3.3 Построение схемы реляционной базы данных в третьей нормальной форме

Пусть дано отношение в 1НФ «Магазин оружия». В виде таблицы 3.1 показаны атрибуты и функциональные зависимости. Имеется первичный ключ { CategoriesId, CharacteristicValuesCommodityTypeId, CommoditiesId, CommoditiesInChartsCommodityId, CommoditiesInChartsCustomerId, CommoditiesTypesId, CommoditiesTypesInCathegoriesCommodityTypeId, CommoditiesTypesInCathegoriesCategoryId, CustomersId, ManufacturersId, OrdersId, ShippingsId, ShopsId, StorageId }.

Для проверки нормализации на соответствие теореме Хеза предлагается следующий SQL код:

CREATE VIEW HEATHS AS SELECT CAT.Id AS CategoriesId,CAT.MasterCategoryId AS CategoriesMasterCategoryId,CAT.Name AS CategoriesName,CHR.Id AS CharacteristicsId,CHR.AvailableValues AS CharacteristicsAvailableValues,CHR.Name AS CharacteristicsName,CHR.Type AS CharacteristicsType,CHR.CategoryId AS CharacteristicsCategoryId,CV.CommodityTypeId AS CharacteristicValuesCommodityTypeId,CV.CharacteristicId AS CharacteristicValuesCommodityTypeId,CV.Value AS CharValuesValue,C.Id AS CommoditiesId,C.CommodityTypeId AS CommoditiesCommodityTypeId,C.OrderId AS CommoditiesOrderId,C.StorageId AS CommoditiesStorageId,CIC.CommodityId AS CommoditiesInChartsCommodityId,CIC.CustomerId AS CommoditiesInChartsCustomerId,CT.Id AS CommoditiesTypesId,CT.Model AS CommoditiesTypesModel,CT.Size AS CommoditiesTypesSize,CT.Weight AS CommoditiesTypesWeight,CT.ManufacturerId AS CommoditiesTypesManufacturerId,CT.Price AS CommoditiesTypesPrice,CTIC.CommodityTypeId AS CommoditiesTypesInCathegoriesCommodityTypeId,CTIC.CategoryId AS CommoditiesTypesInCathegoriesCategoryId,CUST.Id AS CustomersId,CUST.ApplicationUserId AS CustomersApplicationUserId,CUST.Email AS CustomersEmail,CUST.IsTemp AS CustomersIsTemp,M.Id AS ManufacturersId,M.Country AS ManufacturersCountry,M.Name AS ManufacturersName,ORD.Id AS OrdersId,ORD.CustomerId AS OrdersCustomerId,ORD.DateTime AS OrdersDateTime,SR.CommodityId AS ShippingRowsCommodityId,SR.ShippingId AS ShippingRowsShippingId,SS.Id AS ShippingsId,SS.AuthorId AS ShippingsAuthorId,SS.Date AS ShippingsDate,SS.StorageAId AS ShippingsStorageAId,SS.StorageBId AS ShippingsStorageBId,SH.Id AS ShopsId,SH.Adress AS ShopsAdress,SH.Coordinates AS ShopsCoordinates,SH.Name AS ShopsName,SH.StorageId AS ShopsStorageId,ST.Id AS StorageId,ST.Adress AS StorageAdress,ST.Coordinates AS StorageCoordinates,ST.Name AS StorageName

FROM

CommoditiesTypesInCathegories CTIC

FULL OUTER JOIN CommoditiesTypes CT ON CTIC.CommodityTypeId = CT.Id

FULL OUTER JOIN Categories CAT ON CTIC.CategoryId = CAT.Id

FULL OUTER JOIN CharacteristicValues CV ON CV.CommodityTypeId = CT.Id

FULL OUTER JOIN Characteristics CHR ON CV.CharacteristicId = CHR.Id

FULL OUTER JOIN Manufacturers M ON M.Id = CT.Id

FULL OUTER JOIN Commodities C ON C.CommodityTypeId = CT.Id

FULL OUTER JOIN ShippingRows SR ON SR.CommodityId = C.Id

FULL OUTER JOIN Shippings SS ON SR.ShippingId = SS.Id

FULL OUTER JOIN Storage ST ON C.StorageId = ST.Id

FULL OUTER JOIN Orders ORD ON ORD.Id = C.OrderId

FULL OUTER JOIN Customers CUST ON Cust.Id = ORD.CustomerId

FULL OUTER JOIN CommoditiesInCharts CIC ON CIC.CommodityId = C.Id

FULL OUTER JOIN Shops SH ON SH.StorageId = ST.Id

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 🔑 | CategoriesId | ─┐ | ─┐ | ←┐ | ←┐ |  |  |  |  | ←┐ |  |
|  | CategoriesMasterCategoryId | ←┤ | ←┤ | ─┘ | │ |  |  |  |  | │ |  |
|  | CategoriesName | ←┤ | ←┤ |  | │ |  |  |  |  | │ |  |
| 🔑 | CharacteristicsId | ←┤ | ←┤ |  | │ |  |  |  |  | │ |  |
|  | CharacteristicsAvailableValues | ←┤ | ←┤ |  | │ |  |  |  |  | │ |  |
|  | CharacteristicsName | ←┤ | ←┤ |  | │ |  |  |  |  | │ |  |
|  | CharacteristicsType | ←┤ | ←┤ |  | │ |  |  |  |  | │ |  |
|  | CharacteristicsCategoryId | ←┘ | ←┤ |  | ─┘ |  |  |  |  | │ |  |
|  | CharValuesValue | ←┘ | ←┤ |  |  |  |  |  |  | │ |  |
| 🔑 | CommoditiesId | ─┐ | ─┤ |  |  |  |  | ←┐ |  | │ | ←┐ |
|  | CommoditiesCommodityTypeId | ←┤ | ←┤ |  | ─┐ | ─┐ |  | │ |  | │ | │ |
|  | CommoditiesOrderId | ←┤ | ←┤ |  | │ | │ |  | │ |  | │ | │ |
|  | CommoditiesStorageId | ←┘ | ←┤ |  | │ | │ | ─┐ | │ |  | │ | │ |
| 🔑 | CommoditiesInChartsCommodityId |  | ─┤ |  | │ | │ | │ | ─┘ |  | │ | │ |
| 🔑 | CommoditiesInChartsCustomerId |  | ─┤ |  | │ | │ | │ |  | ─┐ | │ | │ |
| 🔑 | CommoditiesTypesId | ─┐ | ─┤ |  | ←┘ | │ | │ | ←┐ | │ | │ | │ |
|  | CommoditiesTypesModel | ←┤ | ←┤ |  |  | │ | │ | │ | │ | │ | │ |
|  | CommoditiesTypesSize | ←┤ | ←┤ |  |  | │ | │ | │ | │ | │ | │ |
|  | CommoditiesTypesWeight | ←┤ | ←┤ |  |  | │ | │ | │ | │ | │ | │ |
|  | CommoditiesTypesManufacturerId | ←┤ | ←┤ | ─┐ |  | │ | │ | │ | │ | │ | │ |
|  | CommoditiesTypesPrice | ←┘ | ←┤ | │ |  | │ | │ | │ | │ | │ | │ |
| 🔑 | CommoditiesTypesInCathegoriesCommodityTypeId |  | ─┤ | │ |  | │ | │ | ─┘ | │ | │ | │ |
| 🔑 | CommoditiesTypesInCathegoriesCategoryId |  | ─┤ | │ |  | │ | │ |  | │ | ─┘ | │ |
| 🔑 | CustomersId | ─┐ | ─┤ | │ | ←┐ | │ | │ |  | ←┘ |  | │ |
|  | CustomersApplicationUserId | ←┤ | ←┤ | │ | │ | │ | │ |  |  |  | │ |
|  | CustomersEmail | ←┤ | ←┤ | │ | │ | │ | │ |  |  |  | │ |
|  | CustomersIsTemp | ←┘ | ←┤ | │ | │ | │ | │ |  |  |  | │ |
| 🔑 | ManufacturersId | ─┐ | ─┤ | ←┘ | │ | │ | │ |  |  |  | │ |
|  | ManufacturersCountry | ←┤ | ←┤ |  | │ | │ | │ |  |  |  | │ |
|  | ManufacturersName | ←┘ | ←┤ |  | │ | │ | │ |  |  |  | │ |
| 🔑 | OrdersId | ─┐ | ─┤ |  | │ | ←┘ | │ |  |  |  | │ |
|  | OrdersCustomerId | ←┤ | ←┤ |  | │ |  | │ |  |  |  | │ |
|  | OrdersDateTime | ←┤ | ←┤ |  | │ |  | │ |  |  |  | │ |
| 🔑 | ShippingRowsCommodityId | ←┤ | ←┤ |  | │ |  | │ |  |  |  | ─┘ |
| 🔑 | ShippingRowsShippingId | ←┘ | ←┤ | ─┐ | │ |  | │ |  |  |  |  |
| 🔑 | ShippingsId | ─┐ | ─┤ | ←┘ | │ |  | │ |  |  |  |  |
|  | ShippingsAuthorId | ←┤ | ←┤ |  | ─┘ |  | │ |  |  |  |  |
|  | ShippingsDate | ←┤ | ←┤ |  |  |  | │ |  |  |  |  |
|  | ShippingsStorageAId | ←┤ | ←┤ | ─┐ |  |  | │ |  |  |  |  |
|  | ShippingsStorageBId | ←┘ | ←┤ | │ | ─┐ |  | │ |  |  |  |  |
| 🔑 | ShopsId | ─┐ | ─┤ | │ | │ |  | │ |  |  |  |  |
|  | ShopsAdress | ←┤ | ←┤ | │ | │ |  | │ |  |  |  |  |
|  | ShopsCoordinates | ←┤ | ←┤ | │ | │ |  | │ |  |  |  |  |
|  | ShopsName | ←┤ | ←┤ | │ | │ |  | │ |  |  |  |  |
|  | ShopsStorageId | ←┘ | ←┤ | │ | │ |  | │ |  |  |  |  |
| 🔑 | StorageId | ─┐ | ─┤ | ←┘ | ←┘ |  | ←┘ |  |  |  |  |
|  | StorageAdress | ←┤ | ←┤ |  |  |  |  |  |  |  |  |
|  | StorageCoordinates | ←┤ | ←┤ |  |  |  |  |  |  |  |  |
|  | StorageName | ←┘ | ←┘ |  |  |  |  |  |  |  |  |

Таблица 3.1 – Отношение в 1НФ

На основании этого разобьем отношение в отношения, находящиеся в 3 , и изображенные в таблице 3.2, таблице 3.3, таблице 3.4, таблице 3.5, таблице 3.6, таблице 3.7, таблице 3.8, таблице 3.9, таблице 3.10, таблице 3.11, таблице 3.12, таблице 3.13, таблице 3.4, таблице 3.15.

Таблица 3.2 - "Categories"

|  |  |  |
| --- | --- | --- |
| 🔑 | CategoriesId | ─┐ |
|  | CategoriesMasterCategoryId | ←┤ |
|  | CategoriesName | ←┘ |

Таблица 3.3 - "CharacteristicValues"

|  |  |  |
| --- | --- | --- |
| 🔑 | CharacteristicValuesCommodityTypeId | ─┐ |
|  | CharacteristicValuesCharacteristicId | ←┤ |
|  | CharacteristicValuesValue | ←┘ |

Таблица 3.4 - "Commodities"

|  |  |  |
| --- | --- | --- |
| 🔑 | CommoditiesId | ─┐ |
|  | CommoditiesCommodityTypeId | ←┤ |
|  | CommoditiesOrderId | ←┤ |
|  | CommoditiesStorageId | ←┘ |

Таблица 3.5 - "CommoditiesInCharts"

|  |  |  |
| --- | --- | --- |
| 🔑 | CommoditiesInChartsCommodityId |  |
| 🔑 | CommoditiesInChartsCustomerId |  |

Таблица 3.7 - "CommoditiesTypes"

|  |  |  |
| --- | --- | --- |
| 🔑 | CommoditiesTypesId | ─┐ |
|  | CommoditiesTypesModel | ←┤ |
|  | CommoditiesTypesSize | ←┤ |
|  | CommoditiesTypesWeight | ←┤ |
|  | CommoditiesTypesManufacturerId | ←┤ |
|  | CommoditiesTypesPrice | ←┘ |

Таблица 3.10 - "Customers"

|  |  |  |
| --- | --- | --- |
| 🔑 | CustomersId | ─┐ |
|  | CustomersApplicationUserId | ←┤ |
|  | CustomersEmail | ←┤ |
|  | CustomersIsTemp | ←┘ |

Таблица 3.8 - "CommoditiesTypesInCathegories"

|  |  |  |
| --- | --- | --- |
|  | CommoditiesTypesInCathegoriesCommodityTypeId |  |
|  | CommoditiesTypesInCathegoriesCategoryId |  |

Таблица 3.11 - "Manufacturers"

|  |  |  |
| --- | --- | --- |
| 🔑 | ManufacturersId | ─┐ |
|  | ManufacturersCountry | ←┤ |
|  | ManufacturersName | ←┘ |

Таблица 3.12 - "Orders"

|  |  |  |
| --- | --- | --- |
| 🔑 | OrdersId | ─┐ |
|  | OrdersCustomerId | ←┤ |
|  | OrdersDateTime | ←┘ |

Таблица 3.13 - "Shippings"

|  |  |  |
| --- | --- | --- |
| 🔑 | ShippingsId | ─┐ |
|  | ShippingsAuthorId | ←┤ |
|  | ShippingsDate | ←┤ |
|  | ShippingsStorageAId | ←┤ |
|  | ShippingsStorageBId | ←┘ |

Таблица 3.14 - "Shops"

|  |  |  |
| --- | --- | --- |
| 🔑 | ShopsId | ─┐ |
|  | ShopsAdress | ←┤ |
|  | ShopsCoordinates | ←┤ |
|  | ShopsName | ←┤ |
|  | ShopsStorageId | ←┘ |

Таблица 3.15 - "Storage"

|  |  |  |
| --- | --- | --- |
| 🔑 | StorageId | ─┐ |
|  | StorageAdress | ←┤ |
|  | StorageCoordinates | ←┤ |
|  | StorageName | ←┘ |