NorthWind Database Query Questions.

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The Northwind database represents a fictitious company sales database “Northwind”, which imports and exports specialty foods worldwide. Contains Following Information:

• Providers (Suppliers): information on Northwind’s suppliers.

• Clients (Customers): information of clients who purchase products from Northwind.

• Employees: Northwind employee information.

• Products (Products): Northwind product information.

• Carrier (Shipper): information about the courier companies used to send Northwind products.

• Orders and Order Details (Orders and Order_Detail): record of orders made, as well as the details of said orders.

```
library(RSQLite)
```

```
## Warning: package 'RSQLite' was built under R version 4.2.3
```

```
con <- dbConnect(RSQLite::SQLite(), dbname = "C:/Users/anura/Desktop/Rey Castro/Nort
hwind.sqlite")
```

1.Obtain a table with the products and units in Stock of the products that are discontinued. Sort descending by Stock and show the first 5 records.

```
query <- "SELECT ProductName, UnitsInStock
          FROM Product
          WHERE Discontinued = 1
          ORDER BY UnitsInStock DESC
          LIMIT 5"
result <- dbGetQuery(con, query)

# Display the result as a table
table(result)
```

```
##                                UnitsInStock
## ProductName                     0 20 26 29
##   Chef Anton's Gumbo Mix        1  0  0  0
##   Guaraná Fantástica            0  1  0  0
##   Mishi Kobe Niku               0  0  0  1
##   Rössle Sauerkraut             0  0  1  0
##   Singaporean Hokkien Fried Mee 0  0  1  0
```

2. Build a table with the product name, unit price, and quantity of products bought. Also, add a column where the total sales are calculated.

```
sales_table <- dbGetQuery(con, "
SELECT Product.ProductName, Product.UnitPrice, SUM(OrderDetail.Quantity) AS Quantit
y,
       SUM(OrderDetail.Quantity * OrderDetail.UnitPrice) AS TotalSales
FROM Product
INNER JOIN OrderDetail ON Product.ID = OrderDetail.ProductID
INNER JOIN 'Order' ON OrderDetail.OrderID = 'Order'.ID
GROUP BY Product.ProductName
ORDER BY TotalSales DESC")

# Display the result as a table
sales_table
```

```
##                         ProductName UnitPrice Quantity TotalSales
## 1                       Côte de Blaye    263.50   205055 54017816.2
## 2            Thüringer Rostbratwurst    123.79   208449 25799290.8
## 3                    Mishi Kobe Niku     97.00   205173 19901393.0
## 4             Sir Rodney's Marmalade     81.00   207647 16817689.8
## 5                   Carnarvon Tigers     62.50   207126 12943675.0
## 6               Raclette Courdavault     55.00   206729 11364111.0
## 7              Manjimup Dried Apples     53.00   209216 11086232.6
## 8                     Tarte au sucre     49.30   206720 10187732.0
## 9                       Ipoh Coffee     46.00   207646  9550115.2
## 10                Rössle Sauerkraut     45.60   204781  9335695.2
## 11                      Vegie-spread     43.90   209875  9211673.3
## 12                Schoggi Schokolade     43.90   205553  9022984.7
## 13       Northwoods Cranberry Sauce     40.00   203223  8127800.0
## 14                      Alice Mutton     39.00   204220  7961920.2
## 15        Queso Manchego La Pastora     38.00   205986  7827262.8
## 16           Gnocchi di nonna Alice     38.00   205532  7807343.2
## 17                  Gudbrandsdalsost     36.00   208439  7502407.2
## 18           Mozzarella di Giovanni     34.80   205172  7137675.6
## 19                Camembert Pierrot     34.00   207652  7056836.0
## 20        Wimmers gute Semmelknödel     33.25   206594  6867654.5
## 21                    Perth Pasties     32.80   207113  6791135.0
## 22                Mascarpone Fabioli     32.00   205060  6561587.2
## 23              Gumbär Gummibärchen     31.23   204972  6399294.3
## 24                            Ikura     31.00   203658  6312536.2
## 25  Uncle Bob's Organic Dried Pears     30.00   205437  6162684.0
## 26                   Sirop d'érable     28.50   205800  5864553.3
## 27            Nord-Ost Matjeshering     25.89   206411  5342911.6
## 28                      Gravad lax     26.00   202955  5276627.2
## 29     Grandma's Boysenberry Spread     25.00   205879  5146795.0
## 30                     Pâté chinois     24.00   205470  4929120.0
## 31                             Tofu     23.25   202923  4717197.2
## 32     Chef Anton's Cajun Seasoning     22.00   204578  4500174.8
## 33                      Flotemysost     21.50   209148  4494833.0
## 34            Chef Anton's Gumbo Mix     21.35   206906  4416881.9
## 35                   Queso Cabrales     21.00   206431  4334127.0
## 36 Louisiana Fiery Hot Pepper Sauce     21.05   205289  4320258.2
## 37              Gustaf's Knäckebröd     21.00   205550  4316474.4
## 38                          Maxilaku     20.00   205546  4110020.0
## 39                      Gula Malacca     19.45   205328  3992464.4
## 40                             Chang     19.00   209418  3977418.2
## 41                   Ravioli Angelo     19.50   203813  3973698.3
## 42                      Inlagd Sill     19.00   205639  3906388.6
## 43                 Boston Crab Meat     18.40   206359  3795758.7
## 44                   Steeleye Stout     18.00   209039  3761344.8
## 45                 Chartreuse verte     18.00   204421  3678454.8
## 46                             Chai     18.00   203353  3659727.6
## 47                   Lakkalikööri     18.00   203216  3657024.0
## 48                          Pavlova     17.45   207533  3619991.8
## 49        Louisiana Hot Spiced Okra     17.00   204278  3472182.0
```

```
## 50                 Valkoinen suklaa     16.25   205042  3331623.8
## 51                     Genen Shouyu     15.50   207128  3210406.5
## 52                   Outback Lager      15.00   205155  3076542.0
## 53                       Röd Kaviar     15.00   204684  3070065.0
## 54           NuNuCa Nuß-Nougat-Creme     14.00   208185  2914189.6
## 55                     Sasquatch Ale     14.00   205557  2877392.0
## 56         Laughing Lumberjack Lager     14.00   204040  2856546.0
## 57    Singaporean Hokkien Fried Mee      14.00   203255  2845144.4
## 58            Escargots de Bourgogne     13.25   209363  2773649.0
## 59  Original Frankfurter grüne Soße      13.00   202538  2632396.0
## 60                          Chocolade     12.75   205185  2615892.0
## 61               Scottish Longbreads     12.50   205394  2566800.0
## 62                 Gorgonzola Telino     12.50   203949  2548072.5
## 63                          Spegesild     12.00   209596  2514720.0
## 64                     Longlife Tofu     10.00   210219  2101786.0
## 65                     Aniseed Syrup     10.00   209901  2098810.0
## 66               Sir Rodney's Scones     10.00   207300  2072476.0
## 67  Jack's New England Clam Chowder       9.65   206008  1987608.7
## 68                     Zaanse koeken       9.50   206123  1957919.6
## 69                       Rogede sild       9.50   203554  1933677.5
## 70       Teatime Chocolate Biscuits       9.20   203971  1876041.1
## 71                           Tunnbröd       9.00   204272  1838068.2
## 72              Rhönbräu Klosterbier       7.75   207358  1606723.8
## 73                           Tourtière      7.45   206769  1539925.3
## 74                           Filo Mix       7.00   204557  1431782.8
## 75                              Konbu       6.00   204733  1228286.4
## 76                Guaraná Fantástica       4.50   203606   915947.1
## 77                             Geitost       2.50   205760   514226.0
```

3. Show total sales by customer's country of origin.

```
#Query the database to obtain the desired table
```

```
query <- "SELECT c.Country, SUM(od.Quantity * od.UnitPrice) AS TotalSales
          FROM Customer c
          JOIN [Order] o ON c.Id = o.CustomerId
          JOIN OrderDetail od ON o.Id = od.OrderId
          GROUP BY c.Country"

# Retrieve the data and store it in a data frame
results <- dbGetQuery(con, query)



results
```

```
##        Country TotalSales
## 1    Argentina   14803755
## 2      Austria    9951507
## 3      Belgium    9668516
## 4       Brazil   47462820
## 5       Canada   15097344
## 6      Denmark   10607108
## 7      Finland   10359385
## 8       France   54380443
## 9      Germany   55543858
## 10     Ireland    4431457
## 11       Italy   14436314
## 12      Mexico   25145477
## 13      Norway    4647668
## 14      Poland    5196525
## 15    Portugal   10382834
## 16       Spain   23968136
## 17      Sweden   10477098
## 18 Switzerland   10322689
## 19          UK   34556507
## 20         USA   65073266
## 21   Venezuela   21400164
```

4. Build a table with the product name, unit price, and quantity of products bought. Also, add a column where the total discounts are calculated.

```
query <- "SELECT Product.ProductName, Product.UnitPrice, SUM(OrderDetail.Quantity) a
s TotalQuantity,
       SUM(OrderDetail.Discount) as TotalDiscount,
       SUM((Product.UnitPrice * OrderDetail.Quantity) * (1 - OrderDetail.Discount))
as TotalSales
FROM Product
INNER JOIN OrderDetail ON Product.Id = OrderDetail.ProductId
GROUP BY Product.ProductName, Product.UnitPrice"

tables <- dbGetQuery(con, query)

tables
```

```
##                         ProductName UnitPrice TotalQuantity TotalDiscount
## 1                       Alice Mutton     39.00        204220          2.30
## 2                     Aniseed Syrup      10.00        209901          0.20
## 3                   Boston Crab Meat     18.40        206359          2.10
## 4                  Camembert Pierrot     34.00        207652          3.26
## 5                   Carnarvon Tigers     62.50        207126          2.15
## 6                               Chai     18.00        203353          2.95
## 7                              Chang     19.00        209418          4.50
## 8                  Chartreuse verte      18.00        204421          2.00
## 9      Chef Anton's Cajun Seasoning     22.00        204578          1.50
## 10           Chef Anton's Gumbo Mix     21.35        206906          0.75
## 11                          Chocolade     12.75        205185          0.65
## 12                    Côte de Blaye    263.50        205055          1.10
## 13           Escargots de Bourgogne     13.25        209363          1.80
## 14                            Filo Mix      7.00        204557          1.20
## 15                       Flotemysost     21.50        209148          1.80
## 16                            Geitost      2.50        205760          1.40
## 17                       Genen Shouyu     15.50        207128          0.10
## 18           Gnocchi di nonna Alice     38.00        205532          3.10
## 19                Gorgonzola Telino     12.50        203949          3.20
## 20     Grandma's Boysenberry Spread     25.00        205879          0.37
## 21                          Gravad lax     26.00        202955          0.30
## 22                Guaraná Fantástica      4.50        203606          2.90
## 23                  Gudbrandsdalsost     36.00        208439          2.30
## 24                       Gula Malacca     19.45        205328          1.45
## 25              Gumbär Gummibärchen     31.23        204972          1.65
## 26              Gustaf's Knäckebröd     21.00        205550          0.30
## 27                              Ikura     31.00        203658          1.45
## 28                       Inlagd Sill     19.00        205639          2.45
## 29                       Ipoh Coffee     46.00        207646          1.40
## 30  Jack's New England Clam Chowder      9.65        206008          1.90
## 31                              Konbu      6.00        204733          1.70
## 32                       Lakkalikööri     18.00        203216          2.05
## 33        Laughing Lumberjack Lager     14.00        204040          0.60
## 34                      Longlife Tofu     10.00        210219          0.65
## 35 Louisiana Fiery Hot Pepper Sauce     21.05        205289          1.55
## 36        Louisiana Hot Spiced Okra     17.00        204278          0.25
## 37            Manjimup Dried Apples     53.00        209216          2.00
## 38               Mascarpone Fabioli     32.00        205060          1.10
## 39                           Maxilaku     20.00        205546          0.65
## 40                  Mishi Kobe Niku     97.00        205173          0.50
## 41           Mozzarella di Giovanni     34.80        205172          0.90
## 42            Nord-Ost Matjeshering     25.89        206411          2.60
## 43       Northwoods Cranberry Sauce     40.00        203223          0.85
## 44          NuNuCa Nuß-Nougat-Creme     14.00        208185          1.55
## 45  Original Frankfurter grüne Soße     13.00        202538          1.95
## 46                      Outback Lager     15.00        205155          2.45
## 47                            Pavlova     17.45        207533          2.88
## 48                      Perth Pasties     32.80        207113          1.15
## 49                       Pâté chinois     24.00        205470          2.55
```

```
## 50                  Queso Cabrales     21.00        206431          2.15
## 51        Queso Manchego La Pastora     38.00        205986          0.90
## 52             Raclette Courdavault     55.00        206729          2.55
## 53                   Ravioli Angelo     19.50        203813          0.65
## 54             Rhönbräu Klosterbier      7.75        207358          2.40
## 55                      Rogede sild      9.50        203554          1.05
## 56                       Röd Kaviar     15.00        204684          0.66
## 57                Rössle Sauerkraut     45.60        204781          1.25
## 58                    Sasquatch Ale     14.00        205557          0.95
## 59               Schoggi Schokolade     43.90        205553          0.25
## 60              Scottish Longbreads     12.50        205394          2.00
## 61    Singaporean Hokkien Fried Mee     14.00        203255          1.65
## 62           Sir Rodney's Marmalade     81.00        207647          0.74
## 63              Sir Rodney's Scones     10.00        207300          2.20
## 64                   Sirop d'érable     28.50        205800          1.70
## 65                       Spegesild     12.00        209596          1.72
## 66                   Steeleye Stout     18.00        209039          1.70
## 67                   Tarte au sucre     49.30        206720          2.60
## 68       Teatime Chocolate Biscuits      9.20        203971          2.05
## 69          Thüringer Rostbratwurst    123.79        208449          2.05
## 70                             Tofu     23.25        202923          1.48
## 71                       Tourtière      7.45        206769          2.60
## 72                        Tunnbröd      9.00        204272          0.75
## 73  Uncle Bob's Organic Dried Pears     30.00        205437          0.80
## 74                Valkoinen suklaa     16.25        205042          0.25
## 75                    Vegie-spread     43.90        209875          0.70
## 76        Wimmers gute Semmelknödel     33.25        206594          1.23
## 77                    Zaanse koeken      9.50        206123          1.55
##    TotalSales
## 1   7961543.8
## 2   2098970.0
## 3   3795765.4
## 4   7056427.3
## 5  12942415.6
## 6   3658815.9
## 7   3976578.4
## 8   3678635.7
## 9   4499837.1
## 10  4416922.2
## 11  2615904.1
## 12 54021729.2
## 13  2773210.4
## 14  1431740.4
## 15  4495296.3
## 16   514330.5
## 17  3210455.3
## 18  7807573.1
## 19  2548023.1
## 20  5146767.0
## 21  5276471.2
## 22   915940.3
```

```
## 23  7501411.8
## 24  3992935.2
## 25  6399422.1
## 26  4316438.7
## 27  6312049.5
## 28  3905978.2
## 29  9550145.1
## 30  1987531.9
## 31  1228121.4
## 32  3656790.0
## 33  2856391.3
## 34  2102032.5
## 35  4320545.1
## 36  3472556.0
## 37 11085336.9
## 38  6561112.0
## 39  4110646.0
## 40 19900141.7
## 41  7139023.4
## 42  5342467.5
## 43  8127792.0
## 44  2914229.5
## 45  2632455.8
## 46  3076482.0
## 47  3619752.8
## 48  6792248.6
## 49  4928926.8
## 50  4333977.9
## 51  7826854.3
## 52 11364498.8
## 53  3974192.6
## 54  1606544.8
## 55  1933349.3
## 56  3070039.2
## 57  9336766.4
## 58  2877452.9
## 59  9023612.1
## 60  2566716.9
## 61  2844798.6
## 62 16818253.6
## 63  2072413.5
## 64  5863136.8
## 65  2514870.5
## 66  3761713.8
## 67 10188641.2
## 68  1876224.5
## 69 25796338.1
## 70  4717262.7
## 71  1540018.9
## 72  1838209.5
## 73  6162673.5
```

```
## 74  3331855.3
## 75  9212320.6
## 76  6868133.0
## 77  1957747.6
```

5. Calculate the total number of discounts by product category.

```
query <- "SELECT Category.CategoryName, SUM(OrderDetail.Discount) as TotalDiscount
FROM Category
INNER JOIN Product ON Category.ID = Product.CategoryId
INNER JOIN OrderDetail ON Product.ID = OrderDetail.ProductID
GROUP BY Category.CategoryName"

tables <- dbGetQuery(con, query)
tables
```

```
##     CategoryName TotalDiscount
## 1      Beverages         25.00
## 2     Condiments         11.37
## 3    Confections         19.02
## 4 Dairy Products         19.56
## 5 Grains/Cereals          8.88
## 6   Meat/Poultry         11.15
## 7        Produce          6.18
## 8        Seafood         19.88
```

6. Suppliers in Spain request to know the demand for their products through the months. The information that will be shared corresponds to the amount of product sold from according to your order date. Show the information graphically.

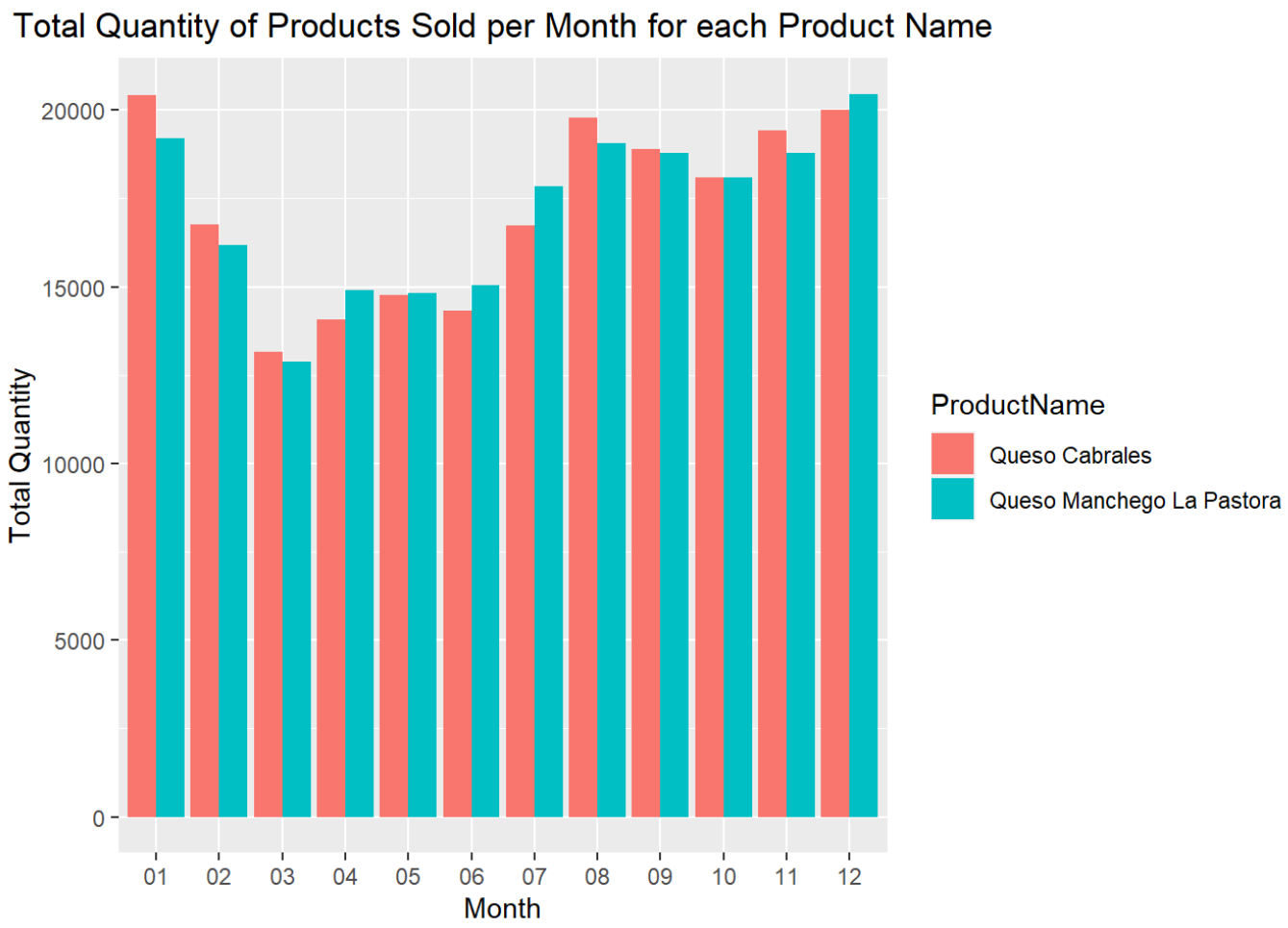
```
query <- "SELECT Product.ProductName, strftime('%m', [Order].OrderDate) as Month, SU
M(OrderDetail.Quantity) as TotalQuantity
FROM [Order]
INNER JOIN OrderDetail ON [Order].ID = OrderDetail.OrderID
INNER JOIN Product ON OrderDetail.ProductID = Product.ID
INNER JOIN Supplier ON Product.SupplierID = Supplier.ID
WHERE Supplier.Country = 'Spain'
GROUP BY Product.ProductName, Month
ORDER BY Month;"

tables <- dbGetQuery(con, query)
tables
```

```
##                  ProductName Month TotalQuantity
## 1             Queso Cabrales    01         20415
## 2  Queso Manchego La Pastora    01         19203
## 3             Queso Cabrales    02         16761
## 4  Queso Manchego La Pastora    02         16168
## 5             Queso Cabrales    03         13150
## 6  Queso Manchego La Pastora    03         12876
## 7             Queso Cabrales    04         14078
## 8  Queso Manchego La Pastora    04         14891
## 9             Queso Cabrales    05         14770
## 10 Queso Manchego La Pastora    05         14811
## 11            Queso Cabrales    06         14330
## 12 Queso Manchego La Pastora    06         15035
## 13            Queso Cabrales    07         16745
## 14 Queso Manchego La Pastora    07         17832
## 15            Queso Cabrales    08         19790
## 16 Queso Manchego La Pastora    08         19053
## 17            Queso Cabrales    09         18888
## 18 Queso Manchego La Pastora    09         18774
## 19            Queso Cabrales    10         18091
## 20 Queso Manchego La Pastora    10         18086
## 21            Queso Cabrales    11         19412
## 22 Queso Manchego La Pastora    11         18798
## 23            Queso Cabrales    12         20001
## 24 Queso Manchego La Pastora    12         20459
```

```
library(ggplot2)

ggplot(data = tables, aes(x = Month, y = TotalQuantity, fill = ProductName)) +
  geom_bar(stat = "identity", position = "dodge") +
  labs(x = "Month", y = "Total Quantity", title = "Total Quantity of Products Sold p
er Month for each Product Name") +
  theme(plot.title = element_text(hjust = 0.5))
```



7. Consult the provider that supplies the most products. Discuss your results with the information from the supplier.

```
query <- "SELECT Supplier.CompanyName, COUNT(Product.ID) AS TotalProducts
FROM Supplier
INNER JOIN Product ON Supplier.ID = Product.SupplierID
GROUP BY Supplier.ID, Supplier.CompanyName
ORDER BY TotalProducts DESC
LIMIT 10;"

tables <- dbGetQuery(con, query)
tables
```

```
##                         CompanyName TotalProducts
## 1                      Pavlova, Ltd.             5
## 2  Plutzer Lebensmittelgroßmärkte AG             5
## 3          New Orleans Cajun Delights             4
## 4            Specialty Biscuits, Ltd.             4
## 5                      Exotic Liquids             3
## 6           Grandma Kelly's Homestead             3
## 7                      Tokyo Traders             3
## 8                           Mayumi's             3
## 9         Heli Süßwaren GmbH & Co. KG             3
## 10           Formaggi Fortini s.r.l.             3
```

8. Obtain a table showing the name of the product categories and the number of products that each category has. Sort by the number of products and show the first 5 items.

```
query <- "SELECT Category.CategoryName, COUNT(*) as ProductCount
FROM Category
INNER JOIN Product ON Category.ID = Product.CategoryID
GROUP BY Category.CategoryName
ORDER BY ProductCount DESC
LIMIT 5;
"

tables <- dbGetQuery(con, query)
tables
```

```
##     CategoryName ProductCount
## 1    Confections           13
## 2        Seafood           12
## 3     Condiments           12
## 4      Beverages           12
## 5 Dairy Products           10
```

9.Insightful Analysis generate a pie chart of the top 5 product categories by the number of products, with each category represented by a different color.

```
library(ggplot2)

result <- dbGetQuery(con, "SELECT Category.CategoryName, COUNT(*) as Count
FROM Product
INNER JOIN Category ON Product.CategoryID = Category.ID
GROUP BY Category.CategoryName
ORDER BY Count DESC
LIMIT 5")

ggplot(result, aes(x="", y=Count, fill=CategoryName)) +
  geom_bar(stat="identity", width=1, color="white") +
  coord_polar("y", start=0) +
  theme_void() +
  labs(title="Top 5 Product Categories", fill="Category Name", x=NULL, y=NULL) +
  theme(legend.position="bottom")
```

Top 5 Product Categories