Mapping ER -> Relation

USER

userID	reviewerName

PRODUCT

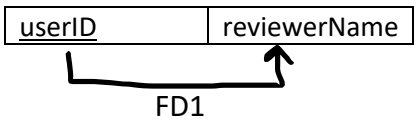
asin	category	duplicateRatio	incentivizedRatio	ratingAnamolyRate	reviewAnamolyRate

REVIEW

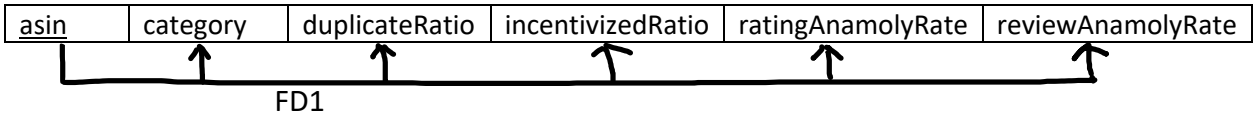
reviewID	userID	asin	reviewText	minHash	overall	unixReviewTime	duplicate

Normalization

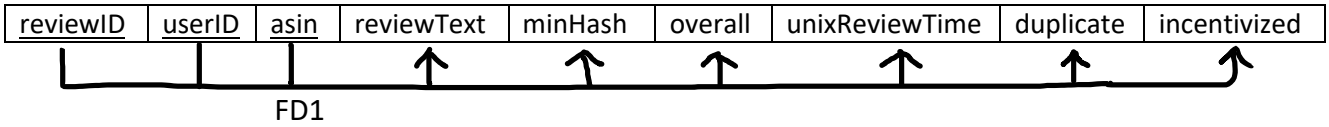
USER



PRODUCT



REVIEW



1NF

1. Is each relation flat?
    a. Yes
2. Are there only single, atomic, indivisible attributes?
    a. Yes

Relations are in 1NF

2NF

1. Are there functional dependencies? (B is functionally dependent on A if **each value of A** in relation R is associated with only **one value of B** at **any time**.

Rules:

- For each set of attributes on the left side of the FD, there is only one value to the right
- This rule must hold at all times
- FD must be nontrivial

Assumptions:
- There can be multiple reviews written at the same time
- Two reviews can have the same text and minHash (those would be duplicate reviews)
- A reviewID depends on the product a user writes a review for.
- {reviewText} -> {minHash} is nontrivial because minHash is not a subset of reviewText, but rather a hash found through calculation.
- Two reviews may be identical, so they may have identical minHashes (a review text may not be unique). Therefore, the functional dependency {reviewText, minHash} -> {duplicate, incentivized} does not hold.

Reviews
Functional dependencies:
- {reviewID} -> {reviewText, minHash, overall, unixReviewTime, duplicate, incentivized}
    - Key -> non-key
- Can I remove anything from the left side and still have a FD hold?
    - No because review is a weak entity type, and therefore requires userID and asin
- Primary Key = {reviewID}

Users
Functional dependencies:
- {userID} -> {reviewerName}
    - Key -> non-key
- Can I remove anything from the left side and still have a FD hold?
    - No because review is a weak entity type, and therefore requires userID and asin
- Primary Key = {reviewID, userID, asin}

Products
Functional dependencies:
- {asin} -> {category, duplicateRatio, incentivizedRatio, ratingAnamolyRate, reviewAnamolyRate}
    - Key -> non-key
- Can I remove anything from the left side and still have a FD hold?
    - No because review is a weak entity type, and therefore requires userID and asin
- Primary Key = {reviewID, userID, asin}

2. Decompose

Reviews
N/A

Users
N/A

Products
N/A

3. Are all FD's Full functional dependencies?

Yes, all relations are in 2NF

3NF

There are no non-key -> non-key FD's and no transitive FD's.
All relations are in 3NF