

1.10) COURSE and SECTION have a relationship shared by the Course_number. COURSE and PREREQUISITE have a relationship shared by Course_number, where PREREQUISITE uses Course_number, from COURSE, in both of its columns. STUDENT and GRADE_REPORT have a relationship shared by the Student_number. SECTION and GRADE_REPORT have a relationship shared by the Section_identifier.

1.12) Simple: The Course_name data item within each COURSE must be no longer than 10 alphabetic characters. The Student_number data item within each STUDENT record must be 4 digit characters.

Referential: Every PREREQUISITE record must be related to a COURSE record. Every SECTION record must be related to a COURSE record.

Key/Uniqueness: Every COURSE record must have a unique value for Course_number. Every STUDENT record must have a unique value for Student_number.

1.14) a) In STUDENT column Major, in COURSE columns Course_number and Department, in SECTION column Course_number, and in PREREQUISITE columns Course_number and Prerequisite_number.

b) Yes.

COURSE

Course_name	Department	Course_number	Credit_hours
Intro to Computer Science	CS	1310	4
Data Structures	CS	3320	4
Discrete Mathematics	MATH	2410	3
Database	CS	3380	3

SECTION

Section_identifier	Course_number	Semester	Year	Instructor
85	2410	Fall	07	King
92	1310	Fall	07	Anderson
102	3320	Spring	08	Knuth
112	2410	Fall	08	Chang
119	1310	Fall	08	Anderson
135	3380	Fall	08	Stone

PREREQUISITE

Course_number	Prerequisite_number
3380	3320
3380	2410
3320	1310

This restructure only works with the integrity constraint that no Course_number can be the same regardless of the Department.

2.14) A) Three-Tier Client/Server Architecture

B) The three-tier architecture is good for web based systems because the middle tier would be good to hold any constraints or procedures when it comes to making an airline reservation or sell airline tickets. For example, if you must be 25 to make a reservation, the middle tier would check the age before even trying to access any of the open airline reservations. If the age is old enough then the middle tier accesses the data from the database server for any open reservations.

C) Centralized Architecture wouldn't be good because there is a capacity restraint and there are normally thousands and thousands of flights a day. Basic Client/Server Architecture isn't a good choice because you must have dedicated client machines. Two-Tier Client/Server Architecture isn't a good choice because is good for searching, such as finding dictionary definitions or books in a library catalog. The Two-Tier Client/Server Architecture could work

but the Three-Tier is the best option because it has that buffer/middle tier to make restrictions with business rules.

3.11) (a) No integrity constraints violated.

(b) Referential integrity constraint is violated because Dnum '2' doesn't refer to any Dnumber in DEPT_LOCATIONS.

(c) Unique key integrity constraint is violated because Dnumber is the only primary key making it the unique key and you can't have identical Dnumbers ('4').

(d) Entity integrity constraint violated because Pno is a primary key in WORKS_ON can't be null.

(e) No integrity constraints violated.

(f) No integrity constraints violated.

(g) Referential integrity constraint violated because the EMPLOYEE tuple being removed is referenced by tuples from EMPLOYEE, DEPARTMENT, WORKS_ON, and DEPENDENT.

(h) Referential integrity constraint violated because the PROJECT tuple is being referenced by tuples in WORKS_ON.

(i) No integrity constraints violated.

(j) No integrity constraints violated because we inserted in (a).

(k) No integrity constraints violated.

To enforce these constraints, you can reject the command, cascade delete (deletes everything related to the tuple), or cascade update (updates everything related to the tuple). These are just some of the few ways to enforce the constraints.

3.16) Assume STUDENT SSN is unique and not NULL

Assume Course# is unique and not NULL.

Assume Book ISBN is unique and not NULL.

In ENROLL SSN, Course#, and Quarter are FK. In BOOK_ADOPTION Course#, Quarter and Book_ISBN are FK.