



### Denormalization:

In the 3NF model a new table was created in order to avoid multi value attributes (the productID in this case) in the SHOPPING\_CART table, to solve that issue a SHOPPING\_CART\_IS\_MADE\_OF\_PRODUCTS table was created but that also meant creating a new table for each product inside each cart created, that could increase a lot the access time because the system would have to spent a lot of time making those connections and wasting a lot of space with the new attributes created. We then denormalized the relationship getting it back to its previous state, eliminating the

SHOPPING\_CART\_IS\_MADE\_OF\_PRODUCTS, and adding the productID attribute directly inside SHOPPING\_CART. The denormalized part is now looking like this:

