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| 成绩评定 |  |
| 教师签名 |  |

**嘉应学院 计算机学院**

**数据库课程设计**

**实验报告**

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| **课程名称：** | **数据库课程设计** |
| **开课学期：** | **2018-2019第一学期** |
| **班 级：** | **软件工程1602** |
| **指导老师：** | **陈旭东** |
| **实验题目：** | **实验10： 概念模式的逻辑** |
| **学 号：** | **161060009** |
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实验10 逻辑设计 - 概念模型->逻辑

一、实验目的

通过本实验掌握概念模型(ER)转变为逻辑设计的方法。

二、实验原理

概念模型（ER图）是独立于任何一个数据库管理平台的一种数据模型。

逻辑结构设计的任务就是把概念模型转换为关系模型（关系数据库的逻辑结构）。

三、实验环境

操作系统： win7

开发环境：数据库管理服务器 MYSQL 5.5，mysql IDE 管理平台 MySQL Workbench 5.2.44 CE

四、实验内容方法

1. 根据实验9的概念模型的优化方案，在MySQL Workbench 生成ER图。

2. 数据库设计的正向工程

2.1 实体 -〉表

2.2 关系约束的转化关系

1:1

M:1; 1:M

M:N

2.3 是 实体还是属性？

地址( 城市、国家），两个以上地址，及两个地址？

2.4 实体属性图，关键属性的标记 -〉函数依赖关系

2.5 关系模式的优化，分解

设计目标

1. BCNF或者4NF

2. 函数依赖保持

3. 无损连接

2.6 优化后的关系模式 与ER 图进行一致性分析

实验报告，在 Workbench 平台将优化后的ER图转化为sql 脚本。

优化如下：

SET @OLD\_UNIQUE\_CHECKS=@@UNIQUE\_CHECKS, UNIQUE\_CHECKS=0;

SET @OLD\_FOREIGN\_KEY\_CHECKS=@@FOREIGN\_KEY\_CHECKS, FOREIGN\_KEY\_CHECKS=0;

SET @OLD\_SQL\_MODE=@@SQL\_MODE, SQL\_MODE='TRADITIONAL,ALLOW\_INVALID\_DATES';

CREATE SCHEMA IF NOT EXISTS `trade1` DEFAULT CHARACTER SET gbk ;

USE `trade1` ;

-- -----------------------------------------------------

-- Table `trade1`.`categories`

-- -----------------------------------------------------

CREATE TABLE IF NOT EXISTS `trade1`.`categories` (

`CategoryID` TINYINT(3) UNSIGNED NOT NULL AUTO\_INCREMENT ,

`CategoryName` VARCHAR(30) NOT NULL ,

`Description` TEXT NULL DEFAULT NULL ,

`Picture` BLOB NULL DEFAULT NULL ,

PRIMARY KEY (`CategoryID`) )

ENGINE = InnoDB

DEFAULT CHARACTER SET = gbk;

-- -----------------------------------------------------

-- Table `trade1`.`customersType`

-- -----------------------------------------------------

CREATE TABLE IF NOT EXISTS `trade1`.`customersType` (

`customersTypeID` INT NULL ,

PRIMARY KEY (`customersTypeID`) )

ENGINE = InnoDB;

-- -----------------------------------------------------

-- Table `trade1`.`customers`

-- -----------------------------------------------------

CREATE TABLE IF NOT EXISTS `trade1`.`customers` (

`CustomerID` VARCHAR(5) NOT NULL ,

`CompanyName` VARCHAR(40) NOT NULL ,

`ContactName` VARCHAR(30) NULL DEFAULT NULL ,

`ContactTitle` VARCHAR(30) NULL DEFAULT NULL ,

`Address` VARCHAR(60) NULL DEFAULT NULL ,

`City` VARCHAR(15) NULL DEFAULT NULL ,

`Region` VARCHAR(15) NULL DEFAULT NULL ,

`PostalCode` VARCHAR(10) NULL DEFAULT NULL ,

`Country` VARCHAR(15) NULL DEFAULT NULL ,

`Phone` VARCHAR(24) NULL DEFAULT NULL ,

`Fax` VARCHAR(24) NULL DEFAULT NULL ,

`customersType\_customersTypeID` INT NOT NULL ,

PRIMARY KEY (`CustomerID`) ,

INDEX `fk\_customers\_customersType1\_idx` (`customersType\_customersTypeID` ASC) ,

CONSTRAINT `fk\_customers\_customersType1`

FOREIGN KEY (`customersType\_customersTypeID` )

REFERENCES `trade1`.`customersType` (`customersTypeID` )

ON DELETE NO ACTION

ON UPDATE NO ACTION)

ENGINE = InnoDB

DEFAULT CHARACTER SET = gbk;

-- -----------------------------------------------------

-- Table `trade1`.`employees`

-- -----------------------------------------------------

CREATE TABLE IF NOT EXISTS `trade1`.`employees` (

`EmployeeID` MEDIUMINT(8) UNSIGNED NOT NULL AUTO\_INCREMENT ,

`LastName` VARCHAR(20) NOT NULL ,

`FirstName` VARCHAR(10) NOT NULL ,

`Title` VARCHAR(30) NULL DEFAULT NULL ,

`TitleOfCourtesy` VARCHAR(25) NULL DEFAULT NULL ,

`BirthDate` DATE NULL DEFAULT NULL ,

`HireDate` DATE NULL DEFAULT NULL ,

`Address` VARCHAR(60) NULL DEFAULT NULL ,

`City` VARCHAR(15) NULL DEFAULT NULL ,

`Region` VARCHAR(15) NULL DEFAULT NULL ,

`PostalCode` VARCHAR(10) NULL DEFAULT NULL ,

`Country` VARCHAR(15) NULL DEFAULT NULL ,

`HomePhone` VARCHAR(24) NULL DEFAULT NULL ,

`Extension` VARCHAR(4) NULL DEFAULT NULL ,

`Photo` BLOB NULL DEFAULT NULL ,

`Notes` TEXT NOT NULL ,

`ReportsTo` MEDIUMINT(8) UNSIGNED NULL DEFAULT NULL ,

`PhotoPath` VARCHAR(255) NULL DEFAULT NULL ,

`Salary` INT(11) NULL DEFAULT NULL ,

PRIMARY KEY (`EmployeeID`) ,

INDEX `ReportsTo` (`ReportsTo` ASC) ,

CONSTRAINT `employees\_ibfk\_1`

FOREIGN KEY (`ReportsTo` )

REFERENCES `trade1`.`employees` (`EmployeeID` ))

ENGINE = InnoDB

DEFAULT CHARACTER SET = gbk;

-- -----------------------------------------------------

-- Table `trade1`.`shippers`

-- -----------------------------------------------------

CREATE TABLE IF NOT EXISTS `trade1`.`shippers` (

`ShipperID` TINYINT(3) UNSIGNED NOT NULL AUTO\_INCREMENT ,

`CompanyName` VARCHAR(40) NOT NULL ,

`Phone` VARCHAR(24) NULL DEFAULT NULL ,

PRIMARY KEY (`ShipperID`) )

ENGINE = InnoDB

DEFAULT CHARACTER SET = gbk;

-- -----------------------------------------------------

-- Table `trade1`.`orders`

-- -----------------------------------------------------

CREATE TABLE IF NOT EXISTS `trade1`.`orders` (

`OrderID` INT(10) UNSIGNED NOT NULL AUTO\_INCREMENT ,

`CustomerID` VARCHAR(5) NULL DEFAULT NULL ,

`EmployeeID` MEDIUMINT(8) UNSIGNED NOT NULL ,

`OrderDate` DATE NULL DEFAULT NULL ,

`RequiredDate` DATE NULL DEFAULT NULL ,

`ShippedDate` DATE NULL DEFAULT NULL ,

`ShipVia` TINYINT(3) UNSIGNED NULL DEFAULT NULL ,

`Freight` DECIMAL(10,2) UNSIGNED NULL DEFAULT '0.00' ,

PRIMARY KEY (`OrderID`) ,

INDEX `CustomerID` (`CustomerID` ASC) ,

INDEX `EmployeeID` (`EmployeeID` ASC) ,

INDEX `ShipVia` (`ShipVia` ASC) ,

CONSTRAINT `orders\_ibfk\_1`

FOREIGN KEY (`CustomerID` )

REFERENCES `trade1`.`customers` (`CustomerID` ),

CONSTRAINT `orders\_ibfk\_2`

FOREIGN KEY (`EmployeeID` )

REFERENCES `trade1`.`employees` (`EmployeeID` ),

CONSTRAINT `orders\_ibfk\_3`

FOREIGN KEY (`ShipVia` )

REFERENCES `trade1`.`shippers` (`ShipperID` ))

ENGINE = InnoDB

DEFAULT CHARACTER SET = gbk;

-- -----------------------------------------------------

-- Table `trade1`.`suppliers`

-- -----------------------------------------------------

CREATE TABLE IF NOT EXISTS `trade1`.`suppliers` (

`SupplierID` SMALLINT(5) UNSIGNED NOT NULL AUTO\_INCREMENT ,

`CompanyName` VARCHAR(40) NOT NULL ,

`ContactName` VARCHAR(30) NULL DEFAULT NULL ,

`ContactTitle` VARCHAR(30) NULL DEFAULT NULL ,

`Address` VARCHAR(60) NULL DEFAULT NULL ,

`City` VARCHAR(15) NULL DEFAULT NULL ,

`Region` VARCHAR(15) NULL DEFAULT NULL ,

`PostalCode` VARCHAR(10) NULL DEFAULT NULL ,

`Country` VARCHAR(15) NULL DEFAULT NULL ,

`Phone` VARCHAR(24) NULL DEFAULT NULL ,

`Fax` VARCHAR(24) NULL DEFAULT NULL ,

`HomePage` TEXT NULL DEFAULT NULL ,

PRIMARY KEY (`SupplierID`) )

ENGINE = InnoDB

DEFAULT CHARACTER SET = gbk;

-- -----------------------------------------------------

-- Table `trade1`.`products`

-- -----------------------------------------------------

CREATE TABLE IF NOT EXISTS `trade1`.`products` (

`ProductID` SMALLINT(5) UNSIGNED NOT NULL AUTO\_INCREMENT ,

`ProductName` VARCHAR(40) NOT NULL ,

`SupplierID` SMALLINT(5) UNSIGNED NOT NULL ,

`CategoryID` TINYINT(3) UNSIGNED NOT NULL ,

`QuantityPerUnit` VARCHAR(20) NULL DEFAULT NULL ,

`UnitPrice` DECIMAL(10,2) UNSIGNED NULL DEFAULT '0.00' ,

`UnitsInStock` SMALLINT(6) NULL DEFAULT '0' ,

`UnitsOnOrder` SMALLINT(5) UNSIGNED NULL DEFAULT '0' ,

`ReorderLevel` SMALLINT(5) UNSIGNED NULL DEFAULT '0' ,

`Discontinued` TINYINT(1) NOT NULL DEFAULT '0' ,

PRIMARY KEY (`ProductID`) ,

INDEX `CategoryID` (`CategoryID` ASC) ,

INDEX `SupplierID` (`SupplierID` ASC) ,

CONSTRAINT `products\_ibfk\_1`

FOREIGN KEY (`CategoryID` )

REFERENCES `trade1`.`categories` (`CategoryID` ),

CONSTRAINT `products\_ibfk\_2`

FOREIGN KEY (`SupplierID` )

REFERENCES `trade1`.`suppliers` (`SupplierID` ))

ENGINE = InnoDB

DEFAULT CHARACTER SET = gbk;

-- -----------------------------------------------------

-- Table `trade1`.`order details`

-- -----------------------------------------------------

CREATE TABLE IF NOT EXISTS `trade1`.`order details` (

`OrderID` INT(10) UNSIGNED NOT NULL ,

`ProductID` SMALLINT(5) UNSIGNED NOT NULL ,

`UnitPrice` DECIMAL(8,2) UNSIGNED NOT NULL DEFAULT '999999.99' ,

`Quantity` SMALLINT(2) UNSIGNED NOT NULL DEFAULT '1' ,

`Discount` DOUBLE(8,0) NOT NULL DEFAULT '0' ,

PRIMARY KEY (`OrderID`, `ProductID`) ,

INDEX `ProductID` (`ProductID` ASC) ,

CONSTRAINT `order details\_ibfk\_1`

FOREIGN KEY (`OrderID` )

REFERENCES `trade1`.`orders` (`OrderID` ),

CONSTRAINT `order details\_ibfk\_2`

FOREIGN KEY (`ProductID` )

REFERENCES `trade1`.`products` (`ProductID` ))

ENGINE = InnoDB

DEFAULT CHARACTER SET = gbk;

-- -----------------------------------------------------

-- Table `trade1`.`theRequiredInfo`

-- -----------------------------------------------------

CREATE TABLE IF NOT EXISTS `trade1`.`theRequiredInfo` (

`idtheRequiredInfo` VARCHAR(20) NOT NULL ,

`shipName` VARCHAR(45) NULL ,

`shipAddress` VARCHAR(45) NULL ,

`shipCity` VARCHAR(45) NULL ,

`shipRegion` VARCHAR(45) NULL ,

`shipPostalCode` VARCHAR(45) NULL ,

`shipCountry` VARCHAR(45) NULL ,

`orders\_OrderID` INT(10) UNSIGNED NOT NULL ,

PRIMARY KEY (`idtheRequiredInfo`) ,

INDEX `fk\_theRequiredInfo\_orders1\_idx` (`orders\_OrderID` ASC) ,

CONSTRAINT `fk\_theRequiredInfo\_orders1`

FOREIGN KEY (`orders\_OrderID` )

REFERENCES `trade1`.`orders` (`OrderID` )

ON DELETE NO ACTION

ON UPDATE NO ACTION)

ENGINE = InnoDB;

-- -----------------------------------------------------

-- Table `trade1`.`Suppliers\_orders`

-- -----------------------------------------------------

CREATE TABLE IF NOT EXISTS `trade1`.`Suppliers\_orders` (

`product` INT NOT NULL ,

`productCount` VARCHAR(45) NULL ,

`shipName` VARCHAR(45) NULL ,

`suppliers\_SupplierID` SMALLINT(5) UNSIGNED NOT NULL ,

`orders\_OrderID` INT(10) UNSIGNED NOT NULL ,

INDEX `fk\_Suppliers\_orders\_suppliers1\_idx` (`suppliers\_SupplierID` ASC) ,

INDEX `fk\_Suppliers\_orders\_orders1\_idx` (`orders\_OrderID` ASC) ,

CONSTRAINT `fk\_Suppliers\_orders\_suppliers1`

FOREIGN KEY (`suppliers\_SupplierID` )

REFERENCES `trade1`.`suppliers` (`SupplierID` )

ON DELETE NO ACTION

ON UPDATE NO ACTION,

CONSTRAINT `fk\_Suppliers\_orders\_orders1`

FOREIGN KEY (`orders\_OrderID` )

REFERENCES `trade1`.`orders` (`OrderID` )

ON DELETE NO ACTION

ON UPDATE NO ACTION)

ENGINE = InnoDB;

-- -----------------------------------------------------

-- Table `trade1`.`kucunInfo`

-- -----------------------------------------------------

CREATE TABLE IF NOT EXISTS `trade1`.`kucunInfo` (

`productName` VARCHAR(45) NULL ,

`CompanyName` VARCHAR(45) NULL ,

`productCount` VARCHAR(45) NULL ,

`none\_enough` VARCHAR(45) NULL ,

`products\_ProductID` SMALLINT(5) UNSIGNED NOT NULL ,

INDEX `fk\_kucunInfo\_products1\_idx` (`products\_ProductID` ASC) ,

CONSTRAINT `fk\_kucunInfo\_products1`

FOREIGN KEY (`products\_ProductID` )

REFERENCES `trade1`.`products` (`ProductID` )

ON DELETE NO ACTION

ON UPDATE NO ACTION)

ENGINE = InnoDB;

SET SQL\_MODE=@OLD\_SQL\_MODE;

SET FOREIGN\_KEY\_CHECKS=@OLD\_FOREIGN\_KEY\_CHECKS;

SET UNIQUE\_CHECKS=@OLD\_UNIQUE\_CHECKS;

这是实验九优化以后的er图所导出的sql文件脚本