

Functional Dependencies and Normalization (cont.)

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Computer Information Systems

November 19th, 2010

Boyce-Codd Normal Form (BCNF)

STUDENT_ADVISOR

<u>SID</u>	<u>Major</u>	Advisor	Maj_GPA
123	Physics	Hawking	4.0
123	Music	Mahler	3.3
456	Literature	Michener	3.2
789	Music	Bach	3.7
678	Physics	Hawking	3.5

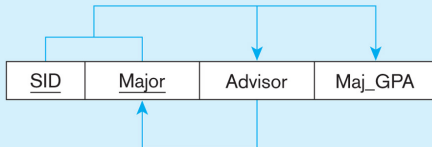
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Boyce-Codd Normal Form (BCNF)

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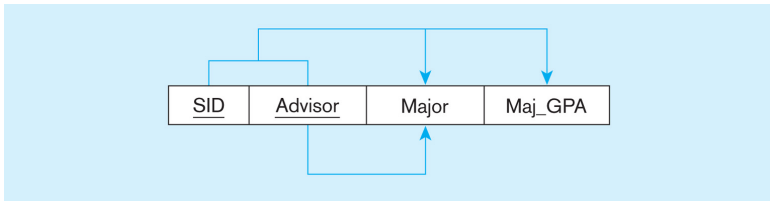
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Boyce-Codd Normal Form

A relation is in **Boyce-Codd Normal Form** if and only if every determinant in the relation is a candidate key.

Converting a relation to BCNF

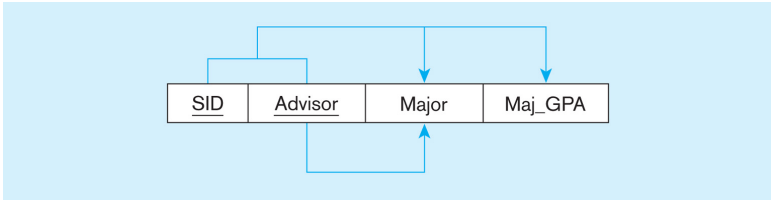
1. the determinant that is not a candidate key becomes a component of the primary key



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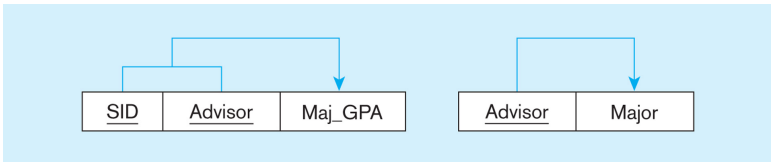
Converting a relation to BCNF

1. the determinant that is not a candidate key becomes a component of the primary key



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2. decompose the relation to eliminate the partial functional dependency



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STUDENT

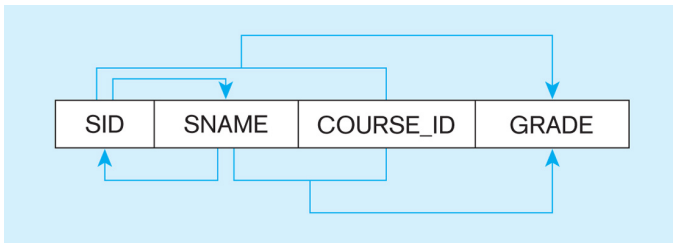
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ADVISOR

<u>Advisor</u>	Major
Hawking	Physics
Mahler	Music
Michener	Literature
Bach	Music

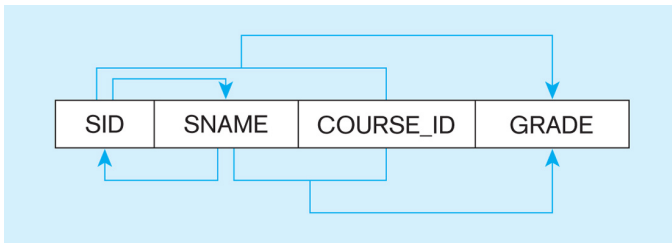
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Overlapping candidate keys

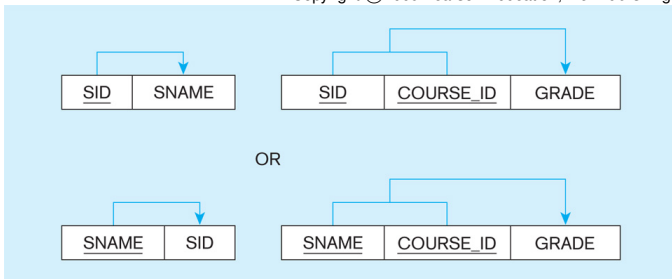


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Overlapping candidate keys

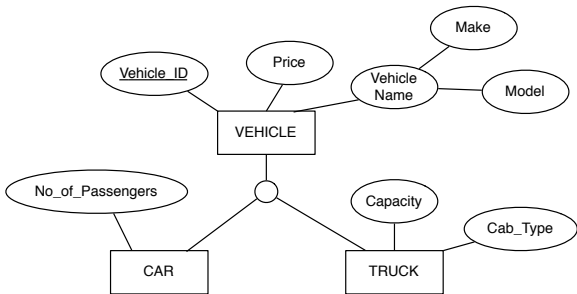


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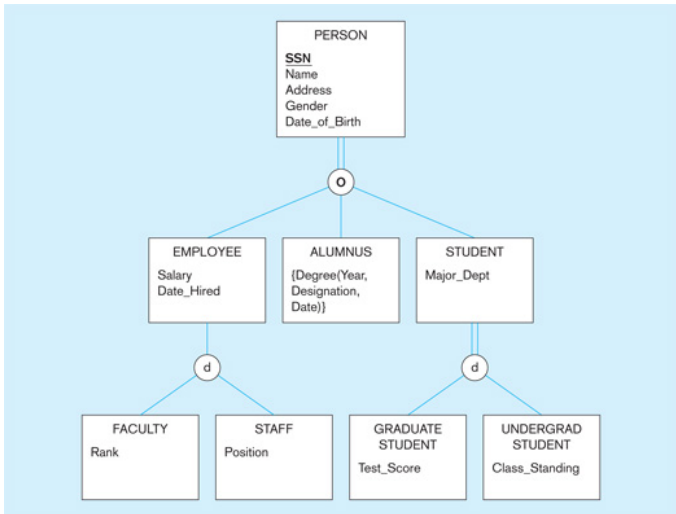


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(a) Transform the EER diagram into a relational schema, (b) show the functional dependencies.



(a) Transform the EER diagram into a relational schema, (b) show the functional dependencies.



For each of the following relations, indicate the normal form. If the relation is not in 3NF, decompose into 3NF relations

- CLASS(CourseNo, SectionNo)
- CLASS(CourseNo, SectionNo, Room)
- CLASS(CourseNo, SectionNo, Room,Capacity)
Room \rightarrow Capacity
- CLASS(CourseNo, SectionNo, CourseName,Room,Capacity)
CourseNo \rightarrow CourseName, Room \rightarrow Capacity

Convert into 3NF relations, assuming

- An instructor has a unique location
- A student has a unique major
- A course has a unique title

MILLENNIUM COLLEGE
CLASS LIST
FALL SEMESTER 200X

COURSE NO.: IS 460
 COURSE TITLE: DATABASE
 INSTRUCTOR NAME: NORMA L. FORM
 INSTRUCTOR LOCATION: B 104

STUDENT NO.	STUDENT NAME	MAJOR	GRADE
38214	Bright	IS	A
40875	Cortez	CS	B
51893	Edwards	IS	A

GRADE REPORT

<u>StudentID</u>	StudentName	Address	Major	<u>CourseID</u>	CourseTitle	Instructor	Location	Grade
1683000458	Williams	208 Brooks	IS	IS350	DBMS	Codd	B104	A
1683000458	Williams	208 Brooks	IS	IS451	Algo	Parson	B105	B
5432177458	Baker	111 Phillips	Business	B201	Marketing	Miller	C102	A
5432177458	Baker	111 Phillips	Business	IS350	DBMS	Codd	B104	C
5432177458	Baker	111 Phillips	Business	M300	Finance	Bennete	B222	A

- draw a relational schema and show the functional dependencies
- in what normal form is this relation?
- decompose your schema into a set of 3NF relations