Assignemnt - 3

NoSQL MongoDB

This assignemnt consists of data from a toy-store where in the obtained datasheet contains details regarding customer, product and it's sale. The tables are created and modulated as per requirement.

The auditing and normalization is done as to eleminate the redundancy and remove baisness in database.

This is done in similar process to previous assignment (Assignment #2 - Physical data model and normalization).

In [1]:
```
import numpy as np
import pandas as pd
import json
import os
import csv
from collections import OrderedDict
from io import StringIO
import tkinter as tk
from tkinter import filedialog
from tkinter import messagebox
from pymongo import MongoClient
```

In [2]:
```
# DB connectivity

client = MongoClient('localhost', 27017)
db = client.db
collection = db.collection
```

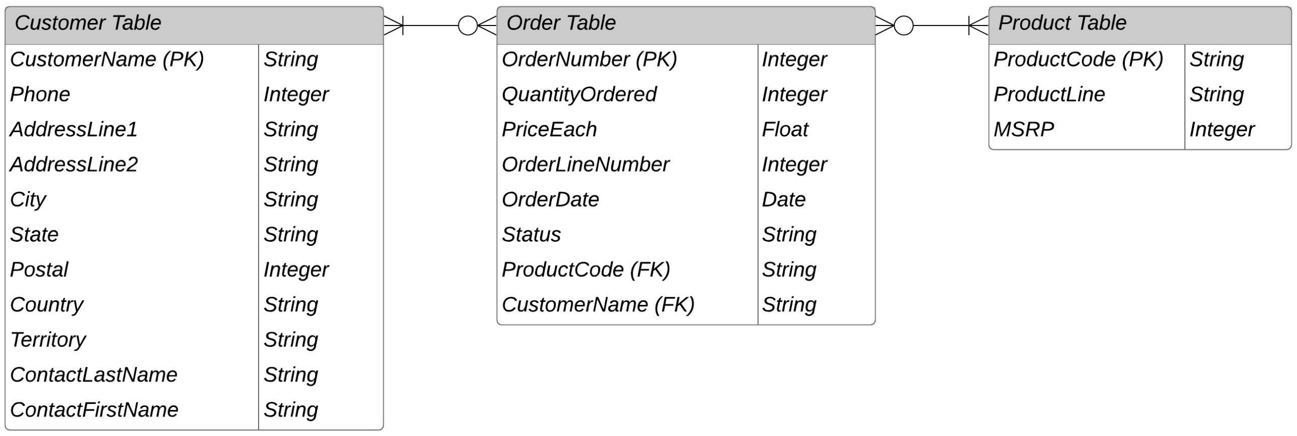
In [3]:
```
# Reading the data from the CSV file

with open('salesDataSample.csv') as f:
    data = f.read()

data = StringIO(data)
data = pd.read_csv(data)

# Creating and viewing master table/datasheet

data
```

Out[3]:

	ORDERNUMBER	QUANTITYORDERED	PRICEEACH	ORDERLINENUMBER	SALES	ORDER
0	10107	30	95.70	2	2871.00	2/2
1	10121	34	81.35	5	2765.90	5/7/200
2	10134	41	94.74	2	3884.34	7/1/200
3	10145	45	83.26	6	3746.70	8/2
4	10159	49	100.00	14	5205.27	10/1
...	...	...	...	...	...	
2818	10350	20	100.00	15	2244.40	12/2
2819	10373	29	100.00	1	3978.51	1/3
2820	10386	43	100.00	4	5417.57	3/1/200
2821	10397	34	62.24	1	2116.16	3/2
2822	10414	47	65.52	9	3079.44	5/6/200

2823 rows × 25 columns

Entity Relationship Diagram (ERD)



Customer Table	
CustomerName (PK)	String
Phone	Integer
AddressLine1	String
AddressLine2	String
City	String
State	String
Postal	Integer
Country	String
Territory	String
ContactLastName	String
ContactFirstName	String

Order Table	
OrderNumber (PK)	Integer
QuantityOrdered	Integer
PriceEach	Float
OrderLineNumber	Integer
OrderDate	Date
Status	String
ProductCode (FK)	String
CustomerName (FK)	String

Product Table	
ProductCode (PK)	String
ProductLine	String
MSRP	Integer

Creating Order table

Here the table is for order details which include the columns for 'ORDERNUMBER', 'QUANTITYORDERED', 'PRICEEACH', 'ORDERLINENUMBER', 'ORDERDATE', 'STATUS', 'PRODUCTCODE' 'CUSTOMERNAME'.

Here the Primary Key is 'ORDERNUMBER' which is unique to all orders. CUSTOMERNAME and PRODUCTCODE are the Foreign Keys in this table.

In [4]:
```
order_table = data.drop(columns=['PRODUCTLINE', 'MSRP', 'PHONE', 'ADDRESSLINE
1', 'ADDRESSLINE2', 'CITY', 'STATE', 'POSTALCODE', 'COUNTRY', 'TERRITORY', 'CO
NTACTLASTNAME', 'CONTACTFIRSTNAME', 'SALES', 'QTR_ID', 'MONTH_ID', 'YEAR_ID',
'DEALSIZE'])
order_table_final = order_table.drop_duplicates()
order_table_final
```

Out[4]:

	ORDERNUMBER	QUANTITYORDERED	PRICEEACH	ORDERLINENUMBER	ORDERDATE	S
0	10107	30	95.70	2	2/24/2003 0:00	S
1	10121	34	81.35	5	5/7/2003 0:00	S
2	10134	41	94.74	2	7/1/2003 0:00	S
3	10145	45	83.26	6	8/25/2003 0:00	S
4	10159	49	100.00	14	10/10/2003 0:00	S
...	...	...	...	...	...	
2818	10350	20	100.00	15	12/2/2004 0:00	S
2819	10373	29	100.00	1	1/31/2005 0:00	S
2820	10386	43	100.00	4	3/1/2005 0:00	R
2821	10397	34	62.24	1	3/28/2005 0:00	S
2822	10414	47	65.52	9	5/6/2005 0:00	(

2823 rows × 8 columns

In [5]:
```
# Auditing

order_table_final.isnull().sum()
```

Out[5]:
```
ORDERNUMBER        0
QUANTITYORDERED    0
PRICEEACH          0
ORDERLINENUMBER    0
ORDERDATE          0
STATUS             0
PRODUCTCODE        0
CUSTOMERNAME       0
dtype: int64
```

In [6]:
```
# Printing

root= tk.Tk()

canvas1 = tk.Canvas(root, width = 300, height = 300, bg = 'lightsteelblue2', r
elief = 'raised')
canvas1.pack()

def exportCSV ():
    global order_table_final

    export_file_path = filedialog.asksaveasfilename(defaultextension='.csv')
    order_table_final.to_csv (export_file_path, index=False, header=True)

saveAsButton_CSV = tk.Button(text='Export CSV', command=exportCSV, bg='green',
fg='white', font=('helvetica', 12, 'bold'))
canvas1.create_window(150, 150, window=saveAsButton_CSV)

root.mainloop()

# Named the exported file as -> orderTableFinal.csv & exit the window to proce
ed further with the application
```

Creating Customer table

Here the table is for customer details which include the columns for 'CUSTOMERNAME', 'PHONE', 'ADDRESSLINE1', 'ADDRESSLINE2', 'CITY', 'STATE', 'POSTALCODE', 'COUNTRY', 'TERRITORY', 'CONTACTLASTNAME', 'CONTACTFIRSTNAME'.

Here the Primary Key for the table is 'CUSTOMERNAME'. No Foreign Key exists here.

In [7]:
```
customer_table = data.drop(columns=['ORDERNUMBER', 'QUANTITYORDERED', 'PRICEEA
CH', 'ORDERLINENUMBER', 'SALES', 'ORDERDATE', 'STATUS', 'QTR_ID', 'MONTH_ID',
'YEAR_ID', 'PRODUCTCODE', 'PRODUCTLINE', 'MSRP', 'DEALSIZE'])
customer_table_final = customer_table.drop_duplicates()
customer_table_final = customer_table_final.drop(columns = ['ADDRESSLINE2', 'S
TATE', 'TERRITORY'])
customer_table_final
```

Out[7]:

	CUSTOMERNAME	PHONE	ADDRESSLINE1	CITY	POSTALCODE	COUNTRY	CO
0	Land of Toys Inc.	2125557818	897 Long Airport Avenue	NYC	10022	USA	
1	Reims Collectables	26.47.1555	59 rue de l'Abbaye	Reims	51100	France	
2	Lyon Souveniers	+33 1 46 62 7555	27 rue du Colonel Pierre Avia	Paris	75508	France	
3	Toys4GrownUps.com	6265557265	78934 Hillside Dr.	Pasadena	90003	USA	
4	Corporate Gift Ideas Co.	6505551386	7734 Strong St.	San Francisco	NaN	USA	
...	...	...	...	...	...	...	
483	Australian Collectables, Ltd	61-9-3844-6555	7 Allen Street	Glen Waverly	3150	Australia	
554	Gift Ideas Corp.	2035554407	2440 Pompton St.	Glendale	97561	USA	
567	Bavarian Collectables Imports, Co.	+49 89 61 08 9555	Hansastr. 15	Munich	80686	Germany	
571	Royale Belge	(071) 23 67 2555	Boulevard Tirou, 255	Charleroi	B-6000	Belgium	
937	Auto-Moto Classics Inc.	6175558428	16780 Pompton St.	Brickhaven	58339	USA	

92 rows × 8 columns

In [8]:
```
#Auditing

customer_table_final.isnull().sum()
```

Out[8]:
```
CUSTOMERNAME        0
PHONE               0
ADDRESSLINE1        0
CITY                0
POSTALCODE          3
COUNTRY             0
CONTACTLASTNAME     0
CONTACTFIRSTNAME    0
dtype: int64
```

In [9]:
```
# Printing

root= tk.Tk()

canvas2 = tk.Canvas(root, width = 300, height = 300, bg = 'lightsteelblue2', r
elief = 'raised')
canvas2.pack()

def exportCSV ():
    global customer_table_final

    export_file_path = filedialog.asksaveasfilename(defaultextension='.csv')
    customer_table_final.to_csv (export_file_path, index=False, header=False)

saveAsButton_CSV = tk.Button(text='Export CSV', command=exportCSV, bg='green',
fg='white', font=('helvetica', 12, 'bold'))
canvas2.create_window(150, 150, window=saveAsButton_CSV)

root.mainloop()

# Named the exported file as -> customerTableFinal.csv & exit the window to pr
oceed further with the application
```

Creating Product table

Here the table is for product details which include the columns for 'PRODUCTCODE', 'PRODUCTLINE', 'MSRP'.

Here, 'PRODUCTCODE' acts as the table's Primary Key. No Foreign Key is present or necessary in the table.

In [10]:
```
product_table = data.drop(columns=['ORDERNUMBER', 'QUANTITYORDERED', 'PRICEEAC
H', 'ORDERLINENUMBER', 'SALES', 'ORDERDATE', 'STATUS', 'QTR_ID', 'MONTH_ID',
'YEAR_ID', 'CUSTOMERNAME', 'PHONE', 'ADDRESSLINE1', 'ADDRESSLINE2', 'CITY', 'S
TATE', 'POSTALCODE', 'COUNTRY', 'TERRITORY', 'CONTACTLASTNAME', 'CONTACTFIRSTN
AME', 'DEALSIZE'])
product_table_final = product_table.drop_duplicates()
product_table_final
```

Out[10]:

	PRODUCTLINE	MSRP	PRODUCTCODE
0	Motorcycles	95	S10_1678
26	Classic Cars	214	S10_1949
54	Motorcycles	118	S10_2016
80	Motorcycles	193	S10_4698
106	Classic Cars	136	S10_4757
...	...	...	...
2691	Ships	100	S700_3505
2717	Ships	99	S700_3962
2743	Planes	74	S700_4002
2770	Planes	49	S72_1253
2797	Ships	54	S72_3212

109 rows × 3 columns

In [11]:
```
#Auditing

product_table_final.isnull().sum()
```

Out[11]:
```
PRODUCTLINE    0
MSRP           0
PRODUCTCODE    0
dtype: int64
```

In [12]:
```
# Printing

root= tk.Tk()

canvas3 = tk.Canvas(root, width = 300, height = 300, bg = 'lightsteelblue2', r
elief = 'raised')
canvas3.pack()

def exportCSV ():
    global product_table_final

    export_file_path = filedialog.asksaveasfilename(defaultextension='.csv')
    product_table_final.to_csv (export_file_path, index=False, header=True)

saveAsButton_CSV = tk.Button(text='Export CSV', command=exportCSV, bg='green',
fg='white', font=('helvetica', 12, 'bold'))
canvas3.create_window(150, 150, window=saveAsButton_CSV)

root.mainloop()

# Named the exported file as -> productTableFinal.csv & exit the window to pro
ceed further with the application
```

Creating JSON file

In [13]:
```
root= tk.Tk()

canvas1 = tk.Canvas(root, width = 300, height = 300, bg = 'lightsteelblue2', r
elief = 'raised')
canvas1.pack()

label1 = tk.Label(root, text='File Conversion Tool', bg = 'lightsteelblue2')
label1.config(font=('helvetica', 20))
canvas1.create_window(150, 60, window=label1)

def getCSV ():
    global read_file

    import_file_path = filedialog.askopenfilename()
    read_file = pd.read_csv (import_file_path)

browseButton_CSV = tk.Button(text="      Import CSV File     ", command=getCSV
, bg='green', fg='white', font=('helvetica', 12, 'bold'))
canvas1.create_window(150, 130, window=browseButton_CSV)

def convertToJSON ():
    global read_file

    export_file_path = filedialog.asksaveasfilename(defaultextension='.json')
    read_file.to_json (export_file_path)

saveAsButton_JSON = tk.Button(text='Convert CSV to JSON', command=convertToJSO
N, bg='green', fg='white', font=('helvetica', 12, 'bold'))
canvas1.create_window(150, 180, window=saveAsButton_JSON)

def exitApplication():
    MsgBox = tk.messagebox.askquestion ('Exit Application','Are you sure you w
ant to exit the application',icon = 'warning')
    if MsgBox == 'yes':
       root.destroy()

exitButton = tk.Button (root, text='       Exit Application     ',command=exit
Application, bg='brown', fg='white', font=('helvetica', 12, 'bold'))
canvas1.create_window(150, 230, window=exitButton)

root.mainloop()
```

After exporting each of the JSON file they can be further imported into MongoDB server/Database where more data processing and modulation actions can be performed.

Web-scraped data

This data is web-scrapped from the gameing forum platform 'pathofstats' for the game 'Path of Exile League'.

In [14]:
```
# Reading Data

data_frame = pd.read_csv('poeStats.csv')
data_frame = data_frame.drop(columns=['dead', 'online'])


# Printing/Output data modulated
# Please un-comment the code line to generate csv file for the same

# data_frame.to_csv(r'poeStatsMod.csv', index = False)


# Showcasing data

data_frame
```

Out[14]:
```
          rank                  name  level        class
    0        1       Tzn_NecroIsFineNow    100  Necromancer    3dcddd59f5088893f734f39686350990dae
    1        1        RaizNeverFirstQT    100  Necromancer     8f3216db5ac9106c287a834731aafc83c3
    2        1  GucciStreamerAdvantage    100  Necromancer   c6ec2dae3855c551e0597c06ef2da06fbb5
    3        1             ChiroxPrime    100       Slayer   c861372da792be0b22c45bf437ccd58437c
    4        2      Cool_NecroIsFineNow    100      Deadeye  24ae924ceed7989ef3d3d6772612832bb46
  ...      ...                     ...    ...          ...
59771    14999        ПроклятьеРекласта     89  Necromancer     d33b4f6e08c10e365765f9a36a8f36d561f
59772    15000       IshibashiSummoner     94  Necromancer  5764cfa387e0a87a4bebc1a3c5017e92de8
59773    15000                 BLively     73       Slayer    9ac75ab75a47cee8a9dfb0a31912df8909
59774    15000                vawddvaw     89    Gladiator    cf02dfc0c90b2df9c7ac76bbedd91e93c2a
59775    15000                 Reselin     53  Necromancer    f7ffda5ca2490546344d32930693f829993

59776 rows × 10 columns
```

The data can also provide answers to the Questions like

What are tags are associated with a person, place or thing?

Tags associated with the users/gamers are

In [15]:
```
data = pd.read_csv('poeStats_tagsAssociatedClass.csv')
data
```

Out[15]:

	class
0	Necromancer
1	Slayer
2	Deadeye
3	Gladiator
4	Inquisitor
5	Raider
6	Champion
7	Occultist
8	Pathfinder
9	Elementalist
10	Chieftain
11	Hierophant
12	Ascendant
13	Trickster
14	Guardian
15	Berserker
16	Juggernaut
17	Saboteur
18	Assassin
19	Witch
20	Marauder
21	Ranger
22	Scion
23	Duelist
24	Shadow
25	Templar

```
In [16]: data = pd.read_csv('poeStats_tagsAssociatedLadder.csv')
         data
```

Out[16]:

	ladder
0	Harbinger
1	SSF Harbinger HC
2	Hardcore Harbinger
3	SSF Harbinger

What users are like other users?

```
In [17]: data = pd.read_csv('poeStats_classNecromancer.csv')
         data
```

Out[17]:

	account
0	TheTzn
1	RaizQT
2	GucciPradas
3	rami1337
4	Pochtli
...	...
995	zhexek222
996	ScrollThief
997	Mataha
998	Clumsy313
999	Rigget86

1000 rows × 1 columns

In [18]:
```
data = pd.read_csv('poeStats_classSlayer.csv')
data
```

Out[18]:

	account
0	Chiroxun
1	shirusen
2	Kanelol
3	Exif
4	Tsar
...	...
995	mosobo
996	vvillow
997	BazouHC
998	propirate
999	Renegade0010

1000 rows × 1 columns

In [19]:
```
data = pd.read_csv('poeStats_classDeadeye.csv')
data
```

Out[19]:

	account
0	cooltail
1	Steelmage
2	celdo
3	mpn
4	YoshiXt
...	...
714	Ramsoe
715	sarodikus
716	Brandaum
717	Aivua9M
718	insinho

719 rows × 1 columns

Solutions

What are tags are associated with a person, place or thing?

Tags associated with Customer(people) : Name, Phonem Address, Location, Point of Contact

Tags associated with Product(thing) : Code, Line, MSRP

Tags associated with Order(Relation) : OrderNumber, Quantity, Price, Date, Status, OrderLineNumber, ProductCode, CustomerName

What social media users are like other social media users in your domain?

In the sales domain, there are customers who would place orders of similar kind.

Here "Euro Shopping Channel" and "Mini Gifts Distribution Ltd." are similar kind as they are interested in the same product "Classic Cars" and "Vintage Cars" and have placed orders accordingly.

On similar grounds, "Euro Shopping Channel" and "Rovelli Gifts" would be interested in a common product "Planes". "Rovelli Gifts" would not be similar to "Mini Gifts Distribution Ltd." as they have no such common product between them.

This comparision is done on the basis of all time data, i.e. From start to end of data logs.

The data for the same can be found in "similarCustomer.csv".

What people, places or things are popular in your domain?

Products popular in the given sales domain are :

1. Classic Cars
2. Vintage Cars
3. Motorcycles
4. Planes
5. Trucks and Buses
6. Ships
7. Trains

In [20]:
```
all_time_popular = pd.read_csv('popularityAllTime.csv')
all_time_popular
```

Out[20]:

	PRODUCTCODE	Line	COUNT(*)
0	S10_1949	Classic Cars	967
1	S18_1342	Vintage Cars	607
2	S10_1678	Motorcycles	331
3	S18_1662	Planes	306
4	S12_1666	Trucks and Buses	301
5	S18_3029	Ships	234
6	S18_3259	Trains	77

What people, places or things are trending in your domain? (A trend is popularity over time.)

Products popular in year 2003 for the given sales domain are :

1. Classic Cars
2. Vintage Cars
3. Trucks and Buses
4. Motorcycles
5. Planes
6. Ships
7. Trains

In [21]:
```
popularity_yr2003 = pd.read_csv('popularityYr2003.csv')
popularity_yr2003
```

Out[21]:

	PRODUCTCODE	Line	COUNT(*)
0	S10_1949	Classic Cars	366
1	S18_1342	Vintage Cars	221
2	S12_1666	Trucks and Buses	110
3	S10_1678	Motorcycles	109
4	S18_1662	Planes	85
5	S18_3029	Ships	81
6	S18_3259	Trains	28

Products popular in year 2004 for the given sales domain are :

1. Classic Cars
2. Vintage Cars
3. Motorcycles
4. Planes
5. Trucks and Buses
6. Ships
7. Trains

In [22]:
```
popularity_yr2004 = pd.read_csv('popularityYr2004.csv')
popularity_yr2004
```

Out[22]:

	PRODUCTCODE	Line	COUNT(*)
0	S10_1949	Classic Cars	442
1	S18_1342	Vintage Cars	284
2	S10_1678	Motorcycles	164
3	S18_1662	Planes	161
4	S12_1666	Trucks and Buses	142
5	S18_3029	Ships	115
6	S18_3259	Trains	37

Products popular in year 2005 for the given sales domain are :

1. Classic Cars
2. Vintage Cars
3. Planes
4. Motorcycles
5. Trucks and Buses
6. Ships
7. Trains

In [23]:
```
popularity_yr2005 = pd.read_csv('popularityYr2005.csv')
popularity_yr2005
```

Out[23]:

	PRODUCTCODE	Line	COUNT(*)
0	S10_1949	Classic Cars	159
1	S18_1342	Vintage Cars	102
2	S18_1662	Planes	60
3	S10_1678	Motorcycles	58
4	S12_1666	Trucks and Buses	49
5	S18_3029	Ships	38
6	S18_3259	Trains	12

Description of the design choices you made in converting your SQL Schema that makes sense.

No such alterations were made to fit the data from SQL database to NoSQL database structure. Whereas, in NoSQL database structure, the whole raw data (partial and biased) data could be fit into it's document and would not present an issue with consistency, but after normalizing the data for SQL data structures, there is no need for any such modifications to be made to fit the given SQL structure to the documented structure.

As the tables are normalized and split into it's sub-tabular structures, this lightens the load on a single document database as if the count of data increases in large, the whole document needs to be loaded to find a given data and takes a lots of time to process the same. Therefore, these relational database structure are helpful to be in for letting the database get converted from SQL to NoSQL.

Report

AUDIT VALIDITY/ACCURACY

The dataset above has been audited and has the least possible null values.

Assignemnt details

This assignment is to convert SQL formated database to NoSQL formated database. Here the .csv files are SQL formated database for the sales data, portable to mySQL and .json files are NoSQL formated database to be portable to MongoDB.

The files used here are - 'sales_data_sample2.csv'

In this document, the file is read and all table details are extracted. After extraction, the Conceptual Model is designed based on this table and an Entity Relationship Diagram is presented to follow the table data. With regards to the conceptual model, other tables are created. They are processed to be in their Normalized forms (1NF, 2NF and 3NF). If there is a large number of null-valued cells in this table, the columns are dropped in that accordance. After the audit, the table is verified if that matches the created conceptual model.

After the tables are created, they are exported to their .csv files labled as "orderTableFinal.csv", "customerTableFinal.csv" and "productTableFinal.csv" along with their headers. They are further processed in mySQL for data extraction. (Code snippets can be found in "sqlCodeSnippets.txt")

This is repeated for all the tables to be created and data extracted from the originally obtained file.

After all of the files are created, they are converted into their .json file formats which contin documented data structures to accomodate all the said tabular data into it. These files can be imported into MongoDB with the command of "> mongoimport --host --username --password --db --collection --file " Where,

```
1. --host is an optional parameter that specifies the remote server Mongo database
 instance
2. --username and --password are the optional parameters that specify the authentic
ation details of a user
3. --db specifies the database name
4. --collection specifies the collection name
5. --file specifies the path of the input file. If this is not specified, the stand
ard input (i.e. stdin) is used
```

The Questions asked in the assignment are solved and mentioned under the "Solution" heading.

*NF here indicates Normal Form

Conclusion

The SQL formated database has successfully been converted to it's counterpart, NoSQL formated database. These are stored in their .csv and .json file extentions respectively.

Contribution

Majority of the application writing is self written. Referenced with Tkinter for UI and pop-up window design.

CITATIONS

https://datatofish.com/ (https://datatofish.com/)

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