
Phosphorus	10%	20%
Magnesium	8%	10%
Zinc	50%	50%
Copper	4%	4%

________EXAM ENDS HERE________

cereal

October 20, 2015 6:42 PM



facebook

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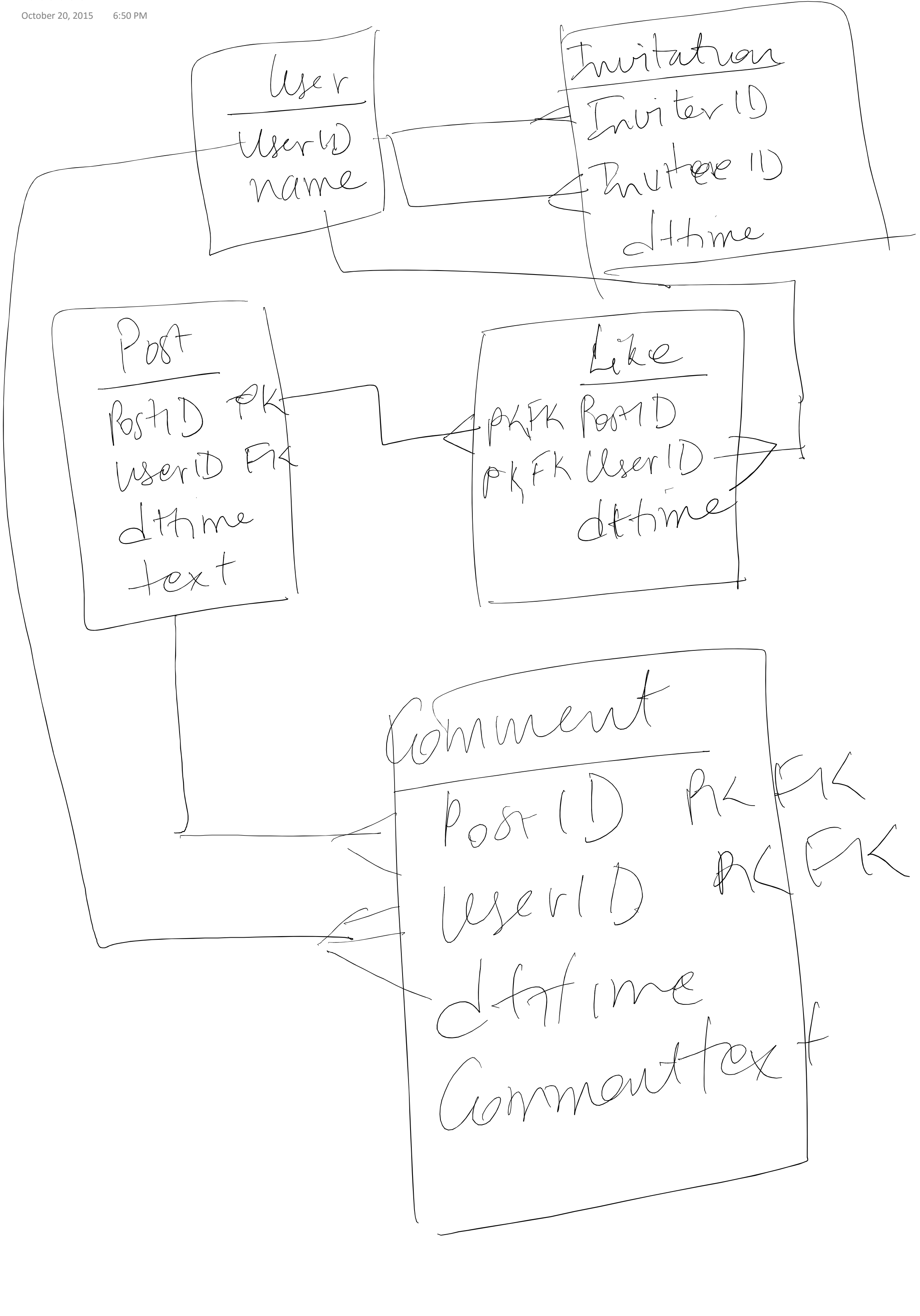

travel

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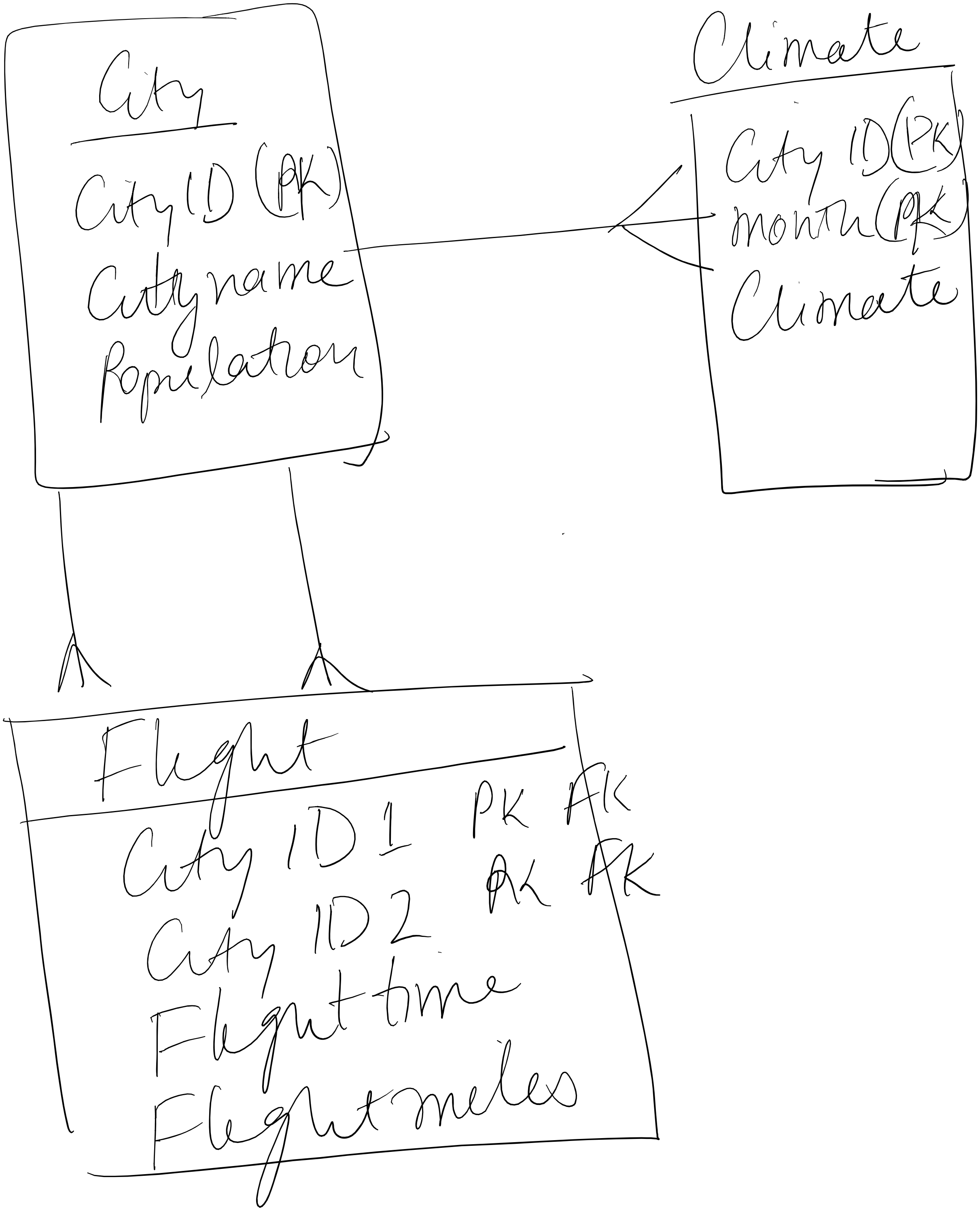
City
City ID (PK)
Cityname
Population
Climate
City ID (PK)
month (PK)
Climate
Flight
City ID 1 PK FK
City ID 2 PK FK
Flight time
Flight miles