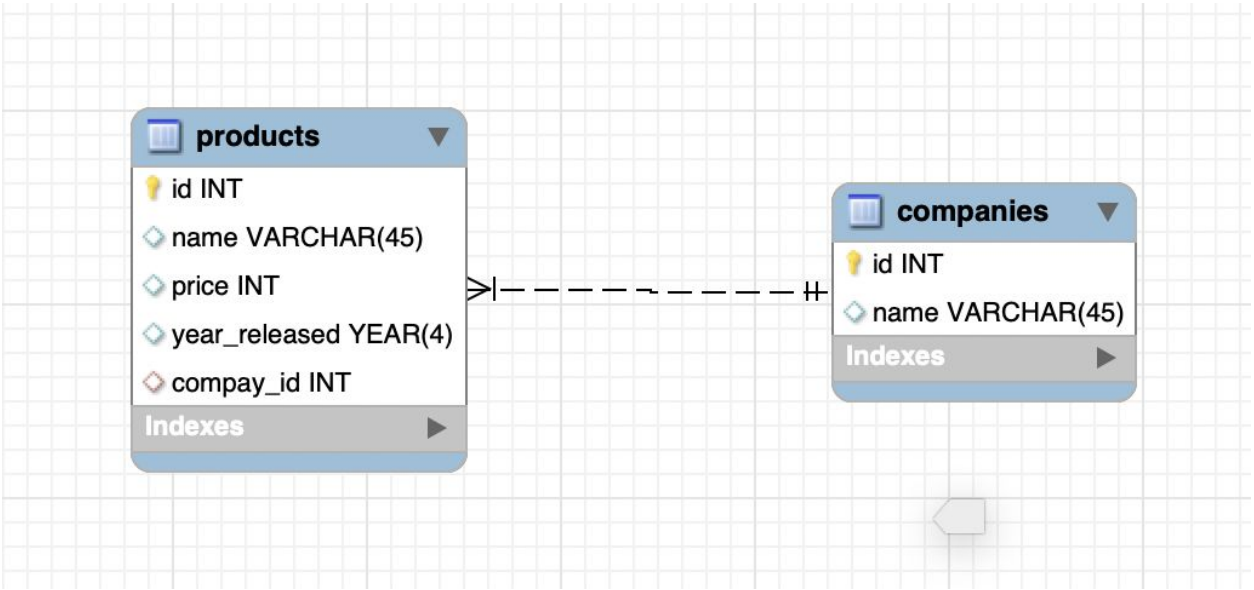
Short Coding Sample questions w/ SOLUTIONS

Database Design

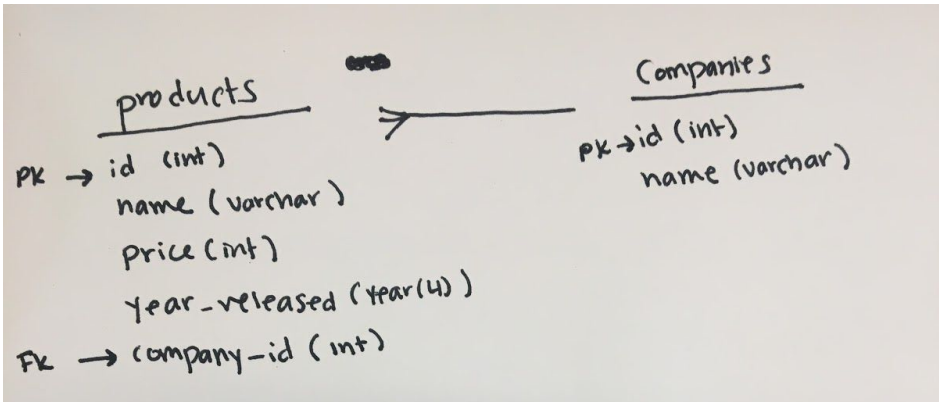
1. Design and **normalize** a database for the given data set on products. Draw tables, indicate their columns, data types, relationships, and label primary keys and foreign keys clearly. You can create this diagram on Workbench, on a graphic software tool, or hand-draw it. You **do not** need to populate the database with records.

Product	Price	Company	Year Released
Echo	$99	Amazon	2019
Kindle	$89	Amazon	2007
iPad Pro	$999	Apple	2019
Switch	$298	Nintendo	2017
Surface	$599	Microsoft	2013

Solution using Workbench (screenshot of EER diagram)



Hand-drawn solution example:



2. Write a short explanation on why you decided to normalize the fields you did in the previous question.
   Various explanations are accepted depending on the diagram. Something along the lines of a company can have multiple products, and a product can be part of just one company. A company is its own entity.

SQL: Write SQL queries (no PHP) for the following questions. Questions are based on the database attached on the last page of this exam. Feel free to detach the last page from this exam.

3. Display orders of phones that were released in *2015* or later made by anyone with the letter "j" in their email address. Show date, email, phone model, and phone release year.
   Sample result (does not show all results):

date	email	model	year_released
2016-10-26	ttrojan@usc.edu	iPhone 7	2016
2016-10-20	jdoe@usc.edu	iPhone 7	2016
2016-09-05	jsmith@usc.edu	Lumina 950	2015
2016-06-06	ajohn@usc.edu	Galaxy Note 7	2016

```
SELECT date, email, model, year_released FROM orders
LEFT JOIN phones
      ON orders.phone_id = phones.id
WHERE year_released >= 2015
AND email LIKE '%j%';
```

4. Change **one** record, the order made by mdavis@usc.edu on 05/15/2013 so that it has the following information:
    a. Phone: iPhone 7
    b. Email: mdavis@gmail.com

```
UPDATE orders
      SET phone_id = 1, email = 'mdavis@gmail.com'
      WHERE id = 6;
```

5. Remove **one** record: a *One M9* order made by ajohn@usc.edu on 06/06/2016. Assume this person could have other orders in the database.

```
DELETE FROM orders
WHERE id = 7;
```

6. Add a new phone to the database listed below:
    a. Model: iPhone XS
    b. Manufacturer: Apple
    c. System: iOS
    d. Release Year: 2018

```
INSERT INTO phones (model, manufacturer_id, system_id, year_released)
VALUES ('iPhone XS', 1, 3, 2018);
```

7. Create a **view** named `not_iphones` that would display phones that do **not** have the manufacturer *Apple.* Show the phones' id, model, manufacturer, system, and year released.

Sample result:

id	model	manufacturer	system	year_released
3	One M9	HTC	Android	2015
6	Galaxy S6	Samsung	Android	2015
7	Galaxy Note 7	Samsung	Android	2016
4	Passport	BlackBerry	Blackberry	2014

```
CREATE OR REPLACE VIEW not_iphones AS
SELECT phones.id, model, manufacturers.manufacturer, systems.system,
phones.year_released FROM phones
LEFT JOIN manufacturers
      ON phones.manufacturer_id = manufacturers.id
LEFT JOIN systems
      ON phones.manufacturer_id = systems.id
WHERE phones.manufacturer_id <> 1;
```

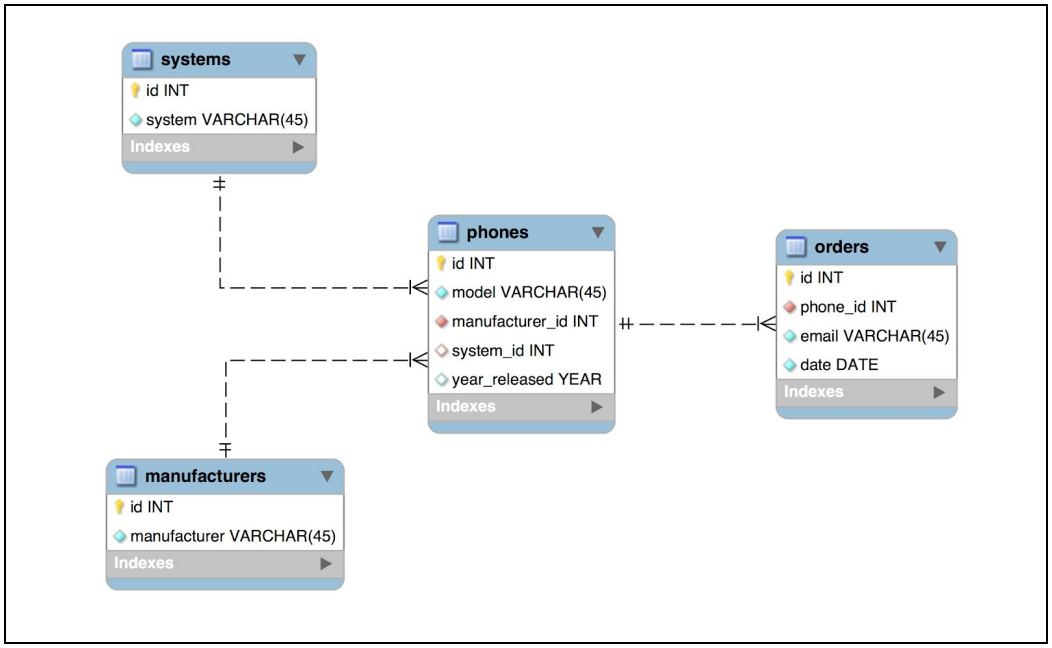
8. Display number of phones for each manufacturer. Show manufacturer name and number of phones (as `count`).

manufacturer	count
Apple	2
Samsung	2
HTC	1

```
SELECT manufacturer, COUNT(*) AS count
FROM phones
LEFT JOIN manufacturers
ON manufacturers.id = phones.manufacturer_id
GROUP BY manufacturers.id;
```

ATTACHMENT

Database Diagram:



systems Table:

id	system
1	Android
2	BlackBerry
3	iOS
4	Windows Phone

phones Table:

id	model	manufacturer_id	system_id	year_released
1	iPhone 7	1	3	2016
2	Lumia 950	4	4	2015
3	One M9	3	1	2015
4	Passport	5	2	2014
5	Q10	5	2	2013
6	Galaxy S6	2	1	2015
7	Galaxy Note 7	2	1	2016
8	iPhone 5	1	3	2012

manufacturers Table:

id	manufacturer
1	Apple
2	Samsung
3	HTC
4	Microsoft
5	BlackBerry

orders Table:

id	email	date	phone_id
1	ttrojan@usc.edu	2016-10-26	1
2	jdoe@usc.edu	2016-10-20	1
3	jsmith@usc.edu	2016-09-05	2
4	ajohn@usc.edu	2016-06-06	7
5	tbrown@usc.edu	2012-10-03	8
6	mdavis@usc.edu	2013-05-15	5
7	ajohn@usc.edu	2016-06-06	3
8	ttrojan@usc.edu	2016-10-26	4