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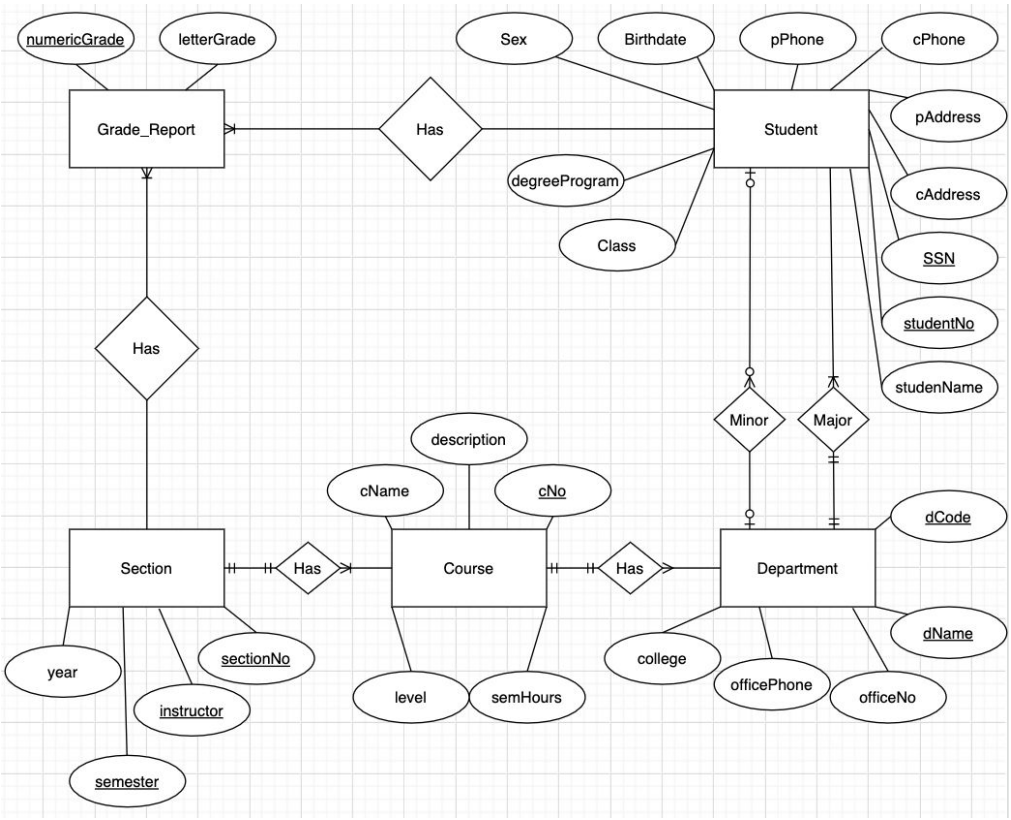
Final Exam Report CSCI 370
4/29/2020

1.Q1 Answer:

Figure 1.1 ER Diagram for University Database



2.Q2 Answer:

Figure 2.1 Completed figure for Company Database

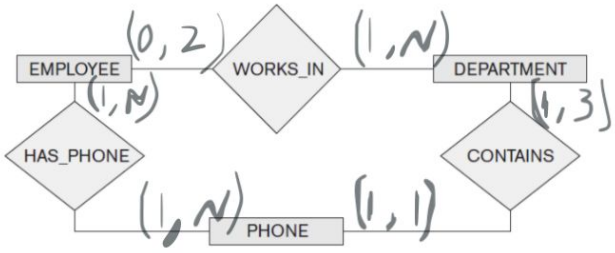


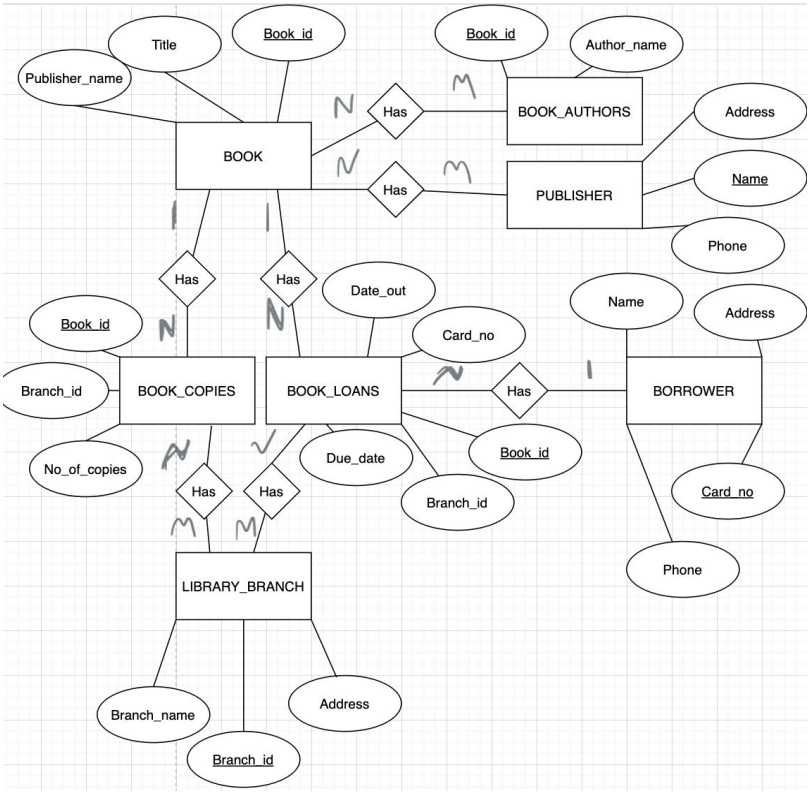
Figure 1: Part of an ER diagram for a COMPANY database.

Assumptions: Assuming that each employee can have multiple phones and that each phone can have multiple employees. And that phones are not shared between departments.

Answer: HAS_PHONE Would be redundant if each employeee Contained every phone in their department, but had no other department's phones.

3.Q3 Answer:

```
DROP TABLE IF EXISTS BOOK;
CREATE TABLE BOOK(
Book_id varchar(20) PRIMARY KEY,
Title varchar(20),
Publisher_name varchar(20)
);

DROP TABLE IF EXISTS BOOK_AUTHORS;
CREATE TABLE BOOK_AUTHORS(
Book_id varchar(20),
Author_name varchar(20),
PRIMARY KEY(Book_id, Author_name)
);

DROP TABLE IF EXISTS PUBLISHER;
CREATE TABLE PUBLISHER(
Name varchar(20) PRIMARY KEY,
Address varchar(20),
Phone int(10)
);

DROP TABLE IF EXISTS BOOK_COPIES;
CREATE TABLE BOOK_COPIES(
Book_id varchar(20),
Branch_id varchar(20),
No_of_copies int(10),
PRIMARY KEY(Book_id, Branch_id)
);

DROP TABLE IF EXISTS BOOK_LOANS;
CREATE TABLE BOOK_LOANS(
Book_id varchar(20),
Branch_id varchar(20),
Card_no int(10),
Date_out varchar(20),
Due_date varchar(20),
PRIMARY KEY(Book_id, Branch_id, Card_no)
);

DROP TABLE IF EXISTS LIBRARY_BRANCH;
CREATE TABLE LIBRARY_BRANCH(
Branch_id varchar(20) PRIMARY KEY,
Branch_name varchar(20),
Address varchar(20)
);

DROP TABLE IF EXISTS BORROWER;
CREATE TABLE BORROWER(
Card_no int(20) PRIMARY KEY,
Name varchar(20),
Address varchar(20),
Phone int(10)
);
```



4.Q4 Answer:

A. SELECT * FROM Borrower;
B. SELECT title FROM Book WHERE year = “2012”;
C. SELECT c.copyNo FROM BookCopy bc, Book k WHERE bc.ISBN = k.ISBN AND bc.available = TRUE;
D. SELECT borrowerName FROM Borrower bw, BookLoan bl WHERE bw.borrowerNo = bl.borrowerNo AND dateDue> today;
E. Select COUNT(copyNo) FROM BookCopy WHERE available = TRUE AND ISBN = “0-321-52306-7”
F. SELECT ISBN, title FROM Book b, BookCopy bc, Borrower bo, BookLoan blWHERE b.ISBN = bc.ISBN AND bc.copyNo = bl.copyNo AND bl.borrowerNo = bo.borrowerNo AND borrowerName = ‘Peter Bloomfield’;

5.Q5 Answer:

A. Transient data is lost once a program terminates, whereas persistent data is stored somewhere outside of the program, so it’s not lost on updates or termination. Persistence is usually handled by creating an object that’s set to a document. Once that document is updated or deleted, the variable will not change.
B. Four operations for EMPLOYEE could be: getSSN, getAddress, getFullName, getAge. These would all be retrieval operations. Four operations for DEPARTMENT could be: getDname, getDNumber, getLocation, getProjects. These would all be retrieval operations.
C. NoSQL is a better choice then SQL if you need flexibility and can’t easily come up with cleary defined schema definitions. NoSQL is also a better choice if the data is variable.
D. Document databases, key-value databases, graph databases, wide-column stores.

6.Q6 Answer:

Functional Dependencies:
if studID changes then so will studName and degreeCourse
If courseID changes then so will courseTitle
ifstudID, courseID, acadYear, or examSession changes then so will mark
ifstudID or courseID changes then so will acadYear and examSession

Students:

studID	studName	degreeCourse

Courses:

courseID	courseTitle	acadYear

ClassDetails:

studID	courseID	gradeID

Grades:

gradeID	mark	examSession

7.Q7 Answer:

a. db.scores.count()
b. db.scores.find({},{“subject”:1}).pretty();
c. db.scores.find({ “subject”:90});
d. db.scores.find({“score”:90},{“subject”:1});
e. db.scores.aggregate([{ $match: { score: { $gt: 80 } } }, { $count: “numOfPassingScores” }]);
f. db.scores.aggregate([{ $group: { avgScore: { $avg: “$score”} } }]);