Assignment 6: Decomposition and Normal Forms

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November 20, 2021

Part 1: The analysis of a quick-event wizard for a local community

1. Minimal cover of all realistic non-trivial functional dependencies:

   - Since each event is organized by a user, we know that if the event id (*id*) is the same, then the organizer (*user_id*) must be the same. So, we can have id $\longrightarrow$ user_id. The reverse would not hold since an organizer could organize many events.
   - Furthermore, each event happens in a day, so, we know that if the event id (*id*) is the same, the date that the event happens in (*date*) must be the same. So, we can have id $\longrightarrow$ date.
   - We also have id, inv_id $\longrightarrow$ inv_confirmed since each guest would determine what event to go to. We need both the event id (*id*) and the guest (*inv_id*) to determine if the invitation is confirmed (*inv_confirmed*).
   - Furthermore, we have id, product $\longrightarrow$ p_amount since we would only know how much to bring if we know what to bring and where we need to bring it to. Only the product wouldn't be able to determine the amount since different event could need different amount of the same product. For example, in the given table, event 1 needs 4 chips while event 2 only needs 2 chips.
   - We have product $\longrightarrow$ p_price since each product has its own price. The price of the product wouldn't depend on the event that the product is brough into. An example is that, in the given table,

the chips cost $2 no matter if it is brought into event with id 1 or 2 and the cola would cost $4 no matter if it is brought into event with id 1 or 2.

2. An example of a non-trivial dependency is id $\twoheadrightarrow$ inv_id, inv_confirmed. This would hold since, for example, in the given table, from the first row and the fourth row, we know that there would exist a row where inv_id and inv_confirmed are the same as the first row and the rest of the attributes (user_id, date, product, p_price, p_amount) are the same as the fourth row. This row is the thrid row. We also know that there would exist a row where inv_id and inv_confirmed are the same as the fourth row and the rest of the attributes (user_id, date, product, p_price, p_amount) are the same as the first row. This row is the second row.