**Group No:2**

|  |  |  |
| --- | --- | --- |
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dbs201

ASSIGNMEMT 1

**DBS201 Assignment 1**

**Due date – April 8, 2019 3:30 PM**

**15%of final mark**

Your group of four to five people is to develop a conceptual database design for the following description and then to create the database using DB2 on the IBMi.

**Required for submission:**

1. Submit a **printed 3NF solution** for EACH user view in this assignment

2. You are to show each step in your solution: UNF, 1NF, 2NF, 3NF

3. You are to clearly mark Primary and Foreign Keys as shown in the sample below:

**Relation1[ column1 (PK), column2, column3, column4 (FK)]**

4. Show the **FINAL ENTITY SET** after performing **MERGE** operation on your five 3NF solutions

5. Produce an ERD that models your finished design.

6. Create the database and produce system reports using the DSPFD command to show all the constraints in place for all tables. Include sample data in your tables and produce sample reports of all tables and views you have created.

7. Allow all group members and your instructor to have all permissions to all your Database objects. The id WS201J40 should only have read access to tables. **Everyone else must be excluded**. Include reports that indicate the permissions. Your collection name should be use the following naming convention. DB201AG01 where **A** is your class section and **G01** is your group number.

8. You must hand in the Submissions Form with your assignment (one per group).

9. Each day being late will result in 10% mark penalty, also if your group is below the minimum group size of 4 this will result in 10% mark penalty. All collections should have been created and secured from the public by March 30. A 10% penalty will be applied to groups who have not secured their collections in time or have misnamed their collections.

**Description of Operations**

**GTA Landscaping is a landscaping company that has been in business for over a decade.**

**GTA Landscaping's business is to offer several services to customers. Services include "Lawn Cutting", "Garden Planting", fall "Leaf Clearing", and winter "Snow Shoveling". Each customer may require one or more of these services at a time; and the customer may require the same service repeated several times each year.**

**Teams of employees deliver the services offered by GTA Landscaping. Each team can carry out all types of service, and more than one team can carry out each service. All of GTA Landscaping maintenance employees are organized into a team. Each employee can belong to only one team. We will also store each employee's OHIP (health card) number in case an employee is injured on the job.**

**Finally, GTA Landscaping also sells lawn and garden products to customers. A customer can purchase one or more products; and we have several of each product in stock to allow sales of the same product to any number of different customers. To help GTA Landscaping organize it's products, each product is given a single classification. For example, GTA Landscaping sells the classification of "Garden Tools" which include products such as: "Garden Rakes", "Shovels", "Pics", "Axes", "Pitch Forks", and "Hand Shears". GTA Landscaping also sells a classification of "Shrubs" which include products: "Cedar", "Golden Cedar", "Mullberry", and "Juniper".**

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#### **GTA Landscaping: User View 1**

**Below are shown 2 sample invoices for the services our business sells. (An invoice is the same as a receipt). We write a customer invoice once all services are completed for a customer visit. This invoice will itemize many details including the services provided, the time it took to complete those services, the charge for those services, the total of all service charges.**

**Sample1**

**Invoice Statement**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **INVOICE #:** | ***1355*** |  |  |  |
| **INVOICE DATE:** | ***5-Jul-19*** |  | **CUSTOMER:** | ***56 - John Adams*** |
| **WORK TEAM:** | ***2*** |  | **ADDRESS:** | ***234 Bloor W*** |
| **EQUIP. USED:** | ***20 hp John Deer tractor/ mower*** | | | ***Toronto*** |
|  | ***10" tree pruning shears*** | |  | ***M2S 4S3*** |
|  | ***2 hp Johnson grass trimmer*** | |  |  |
|  |  |  |  |  |
| **SERVICES:** |  |  |  |  |
| **SERVICE CODE** | **DESCRIPTION** | **HOURLY CHARGE** | **WORK DURATION (hours)** | **TOTAL CHARGE** |
| ***LC*** | ***Lawn Cutting*** | ***$25.00*** | ***0.75*** | ***$18.75*** |
| ***LW*** | ***Lawn Weeding*** | ***$35.00*** | ***1.15*** | ***$40.25*** |
| ***LF*** | ***Lawn Fertilizing*** | ***$15.00*** | ***0.25*** | ***$3.75*** |
| ***TG*** | ***Tree Pruning*** | ***$45.00*** | ***0.50*** | ***$22.50*** |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  | **SUBTOTAL:** | ***$85.25*** |
|  |  |  | **GST (7%):** | ***$5.97*** |
|  |  |  | **PST (8%):** | ***$6.82*** |
|  |  |  | **TOTAL DUE:** | ***$98.04*** |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

**Sample2**

**Invoice Statement**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **INVOICE #:** | ***1412*** |  |  |  |
| **INVOICE DATE:** | ***04-Jul-19*** |  | **CUSTOMER:** | ***34 - Ashley Riley*** |
| **WORK TEAM:** | ***3*** |  | **ADDRESS:** | ***156 Avindale Cresc*** |
| **EQUIP. USED:** | ***20 hp John Deer tractor/ mower*** | | | ***Toronto*** |
|  | ***2 hp Johnson grass trimmer*** | |  | ***M4T 4R7*** |
|  | ***Haggmann garden-tiller*** |  |  |  |
| **SERVICES:** |  |  |  |  |
| **SERVICE CODE** | **DESCRIPTION** | **HOURLY CHARGE** | **WORK DURATION (hours)** | **TOTAL CHARGE** |
| ***LC*** | ***Lawn Cutting*** | ***$25.00*** | ***0.75*** | ***$18.75*** |
| ***GW*** | ***Garden Weeding*** | ***$25.00*** | ***1.15*** | ***$28.75*** |
| ***GP*** | ***Garden Planting*** | ***$30.00*** | ***0.25*** | ***$7.50*** |
| ***GF*** | ***Garden Fertilizing*** | ***$10.00*** | ***0.50*** | ***$5.00*** |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  | **SUBTOTAL:** | ***$60.00*** |
|  |  |  | **GST (7%):** | ***$4.20*** |
|  |  |  | **PST (8%):** | ***$4.80*** |
|  |  |  | **TOTAL DUE:** | ***$69.00*** |
|  |  |  |  |  |

**UNF:**

**Invoice[invNo, invdate, custid,custname, custaddr, worker#,(Equipment\_used), (serv\_code,serv\_desc, hrly\_charge), work\_desc]**

**1NF:**

**Invoice[ invNo,invdate, custid,custname,custaddr, worker#]**

**Inv-Service[invNo, serv\_code,serv\_desc,hrly\_charge,work\_dur,work\_desc]**

**Inv-Equip[invNo, equip\_code,Eqip-used] equip\_code is surrogate key**

**2NF:**

**Inv\_service[invNo, serv\_code,work\_dur]**

**Service[serv\_code,serv\_desc,hrly\_charge]**

**Inv\_Equip[invNo, Eqip\_code]**

**Equipment[Equip\_code,Equip\_used]**

**Invoice[invNo, incdate,custid,custname,custaddr,workerNo]**

**3NF:**

**Invoice[invNo, invdate,custid(FK), custadd,workerid]**

**Service[serv\_code, serv\_desc, hrly\_charge]**

**Inv\_serv[invNo,serv\_code(FK),work\_dur]**

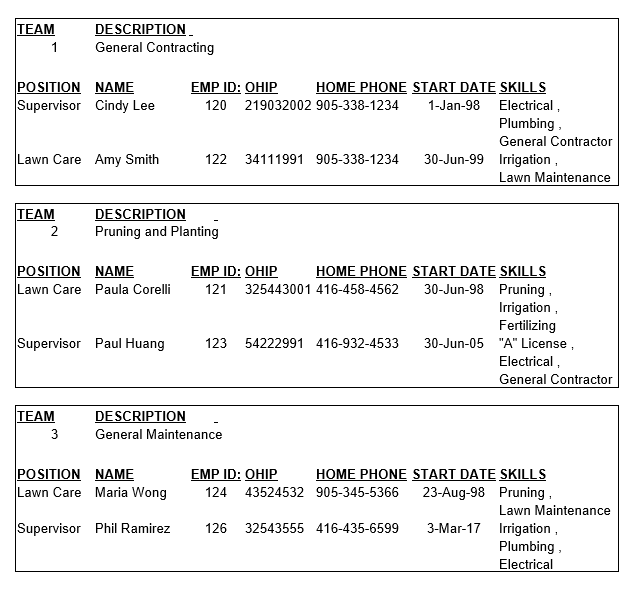
**Equipment[Equip\_code,Equip\_used]**

**Customer[custid,custfname,custlname,custst,custps, region]**

#### **GTA Landscaping: User View 2**

**Below is a listing of GTA Landscaping teams of lawn care specialists that do the services for our customers. The Operations Manager uses this report to schedule which teams will be sent to which customers on any given workday. Team members work together when visiting a customer site.**

**Team - Employee Reports**

****

**UNF**

**Team[team\_id,, team\_desc, (emp\_position, empName, empID, OHIP, homePhone, start\_date,(sill\_desc))]**

**1NF**

**Team[team\_id, team\_desc]**

**Employee[team\_id, emp\_id, empName, emp\_position, OHIP, homePhone, start\_date]**

**Emp\_skill[team\_id, emp\_id, skill\_no, skill\_desc]skill-no is a surrogate key**

**2NF**

**Team[team\_id, emp\_id, skill\_no]**

**Employee[emp\_id, emp\_name, emp\_position, OHIP, homePhone, start\_date]**

**TeamInfo[team\_id, team\_desc]**

**Skills[skill\_no, skill\_desc]**

**Team-Skill[team-id, skill-no]**

**3NF**

**Team[team\_id(fk1), emp\_id(fk2), skill\_no(fk3)]**

**Employee[emp\_id, emp\_fname, emp\_lname, emp\_position, OHIP, homePhone, start\_date]**

**TeamInfo[team\_id, team\_desc]**

**Skills[skill\_no, skill\_desc]**

**GTA Landscaping: User View 3**

**GTA Landscaping also sells products to its customers. Below is shown a sample product sales report list. This type of report is required by the Purchasing Manager to evaluate which products are selling well and which ones are not selling well. When placing new purchases to replace items already sold, the Purchasing Manager will analyse this report first. The list shows a sample of products purchased over a 3-day period.**

**Product Sales Report - 3 day Sample**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PROD. CLASS:** | **PROD. ID:** | **PRODUCT:** | **CHARGE** | **QTY:** | **INVOICE ID:** | **INVOICE DATE:** | **SALES ASSISTANT:** | **CUST. NO.:** |
| ***GT*** | ***10*** | ***6 foot garden rake*** | ***$12.00*** | ***1*** | ***1356*** | ***5-Jul-18*** | ***144 - Paul Smith*** | ***56*** |
| ***GT*** | ***40*** | ***Flat-nosed Shovel*** | ***$8.00*** | ***1*** | ***1356*** | ***5-Jul-18*** | ***144 - Paul Smith*** | ***56*** |
| ***FT*** | ***140*** | ***General grade lawn fertilizer*** | ***$10.00*** | ***3*** | ***1356*** | ***5-Jul-18*** | ***144 - Paul Smith*** | ***56*** |
| ***SB*** | ***100*** | ***Golden cedar sapling*** | ***$35.00*** | ***5*** | ***1367*** | ***6-Jul-18*** | ***145 - Maria Wong*** | ***7*** |
| ***SB*** | ***110*** | ***Mulberry sapling*** | ***$15.00*** | ***2*** | ***1367*** | ***6-Jul-18*** | ***145 - Maria Wong*** | ***7*** |
| ***GT*** | ***50*** | ***Garden pitch-fork*** | ***$7.00*** | ***1*** | ***1367*** | ***6-Jul-18*** | ***145 - Maria Wong*** | ***7*** |
| ***FT*** | ***140*** | ***General grade lawn fertilizer*** | ***$10.00*** | ***2*** | ***1367*** | ***6-Jul-18*** | ***145 - Maria Wong*** | ***7*** |
| ***SP*** | ***170*** | ***120 foot watering hose*** | ***$25.00*** | ***3*** | ***1401*** | ***6-Jul-18*** | ***144 - Paul Smith*** | ***34*** |
| ***SP*** | ***190*** | ***Rotating sprinkler jet*** | ***$19.00*** | ***3*** | ***1401*** | ***6-Jul-18*** | ***144 - Paul Smith*** | ***34*** |
| ***GT*** | ***50*** | ***Garden pitch-fork*** | ***$7.00*** | ***1*** | ***1405*** | ***7-Jul-18*** | ***145 - Maria Wong*** | ***56*** |

**Product sales Report**

**UNF:**

**PRODUCT [*Invoice#*, InvoiceDate, Cust#,, SalesRepName, (ProductClass, Prod#, ProdName, Price, Qty)]**

**1NF:**

**INVOICE [*Invoice#,* InvoiceDate, cust#,SalesRepName]**

**PRODUCT [*Invoice#, Prod#*, ProductClass, ProdName, Price, Qty,,]**

**2NF:**

**INVOICE [*Invoice#*, InvoiceDate, SalesRepName, Cust#]**

**PRODUCT [*Product#*, ProductClass, ProductName, Price]**

**INV\_PRO [*Invoice#*, Product#, Qty]**

**3NF:**

**INVOICE [*Invoice#*, InvoiceDate, Cust#]**

**PRODUCT [*Product#*, ProductClass, ProductName, Price]**

**INV\_PRO [*Invoice#(FK)*, Product#(FK), Qty]**

**SALESREP[SalesRep#, SaleFname, saleLname]**

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#### **GTA Landscaping: User View 4**

**Below is shown a sample product listing and pricing schedule. This report is used by the Sales Staff to determine pricing to be charged for the products that we sell. The "charge" of product sold is determined by adding the markup percentage to the cost.**

**Product Report**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **PRODUCT CLASS:** | **CLASSIFICATION** | **PRODUCT ID:** | **DESCRIPTION** | **COST** | **MARKUP** | **CHARGE** |
| ***GT*** | ***Garden Tools*** | ***10*** | ***6 foot garden rake*** | ***$9.23*** | ***30%*** | ***$12.00*** |
| ***GT*** | ***Garden Tools*** | ***20*** | ***7 foot leaf rake*** | ***$7.69*** | ***30%*** | ***$10.00*** |
| ***GT*** | ***Garden Tools*** | ***30*** | ***Round mouth shovel*** | ***$7.69*** | ***30%*** | ***$10.00*** |
| ***GT*** | ***Garden Tools*** | ***40*** | ***Flat-nosed Shovel*** | ***$6.15*** | ***30%*** | ***$8.00*** |
| ***GT*** | ***Garden Tools*** | ***50*** | ***Garden pitch-fork*** | ***$5.38*** | ***30%*** | ***$7.00*** |
| ***GT*** | ***Garden Tools*** | ***60*** | ***8 inch hand shears*** | ***$11.54*** | ***30%*** | ***$15.00*** |
| ***GT*** | ***Garden Tools*** | ***70*** | ***12 inch trimming shears*** | ***$14.62*** | ***30%*** | ***$19.00*** |
| ***GT*** | ***Garden Tools*** | ***80*** | ***10 inch tamper*** | ***$10.77*** | ***30%*** | ***$14.00*** |
| ***SB*** | ***Shrubs*** | ***90*** | ***Cedar sapling*** | ***$20.00*** | ***50%*** | ***$30.00*** |
| ***SB*** | ***Shrubs*** | ***100*** | ***Golden cedar sapling*** | ***$23.33*** | ***50%*** | ***$35.00*** |
| ***SB*** | ***Shrubs*** | ***110*** | ***Mulberry sapling*** | ***$10.00*** | ***50%*** | ***$15.00*** |
| ***SB*** | ***Shrubs*** | ***120*** | ***Juniper sapling*** | ***$16.67*** | ***50%*** | ***$25.00*** |
| ***FT*** | ***Fertilizers*** | ***130*** | ***Premium lawn fertilizer*** | ***$12.00*** | ***25%*** | ***$15.00*** |
| ***FT*** | ***Fertilizers*** | ***140*** | ***General grade lawn fertilizer*** | ***$8.00*** | ***25%*** | ***$10.00*** |
| ***FT*** | ***Fertilizers*** | ***150*** | ***Premium garden fertilizer*** | ***$14.40*** | ***25%*** | ***$18.00*** |
| ***FT*** | ***Fertilizers*** | ***160*** | ***General grade garden fertilizer*** | ***$9.60*** | ***25%*** | ***$12.00*** |
| ***SP*** | ***Sprinklers*** | ***170*** | ***120 foot watering hose*** | ***$17.86*** | ***40%*** | ***$25.00*** |
| ***SP*** | ***Sprinklers*** | ***180*** | ***12 inch aluminum sprinkler*** | ***$10.71*** | ***40%*** | ***$15.00*** |
| ***SP*** | ***Sprinklers*** | ***190*** | ***Rotating sprinkler jet*** | ***$13.57*** | ***40%*** | ***$19.00*** |

**UNF:**

**PRODUCT[product#, productClass, classification, prod\_desc, cost, markup]**

**1NF:**

**Same as UNF(no second primary key)**

**2NF:**

**Same as 1NF(no Partial dependency)**

**3NF:**

**Same as 2NF(no transitive dependency)**

#### **GTA Landscaping: User View 5**

**GTA Landscaping maintains a list of supplier information and inventory information for the products being sold. All of our products are stored and displayed in one of the aisles of our main office showroom. (Inventory is the number of products GTA Landscaping has available for sale). Below is a sample Inventory Report**

**Inventory Report**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **PRODUCT ID:** | **DESCRIPTION** | **INVENTORY** | **AISLE#** | **SUPPLIER** |
| ***10*** | ***6 foot garden rake*** | ***5*** | ***1*** | ***Sheffield-Gander inc.*** |
| ***20*** | ***7 foot leaf rake*** | ***5*** | ***1*** | ***Sheffield-Gander inc.*** |
| ***30*** | ***Round mouth shovel*** | ***4*** | ***1*** | ***Husky Inc.*** |
| ***40*** | ***Flat-nosed Shovel*** | ***2*** | ***1*** | ***Husky Inc.*** |
| ***50*** | ***Garden pitch-fork*** | ***6*** | ***1*** | ***Husky Inc.*** |
| ***60*** | ***8 inch hand shears*** | ***9*** | ***2*** | ***Sheffield-Gander inc.*** |
| ***70*** | ***12 inch trimming shears*** | ***10*** | ***2*** | ***Sheffield-Gander inc.*** |
| ***80*** | ***10 inch tamper*** | ***3*** | ***2*** | ***Husky Inc.*** |
| ***90*** | ***Cedar sapling*** | ***34*** | ***5*** | ***Northwood Farms inc.*** |
| ***100*** | ***Golden cedar sapling*** | ***23*** | ***5*** | ***Northwood Farms inc.*** |
| ***110*** | ***Mulberry sapling*** | ***12*** | ***4*** | ***Sherwood Nursery*** |
| ***120*** | ***Juniper sapling*** | ***15*** | ***4*** | ***Northwood Farms inc.*** |
| ***130*** | ***Premium lawn fertilizer*** | ***4*** | ***6*** | ***Sherwood Nursery*** |
| ***140*** | ***General grade lawn fertilizer*** | ***12*** | ***6*** | ***Sherwood Nursery*** |
| ***150*** | ***Premium garden fertilizer*** | ***14*** | ***6*** | ***Sherwood Nursery*** |
| ***160*** | ***General grade garden fertilizer*** | ***12*** | ***6*** | ***Sherwood Nursery*** |
| ***170*** | ***120 foot watering hose*** | ***9*** | ***3*** | ***Diemar Garden Center*** |
| ***180*** | ***12 inch aluminum sprinkler*** | ***5*** | ***3*** | ***Diemar Garden Center*** |
| ***190*** | ***Rotating sprinkler jet*** | ***4*** | ***3*** | ***Diemar Garden Center*** |

**UNF:**

**Inventory[aisleNo, supplier(product\_id, prod\_desc, inventory)]**

**1NF:**

**Inventory[aisleNo, product\_id, wupplier, prod\_desc, inventory]**

**2NF:**

**Inventory[aisleNo, supplier, inventoryNo]**

**Product[product\_id, prod\_desc]**

**Inv\_Pro[aisleNo(fk1), prod\_id(fk2)]**

**3NF:**

**Same as 2NF**

**Inventory[aisleNo, supplier, inventory]**

**Product[product\_id, prod\_desc]**

**Inv\_Pro[aisleNo(fk1), prod\_id(fk2)]**

**Merging**

**View 1: (3NF)**

**Invoice[inv#, invdate,custid(FK), workerid]**

**Service[serv\_code, serv\_desc, hrly\_charge]**

**Inv\_serv[invioceNo,serv\_code(FK),work\_dur, work\_desc]**

**Equipment[Equip\_code,Equip\_used]**

**Customer[custid,custfname,custlname,custst,custps, region]**

Inv\_equip[inv#, Equip\_code]

**View 2: (3NF)**

Team[team\_id(fk1), emp\_id(fk2), skill\_no(fk3)]

Employee[emp\_id, emp\_fname, emp\_lname, emp\_position, OHIP, homePhone, start\_date]

TeamInfo[team\_id, team\_desc]

Skills[skill\_no, skill\_desc]

Team-Skill[team-id, skill-no]

**View 3: (3NF)**

**~~INVOICE [~~*~~Inv#~~*~~, Invdate, Cust#]~~**

**~~PRODUCT [~~*~~Product#~~*~~, ProductClass, ProductName, Price]~~**

**INV\_PRO [*Invoice#(FK)*, Product#(FK), Qty]**

**SALESREP[SalesRep#, SaleFname, saleLname]**

**View 4: (3NF)**

**PRODUCT[product#, productClass, classification, prod\_desc,price, markup]**

**View 5: (3NF)**

**Inventory[aisleNo, supplier, inventoryNocREATY]**

**~~Product[product\_id, prod\_desc]~~**

**Inv\_Pro[aisleNo(fk1), prod\_id(fk2)]**