



ERD with errors fixed

The ERD given above fixes the errors in the original ERD. The following list describes the problem resolutions.

- The *Purchases* relationship should have a minimum cardinality of zero on the *Customer* side, as the narrative states that vehicles remain on the lot for a period of time before sales occur, so the vehicle can have no or zero customers (**cardinality design error**).
- The *IncomeOf* relationship should be 1-M from *Account* to *Payment* and so it is reversed, as the narrative states that an *Account* can have multiple statements and that each *Payment* is associated with one account for company accounting purposes so cardinality is M on the *Payment* side and 1 on the *Account* side. Also, the minimum cardinality is taken as 1 on the *Account* side and 0 on the *Payment* side, though additional requirement collection is necessary (**cardinality design error**).
- The cardinality in the *ExpenseOf* relationship should be 1-M from *Account* to *Expense* as *Expense* details is said to have an account and an *Account* is said to have related expenses.

Also, the minimum cardinality is taken as 1 on the *Account* side and 0 on the *Expense* side, though additional requirement collection is necessary (**cardinality design error**).

- The *Customer* entity has been changed. The *CustPhone* and *CustEmail* have been deleted and *CustPrimPhone* (for primary phone) and *CustCellPhone* (for cell phone) have been added according to the *Customer* entity specifications (**design error**).
- The *Account* entity has been changed and *AcctName* has been deleted as it can be accommodated in *AcctDesc* if needed and also it is not specified in the requirements (**design error**).
- In the *Expense* entity, *ExpDate* has been deleted as it is not specified in the requirements and only *ExpPaidDate* has been specified, which is already present (**design error**).
- In the *Vehicle* entity, *VehStatus* has been exchanged with *VehTransType* (transmission type) as per the given specifications (**design error**).
- *Account* should not be a weak entity type as it has two 1-M relationships originating from it (**Identification Dependency Cardinality type diagram error**).
- The *IncomeOf* and *ExpenseOf* relationships shouldn't be identifying (**Identifying Relationship rule diagram error**).
- The *Process* relationship from *Employee* to *Payment* should be removed because it is redundant (**redundant relationship design error**). The specification indicates that the same employee works as sales associate and processes the payment to complete the sale. Thus, the *MakesSale* and *Sold* relationship can cover this as well. Though we can add the *Process* relationship.
- The specification is also incomplete about attribute constraints such as null value allowed and data types.
- Also, the narrative contains no details for *Employee* and so the attributes given in the diagram are taken as is.
- The problem does not specify *PayAmount* as the attribute of payment but it has not been deleted as it is an important attribute for any payment process. Though it can be deleted by including the amount in the description attribute (*PayDesc*).