Answers

University of Pittsburgh
BUSBIS 1605
Professor David Eargle
Mid Semester Examination
Spring 2017

By submitting this exam you acknowledge that the completed exam is entirely your own work and you have complied with the Academic Honesty program of the University of Pittsburgh.

Submitted exams are analyzed to identify similarities in content and structure.

You may consult your notes and textbook and use your computer for testing SQL queries or drawing data models. You can even search the web for general help with queries, syntax, etc. But you may not consult anyone else.

Please submit this exam on CourseWeb as a single PDF

CourseWeb Quiz (2 points)

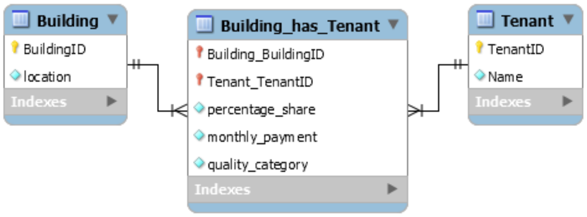
Before doing anything else, complete the short quiz on CourseWeb called “Midterm – short quiz.”

Data Modeling

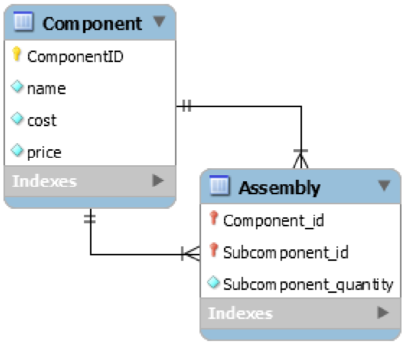
Data modeling – part 1 (40 points)

Draw data models for the following two situations. Be thoughtful in the name you give each entity.

a. (20 points)
A building is leased by multiple tenants, and a tenant can lease multiple buildings. Each lease has a start date, percentage share of the building, and monthly payment amount. Additionally, each lease can be categorized as being premium-, standard-, or slum-quality.

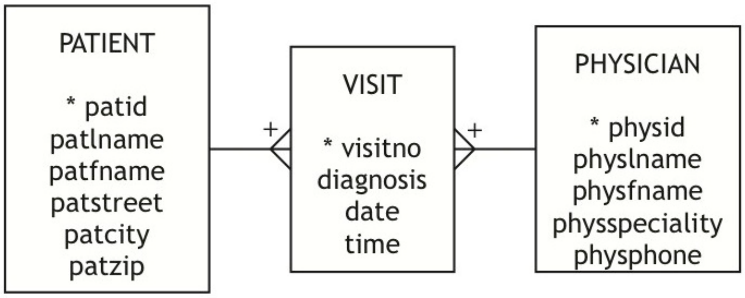


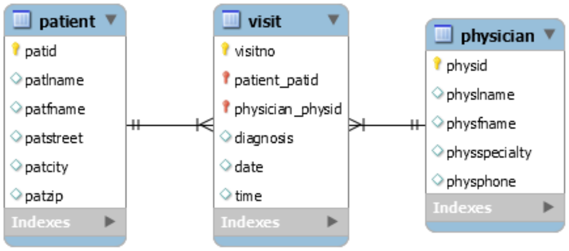
b. (20 points)
A computer part is made of many components, and a computer part can be a component of many other parts. Record the name of each part, as well as the quantity of the part used for each part-component combination.



Data modeling – part 2 (12 points)

A physician's office has developed the following data model for storing details of patient visits. When you map the data model to a relational database, what will be the columns, primary key, and foreign key(s) for the table Visit?





```
CREATE TABLE IF NOT EXISTS `visit` (
  `visitno` INT NOT NULL,
  `patient_patid` INT NOT NULL,
  `physician_physid` INT NOT NULL,
  `diagnosis` VARCHAR(45) NULL,
  `date` VARCHAR(45) NULL,
  `time` VARCHAR(45) NULL,
  PRIMARY KEY (`visitno`, `patient_patid`, `physician_physid`),
  INDEX `fk_visit_patient1_idx` (`patient_patid` ASC),
  INDEX `fk_visit_physician1_idx` (`physician_physid` ASC),
  CONSTRAINT `fk_visit_patient1`
    FOREIGN KEY (`patient_patid`)
    REFERENCES `mydb`.`patient` (`patid`)
    ON DELETE NO ACTION
    ON UPDATE NO ACTION,
  CONSTRAINT `fk_visit_physician1`
    FOREIGN KEY (`physician_physid`)
    REFERENCES `mydb`.`physician` (`physid`)
    ON DELETE NO ACTION
    ON UPDATE NO ACTION)
ENGINE = InnoDB
```

SQL

Use the ClassicModels database to answer the following requests using SQL. The data model is on the book web site.

SQL part 1 (16 points – 4 points each)

1. Select the number of offices from each country.

```
SELECT country, COUNT(*)
FROM Offices
```

```
GROUP BY country;
```

2. Which Product has the highest MSRP?

```
SELECT productName FROM Products
WHERE MSRP = (SELECT MAX(MSRP) FROM Products);
```

3. Report details of those payments greater than the average of all payments.

```
SELECT *
FROM payments
WHERE amount > (SELECT AVG(amount) FROM Payments);
```

4. What is the total value of payments received in February 2003 for each country?

```
SELECT country, SUM(amount)
FROM Payments
JOIN customers ON Payments.customerNumber = Customers.customerNumber
WHERE MONTH(paymentDate) = 2
AND YEAR(paymentDate) = 2003
GROUP BY country;
```

SQL part 2 (30 points – 10 for each query)

1. How many distinct products were involved in a sale recorded in 2003? (Hint: No need to use DISTINCT for this.)

```
SELECT COUNT(distinct productCode) as distinct_product
From OrderDetails
JOIN Orders
ON Orders.orderNumber = OrderDetails.orderNumber
WHERE YEAR(orderDate) = 2003
```

OR

```
SELECT COUNT(*)
FROM Products
WHERE EXISTS (
      SELECT * FROM orderdetails JOIN Orders
      ON orderDetails.orderNumber = Orders.orderNumber
      WHERE orderdetails.productCode = Products.productCode
      AND YEAR(orderDate) = 2003
);
```

OR

```
SELECT COUNT(*) AS Products
FROM products
WHERE productCode IN (
      SELECT productCode FROM orderdetails
      JOIN orders ON
      orders.orderNumber=orderdetails.orderNumber
      WHERE YEAR(orderDate)=2003
)
```

2. Which products have a greater average quantity ordered than are currently in stock for that product?

```
SELECT
       Products.productCode,
       productName,
       AVG(quantityOrdered),
       Products.quantityInStock
FROM Products JOIN OrderDetails
ON Products.productCode = OrderDetails.productCode
GROUP BY Products.productCode
HAVING AVG(quantityOrdered) > Products.quantityInStock;
```

3. What are the maximum, average, and minimum **percentage discounts** off of MSRP that each product has ever been sold at? Format the percentage discounts to two decimal places. (Hint: For each product, calculate the ratio of sale price to MSRP for each of its line items, and subtract from 1 to get the percentage discount.)

```
SELECT
    Products.productName,
    FORMAT((1-MIN(priceEach/MSRP))*100,2) AS MaxDiscount,
    FORMAT((1-MAX(priceEach/MSRP))*100,2) AS MinDiscount,
    FORMAT((1-AVG(priceEach/MSRP))*100,2) AS AvgDiscount
FROM Products JOIN orderDetails ON Products.productCode =
orderDetails.ProductCode
GROUP BY OrderDetails.productCode;
```