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Database Management Systems

Assignment 1

CREATE TABLE Product (

maker CHAR (40) PRIMARY KEY,

model CHAR (40) UNIQUE,

type CHAR (7)

);

CREATE TABLE PC (

model CHAR(40) PRIMARY KEY,

speed DECIMAL(3,2),

ram INT,

hdisk INT,

price DECIMAL(6,2)

);

CREATE TABLE Laptop (

model CHAR(40) PRIMARY KEY,

speed DECIMAL(3,2),

ram INT,

hdisk INT,

screen REAL,

price DECIMAL(6,2)

);

CREATE TABLE Printer (

model CHAR(40) PRIMARY KEY,

color BOOL,

type CHAR(20),

price DECIMAL(6,2)

);

CREATE TABLE Classes (

Class CHAR(40) PRIMARY KEY,

Type CHAR(2),

Country CHAR(40),

Guns INT,

Bore REAL,

Displacement REAL

);

CREATE TABLE Ships (

Name CHAR(40) PRIMARY KEY,

Class CHAR(40),

Launched INT

);

CREATE TABLE Battles (

Name CHAR(40) PRIMARY KEY,

Bdate INT

);

CREATE TABLE Outcomes (

Ship CHAR(40) PRIMARY KEY,

Battle CHAR(40) UNIQUE,

Result CHAR(7)

);

CREATE TABLE Employees (

Eno INT PRIMARY KEY,

Ename CHAR(40),

Hire\_Date DATE

);

CREATE TABLE Books (

Isbn CHAR(40) PRIMARY KEY,

Bname CHAR(80),

Quantity INT,

Price Decimal(6,2)

);

CREATE TABLE Customers (

Cno INT PRIMARY KEY,

Cname CHAR(40),

Street CHAR(40),

Zip INT,

Phone CHAR(10)

);

CREATE TABLE orders (

Ono INT PRIMARY KEY,

Cno INT,

Eno INT,

Received DATE,

Shipped DATE

);

CREATE TABLE orderline (

Ono INT PRIMARY KEY,

Isbn CHAR(40) UNIQUE,

Qty INT

);

CREATE TABLE Zipcodes (

Zip INT PRIMARY KEY,

City CHAR(40),

State CHAR(25)

);

1. ∏ model ( σ PC.model >= ‘3.00’(PC))
2. ∏ maker ( Product ⋈ ( σ Laptop.hdisk >= ‘100GB’ ( Laptop ) )
3. ∏ model, price ( σ maker = ‘B’ ( Product ) ) ⋈ ( ∏ model,price ( PC ) ∪ ∏ model,price ( Laptop ) ∪ ∏ model,price ( Printer ) )
4. ∏ model ( σ Printer.color = ‘true’ ∧ Printer.type = ‘laser’ ( Printer ) )
5. ∏ maker ( σ Product.type = ‘Laptop’ ( Product ) ) – ∏ maker ( σ Product.type = ‘PC’ ( Product ) )
6. Temp := PC  
   Result := ∏ hdisk ( Temp ⋈ Temp.hdisk = PC.hdisk ∧ Temp.Model <> PC.Model ( PC ) )
7. PC1 := PC  
   PC2 := PC  
   ∏ PC1.Model,PC2.Model ( σ PC1.Speed = PC2.Speed ∧ PC1.ram = PC2.ram ∧ PC1.Model > PC2.Model ( PC1 X PC2 ) )
8. R1 := ∏ Model ( σ speed >= ‘2.80’ ( PC ) ) ∪ ∏ Model ( σ speed >= ‘2.80’ ( Laptop ) )  
   R2 := Product ⋈ R1  
   ∏ maker ( σ R2.maker = R3.Maker ∧ R2.Model <> R3.model ( R2 X ρ(R3, R2 ) ) )
9. R1(maker, speed1) := ∏ maker, speed ( PC ⋈ Product )  
   R2(maker, speed2) := R1  
   R3( maker, speed3) := R1  
   R4(maker, speed1, speed2, speed3) := R1 ⋈ R3 ⋈ R3  
   R5 := ∏ maker ( σ speed1 <> speed2 ∧ speed1 <> speed3 ∧ speed2 <> speed3 ( R4 ) )
10. R1(maker, model1) := ∏ maker,model ( σ Product.type = ‘PC’ ( Product ) )  
    R2(maker, model2) := R1  
    R3(maker, model3) := R1  
    R4(maker, model4) := R1  
    R5(maker, model1, model2, model3) := R1 ⋈ R2 ⋈ R3  
    Temp1 := ∏ maker ( σ model1 <> model2 ∧ model1 <> model3 ∧ model2 <> model3 ( R5 ) )  
    R6(maker, model1, model2, model3, model4) := R5 ⋈ R4  
    Temp2 := ∏ maker ( σ model1 <> model2 ∧ model1 <> model3 ∧ model1 <> model4 ∧ model2 <> model3 ∧ model2 <> model4 ∧ model3 <> model4 ( R6 ) )  
    Temp3 := Temp1 – Temp2
11. ∏ class,country ( σ Classes.bore >= 16.0 ( Classes ) )
12. ∏ name ( σ country = ‘USA’ ( ∏ country ( Classes ) X ∏ name ( Ships ) ) )
13. ∏ name ( σ Ships.launched < ‘1921’ ( Ships ) )
14. ∏ ship ( σ battle = ‘Denmark Straight’ ∧ result = ‘sunk’ ( Outcomes ) )
15. ∏ name ( ( σ Ships.launched >= ‘1921’ ( Ships ) ) X ( σ Classes.displacement > ‘35000’ ( Classes) ) )
16. ∏ name,displacement,guns ( σ battle = ‘Guadalcanal’ ( ∏ ship,battle ( Outcomes ) X ∏ guns, displacement ( Classes ) )
17. R1(name) := ∏ ship ( Outcomes )  
    ∏ name ( R1 ⋈ ( ∏ name ( Ships ) ) )
18. ∏ class ( Classes ) – ∏ class ( Ships ⋈ Ships.class = Ship2.class ∧ Ships.name <> Ship2.name Ρ Ship2 ( Ships ) )
19. ∏ country ( σ type = ‘bb’ ( Classes ) ) ∩ ∏ country ( Σ type = ‘bc’ ( Classes ) )
20. ∏ R1.ship ( ( ρ R1 ( σ result = ‘damaged’ ( Outcomes ) ⋈ battle = name ( Battles ) ) ) ⋈ R1.ship = R2.Ship ∧ R1.date < R2.date ρ R2 ( Outcomes ⋈ battle = name ( Battles ) ) )
21. ∏ Cno,Cname ( σ Customers.Zip = 49008 ( Customers ) )
22. ∏ Cno,Cname ( σ State = ‘Michigan’ ( Customers ⋈ Zipcodes ) )
23. ∏ Ename ( ( ( σ State = ‘Michigan’ ( Zipcodes ) ⋈ Customers ) ⋈ Orders ) ⋈ Employees )
24. ∏ Ename ( ( ( σ Zip=’49008’ ∨ Zip=’49009’ ( Zipcodes ) ⋈ Customers ) ⋈ Orders ) ⋈ Employees )
25. ∏ Cname (( Orders ⋈ Customers ) ⋈ σ Ename=’John’ ( Employees) )
26. PROJECT Cname ( SELECT book <> ‘Database’ ( ( ( Orders JOIN Customers ) JOIN Orderline ) JOIN Books ) )

I can’t do the rest… Not a clue how to do them.