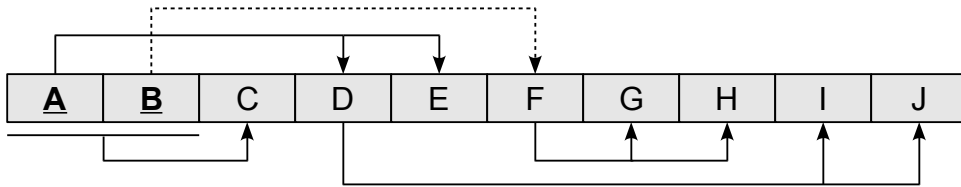


CSCI-321: Database Systems
Homework #6 – Answer Key

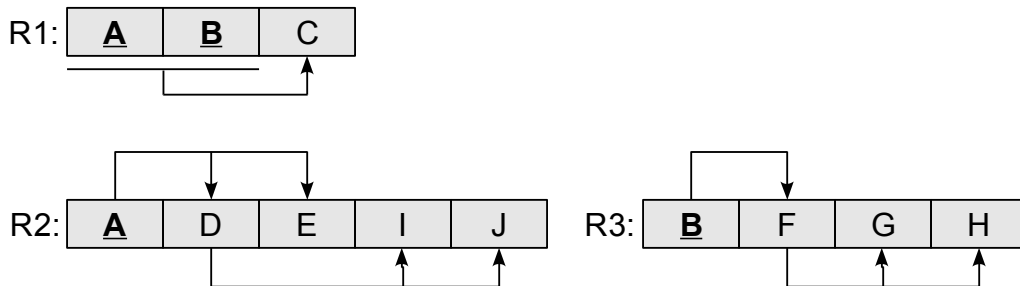
15.9. Removes partial dependencies where some attributes only depend on part of a multi-component primary key.

15.10. Removes transitive dependencies where an attribute(s) depend on a non-primary key.

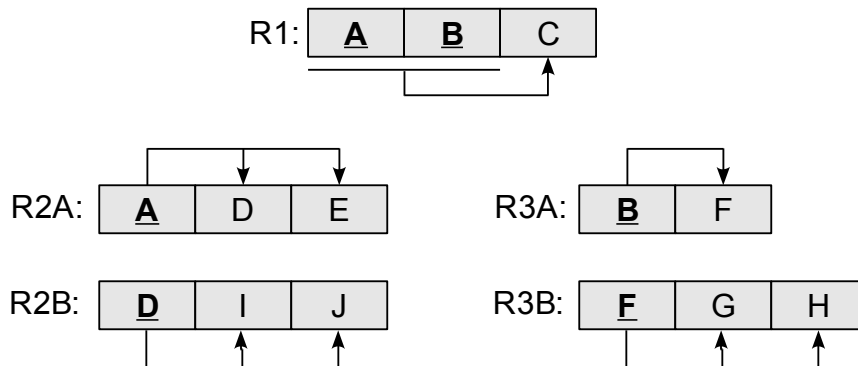
15.24. The primary key would be the composite **A, B** since other attributes must depend on the primary key and the primary key can not be dependent on any other attribute.



The result of decomposing R into 2NF:



The result of decomposing these relations to 3NF:



15.31. The relation is in 1NF with a composite key of Book_title, Author_name.

It can be decomposed into 2NF:

Book = { Book_title, Author_name, Book_type, List_price, Publisher }
Author = { Author_name, Author_affil }

and into 3NF:

Book = { Book_title, Author_name, Book_type, Publisher }
Author = { Author_name, Author_affil }
Price = { Book_type, List_price }

15.33. There can be different answers depending on the argument provided and the assumptions made.
The relation

R(Doctor#, Patient#, Date, Diagnosis, Treat_code, Charge)

is in 2NF since the primary key would be the composite of Patient#, Date and assuming

- a diagnosis is unique to each patient
- a patient can visit multiple dates
- but a patient will have a single visit on a given date.

and which has the following dependencies

Patient#, Date → Doctor#, Diagnosis, Treat_code
Treat_code → Charge

but it is not in 3NF since there is a transitive dependency between Treat_code and Charge.
Transforming R into 3NF yields

R1(Doctor#, Patient#, Date, Diagnosis, Treat_code)
R2(Treat_code, Charge)

15.34. This question will be dropped since it considers the use of the generalized definition of the 3NF.