

Step A

1. Introduction:

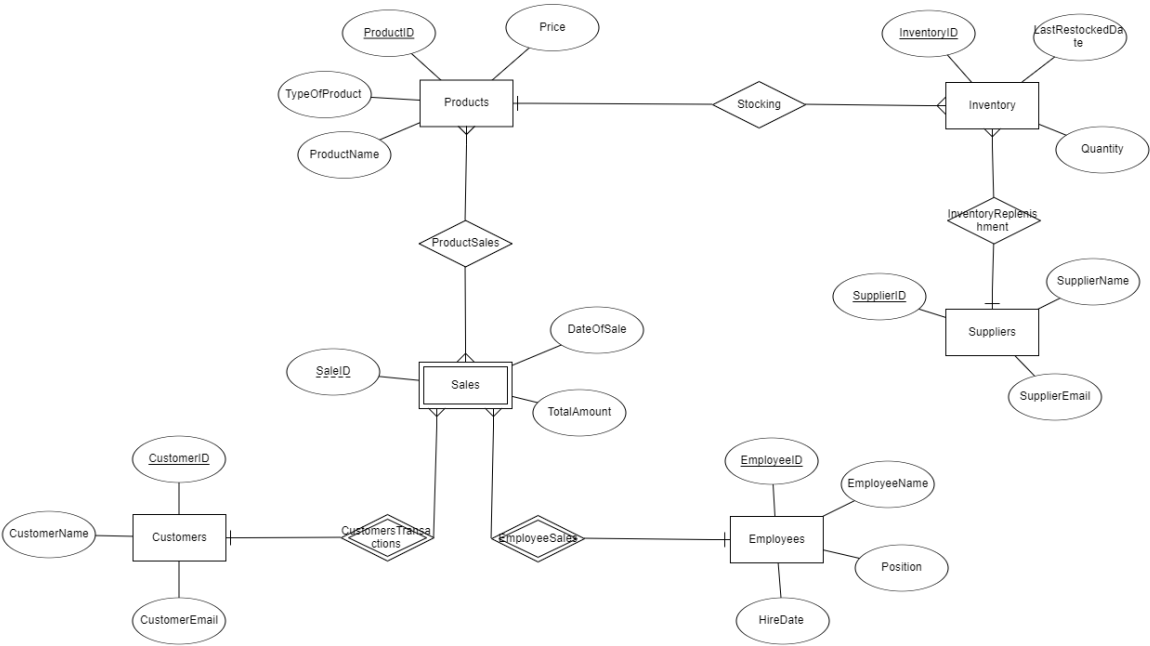
The system is designed to store and manage data for a retail business. It includes information about customers, products, employees, suppliers, sales transactions, and inventory levels. The main functionalities of the system include managing sales transactions, tracking inventory levels, and maintaining records of customers, employees, and suppliers.

Entities and their functions:

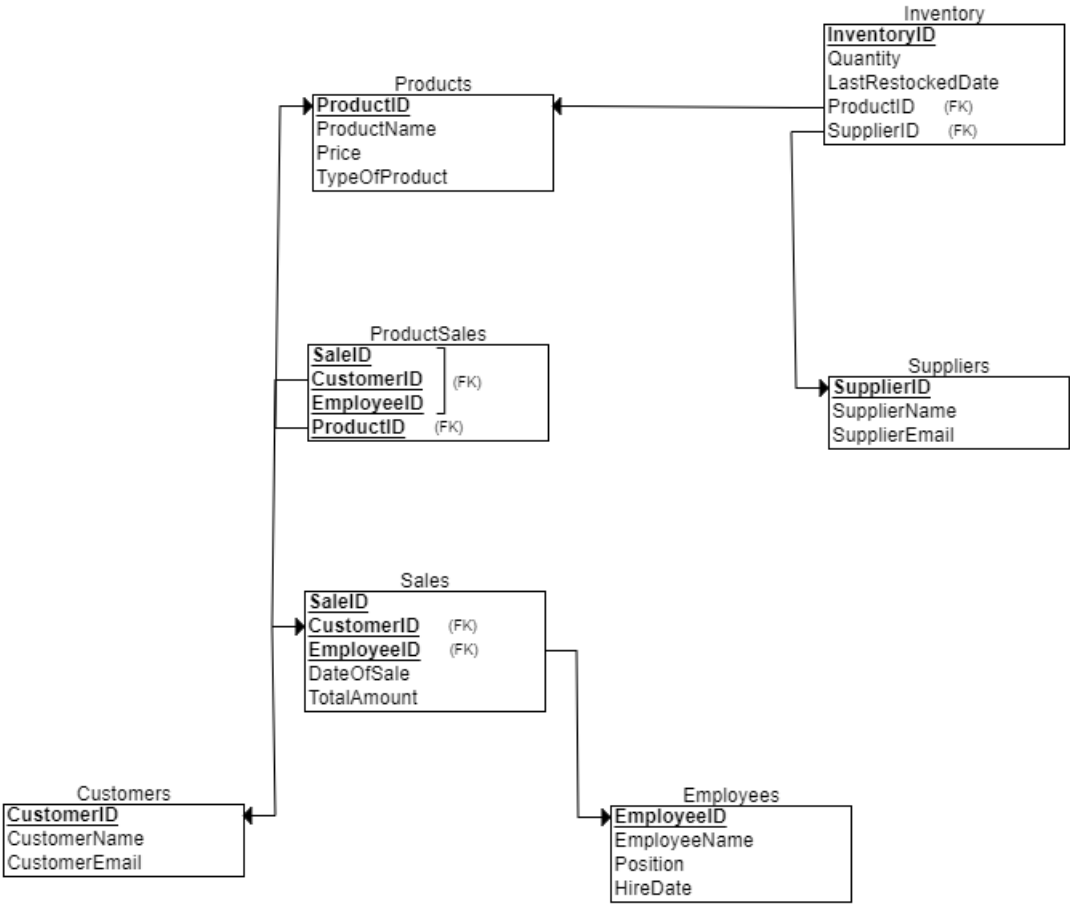
- **Customers:** This entity stores information about the customers of the store, including their unique ID, name, and email address.
- **Employees:** This entity holds data about the store's employees, including their unique ID, name, position, and hire date.
- **Products:** This entity captures details about the products available in the store, including their unique ID, name, type, and price.
- **Suppliers:** This entity maintains information about the suppliers who provide products to the store, including their unique ID, name, and email address.
- **Inventory:** This entity tracks the stock of products in the store, including the unique inventory ID, quantity, last restocked date, product ID, and supplier ID.
- **Sales:** As a weak entity identified by CustomerID and EmployeeID, this entity records sales transactions, including the unique sale ID, date of sale, total amount, customer ID, and employee ID involved in the sale.

2. ERD and DSD Diagrams:

ERD Diagram



DSD Diagram



3. Design decisions :

Several design decisions were made to ensure the database structure meets the requirements:

- The Sales table is designed as a weak entity with identifying relationships to Customers and Employees.
- A many-to-many relationship between Products and Sales is implemented through the ProductSales table.
- Referential integrity is maintained with foreign key constraints.
- Data Types: INT was used for numeric fields, VARCHAR2 for text fields, and DATE for date fields, ensuring appropriate data representation and storage efficiency.

4. SQL Commands :

- *createTables.sql*

This script contains the SQL commands to create all the necessary tables for the database, including Customers, Employees, Products, Suppliers, Inventory, Sales, and ProductSales. Each table is defined with its respective columns and data types, and foreign key constraints are set to maintain data integrity and establish relationships between tables.

```
CREATE TABLE Products
(
    ProductID INT NOT NULL,
    ProductName VARCHAR2(100) NOT NULL,
    Price INT NOT NULL,
    TypeOfProduct VARCHAR2(100) NOT NULL,
    PRIMARY KEY (ProductID)
);
```

```
CREATE TABLE Customers
(
    CustomerID INT NOT NULL,
    CustomerName VARCHAR2(100) NOT NULL,
    CustomerEmail VARCHAR2(100) NOT NULL,
    PRIMARY KEY (CustomerID)
);
```

```
CREATE TABLE Employees
(
    EmployeeID INT NOT NULL,
    EmployeeName VARCHAR2(100) NOT NULL,
    Position VARCHAR2(100) NOT NULL,
    HireDate DATE NOT NULL,
    PRIMARY KEY (EmployeeID)
);
```

```
CREATE TABLE Suppliers
(
    SupplierID INT NOT NULL,
    SupplierName VARCHAR2(100) NOT NULL,
    SupplierEmail VARCHAR2(100) NOT NULL,
    PRIMARY KEY (SupplierID)
);

CREATE TABLE Sales
(
    SaleID INT NOT NULL,
    DateOfSale DATE NOT NULL,
    TotalAmount INT NOT NULL,
    CustomerID INT NOT NULL,
    EmployeeID INT NOT NULL,
    PRIMARY KEY (SaleID, CustomerID, EmployeeID),
    FOREIGN KEY (CustomerID) REFERENCES Customers (CustomerID),
    FOREIGN KEY (EmployeeID) REFERENCES Employees (EmployeeID)
);

CREATE TABLE Inventory
(
    InventoryID INT NOT NULL,
    Quantity INT NOT NULL,
    LastRestockedDate DATE NOT NULL,
    ProductID INT NOT NULL,
    SupplierID INT NOT NULL,
    PRIMARY KEY (InventoryID),
    FOREIGN KEY (ProductID) REFERENCES Products (ProductID),
    FOREIGN KEY (SupplierID) REFERENCES Suppliers (SupplierID)
);
```

- dropTables.sql

This script provides the SQL commands to drop all the tables created by the createTables.sql script. It ensures that tables are dropped in the correct order, taking into account the dependencies between them, and includes the CASCADE CONSTRAINTS option to handle foreign key constraints smoothly.

- insertTables.sql

This script includes SQL commands to insert data into each of the tables in the database. We provided sample data for Customers, Employees, Products, Suppliers, Inventory, Sales, and ProductSales tables to facilitate the testing and demonstration of the database's functionality.

- selectAll.sql

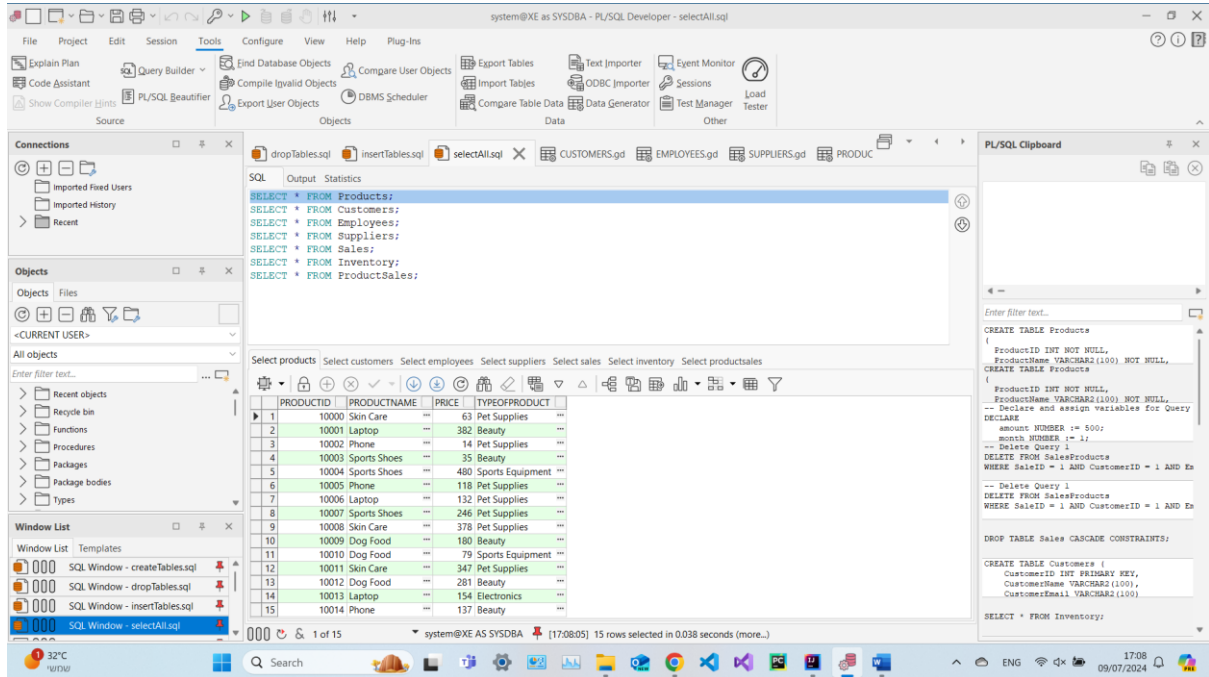
This script contains SQL commands to retrieve and display all data from each of the tables in the database. It is used to verify that the data has been correctly inserted and to provide an overview of the current state of the database.

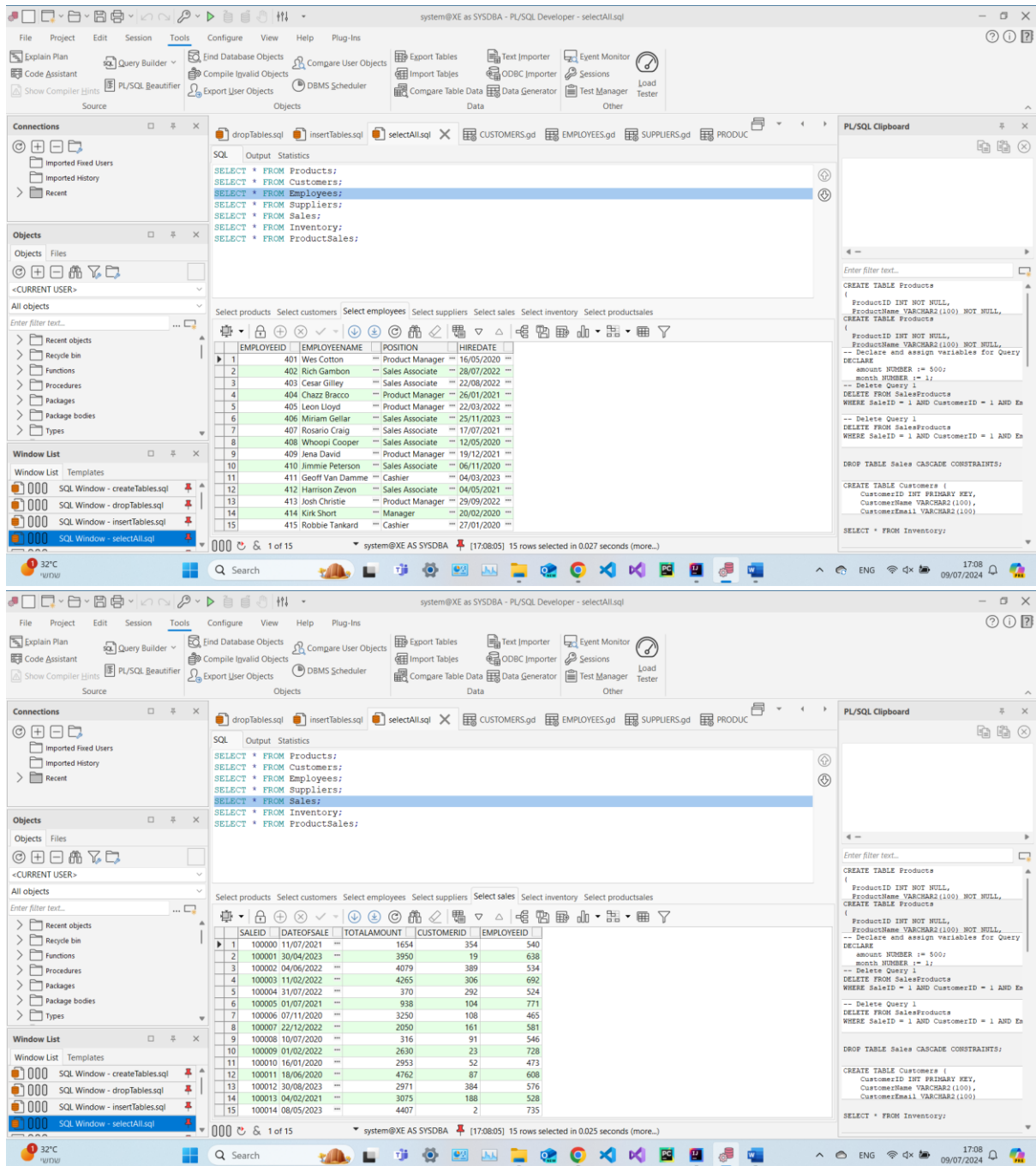
5. Data Entry Methods

Method 1: Data Generator

We used the Data Generator tool in PL/SQL Developer to generate realistic data for each table.

Screenshots





Method 2: CSV Files

We used Mockaroo to generate CSV files for each table with 400 records.

Screenshots

345537708 Samuel Tapiro - 133467 Lior Tordjman - 346012065 Daniel Elbaz

Suppliers (2) • Saved to this PC

File Home Insert Page Layout Formulas Data Review View Automate Help

Clipboard Font Alignment Number Styles Cells Editing Add-ins

SupplierID,SupplierName,SupplierEmail

SupplierID	SupplierName	SupplierEmail
648	Theadora Megson	tmegson0@sfgate.com
514	Silvester Galbraith	sgalbraith1@wordpress.com
295	Adolf Paliser	apaliser2@salon.com
413	Scot Tolumello	stolumello3@nps.gov
575	Abigale Hayne	ahayne4@example.com
467	Theobald Wetter	twetter5@hhs.gov
808	Giacomo Simo	gsimo6@issuu.com
468	Brock Wharton	bwharton7@sciencedirect.com
32	Vicky Guilaem	vguilaem8@dailymotion.com
601	Jephthah Sellwood	jsellwood9@behance.net
357	Carina McCloughen	cmcccloughena@reverbnation.com
994	Daisi Pudner	dpudnerb@blog.com
157	Sargent Tomaskunas	stomaskunasc@economist.com
369	Dickie Ferrillo	dferrillod@discuz.net
224	Haze Elsdon	helsdone@e-recht24.de
455	Ryon Townson	rtownsonf@wisc.edu
222	Doug Hartly	dhartlyg@loc.gov
735	Ricky MacClenan	rmacclenanh@msu.edu
596	Perle Skacel	pskaceli@skyrock.com
545	Bridgette Reder	brederj@infoseek.co.jp
224	Lorrie Hubble	lhubblek@usatoday.com
267	Aurelia Georgiades	ageorgiadesl@phoca.cz
362	Legra Richards	lrichardsm@latimes.com
671	Edwina Mattock	emattockn@vinaora.com
92	Bridgette Ogbourne	bogbourneo@infoseek.co.jp
3	Ezra Crannis	ecrannisp@xing.com

Suppliers (2)

Ready 26°C Sunny

Rechercher

Sales (2) • Saved to this PC

File Home Insert Page Layout Formulas Data Review View Automate Help

Clipboard Font Alignment Number Styles Cells Editing Add-ins

SaleID,DateOfSale,TotalAmount,CustomerID,EmployeeID

SaleID	DateOfSale	TotalAmount	CustomerID	EmployeeID
412	5/1/2011	3169,442,744		
381	5/28/2015	5256,234,499		
664	12/15/2010	5237,646,696		
156	3/17/2006	5176,42,129		
582	9/30/2019	6140,275,864		
259	6/24/2008	8724,7,883		
886	12/2/2001	6879,759,93		
228	4/6/2005	3804,926,812		
60	9/24/2001	4136,159,949		
301	2/21/2011	6306,731,856		
318	7/8/2005	3598,711,747		
311	12/20/2010	8441,258,687		
72	11/10/2016	9434,926,901		
27	3/18/2010	7364,958,673		
945	7/24/2011	1360,573,634		
621	2/26/2003	8782,42,795		
304	2/7/2012	1418,701,635		
661	8/9/2001	1994,876,752		
162	10/22/2018	9957,40,39		
58	7/4/2004	8411,843,474		
696	3/6/2008	4692,833,786		
707	2/18/2012	4093,519,871		
464	9/18/2001	7184,675,125		
650	11/30/2020	7470,740,131		
756	12/29/2021	7638,286,260		
235	11/16/2017	8678,945,154		

Sales (2)

Ready 26°C Sunny

Rechercher

AutoSave

Products (2) • Saved to this PC

Search

FileHomeInsertPage LayoutFormulasDataReviewViewAutomateHelp

Paste

Clipboard

Font

Alignment

Merge & Center

Number

Conditional Formatting

Format as Table

Cell Styles

Insert

Delete

Format

Σ AutoSum

Fill

Sort & Filter

Find & Select

Add-ins

Analyze Data

CommentsShare

A1

ProductID,ProductName,Price,TypeOfProduct

ProductID	ProductName	Price	TypeOfProduct
5299	electronics	3593	sed accusan felis ut at dolor quis odio consequat varius Integer ac leo pellentesque ultrices mattis odio
3327	clothing	1042	lobortis est phasellus sit amet erat nulla tempus vivamus in felis eu sapien
8727	toys	399	volutpat eleifend donec ut dolor morbi vel lectus in quam
6672	home goods	4657	quam turpis adipiscing lorem vitae mattis nibh ligula nec sem duis aliquam convallis
8979	toys	7190	placerat praesent blandit nam nulla integer pede justo lacinia eget tincidunt eget tempus vel pede morbi
8702	electronics	2772	in consequat ut nulla sed accusan felis ut at dolor quis odio consequat varius Integer ac leo pellentesque ultrices mattis
3806	clothing	4266	suscept ligula in lacus curabitur at ipsum ac tellus semper interdum mauris ullamcorper purus sit amet nulla quisque arcu
6425	electronics	1990	in hac habitasse platea dictumst maecenas ut massa quis augue
7184	clothing	6215	duis bibendum felis sed interdum venenatis turpis enim blandit mi in porttitor pede justo eu massa donec dapibus
6772	electronics	7304	magna vestibulum aliquet ultrices erat tortor sollicitudin mi sit amet lobortis
9255	electronics	1636	suspendisse potenti cras in purus eu magna vulputate luctus cum sociis natoque penatibus
5061	home goods	4074	consequat lectus in est risus auctor sed tristique in tempus sit amet sem fusce consequat nulla nisl
3149	food	3546	magna vestibulum aliquet ultrices erat tortor sollicitudin mi sit amet lobortis sapien sapien non mi integer ac neque duis
7530	clothing	8436	vulputate luctus cum sociis natoque penatibus et magnis dis parturient montes nascetur ridiculus mus vivamus vestibulum sagittis sapien
8805	electronics	3659	nam congue risus semper porta volutpat quam pede lobortis ligula sit amet eleifend pede
7246	toys	1140	id turpis integer aliquet massa id lobortis convallis tortor risus dapibus augue vel accumsan tellus nisi orci mauris
666	home goods	2134	pede justo eu massa donec dapibus duis at velit eu est congue elementum in hac habitasse platea dictumst morbi
6671	toys	2305	tempus vel pede morbi porttitor lorem id ligula suspendisse ornare
5545	food	2935	in hac habitasse platea dictumst aliquam augue quam sollicitudin vitae consectetur eget rutrum at lorem integer tincidunt ante vel
7627	toys	7248	tincidunt eu felis fusce posuere felis sed lacus morbi sem mauris laoreet
9995	clothing	3923	dui nec nisi volutpat eleifend donec ut dolor morbi vel lectus in quam fringilla rhoncus mauris enim leo
5610	clothing	6563	ante nulla justo aliquam quis turpis eget elit sodales scelerisque mauris sit amet
8789	electronics	3779	id lobortis convallis tortor risus dapibus augue vel accumsan tellus nisi eu
2200	toys	4125	in lectus pellentesque at nulla suspendisse potenti cras in purus eu magna vulputate luctus cum sociis
5164	clothing	5711	erat volutpat in congue etiam justo etiam pretium iaculis justo in hac habitasse
6248	food	6338	dapibus nulla suscipit ligula in lacus curabitur at ipsum ac tellus

Ready

26°C Sunny

Rechercher

09:41 03/07/2024

AutoSave

Inventory (2) • Saved to this PC

Search

FileHomeInsertPage LayoutFormulasDataReviewViewAutomateHelp

Paste

Clipboard

Font

Alignment

Merge & Center

Number

Conditional Formatting

Format as Table

Cell Styles

Insert

Delete

Format

Σ AutoSum

Fill

Sort & Filter

Find & Select

Add-ins

Analyze Data

CommentsShare

A1

InventoryID,Quantity,LastRestockedDate,ProductID,SupplierID

InventoryID	Quantity	LastRestockedDate	ProductID	SupplierID
1	71	9/25/2022	1,1	
2	3	2/23/2023	2,2	
3	8	12/17/2006	3,3	
4	1,164	3/21/2007	4,4	
5	1,138	7/11/2005	5,5	
6	6,366	3/2/2016	6,6	
7	7,87	1/24/2023	7,7	
8	6,634	8/18/2018	8,8	
9	9,81	2/22/2005	9,9	
10	10,588	10/7/2012	10,10	
11	11,743	2/21/2020	11,11	
12	12,597	11/2/2011	12,12	
13	13,12	7/8/2011	13,13	
14	14,901	8/30/2016	14,14	
15	15,947	11/18/2002	15,15	
16	16,909	7/14/2011	16,16	
17	17,139	2/18/2020	17,17	
18	18,951	8/15/2019	18,18	
19	19,491	1/17/2000	19,19	
20	20,866	3/10/2005	20,20	
21	21,854	8/29/2002	21,21	
22	22,76	10/23/2023	22,22	
23	23,936	2/12/2008	23,23	
24	24,807	9/8/2023	24,24	
25	25,611	8/15/2001	25,25	
26	26,908	1/10/2023	26,26	

Ready

26°C Sunny

Rechercher

09:41 03/07/2024

כלי היתרון

צילום הסקר הועקק ללוח וגשומר
ברר כאן כדי לסמן ולשחק

345537708 Samuel Tapiro - 133467 Lior Tordjman - 346012065 Daniel Elbaz

AutoSave

Employees • Saved to this PC

Search

FileHomeInsertPage LayoutFormulasDataReviewViewAutomateHelp

Clipboard

Font

Alignment

Number

Conditional Formatting

Format as Table

Cell Styles

Insert

Delete

Format

Σ AutoSum

Fill

Sort & Filter

Find & Select

Add-ins

Analyze Data

A1

fx

EmployeeID,EmployeeName,Position,HireDate

EmployeeID	EmployeeName	Position	HireDate
6267	Porter Burghall	sales associate	8/5/1926
9201	Ingrid MacGraith	sales associate	9/5/1913
716	Barby Easterbrook	assistant manager	5/21/1935
4094	Urson Beasley	supervisor	4/18/2020
6819	Terrill McDoual	customer service representative	1/30/1993
8214	Peta Bibben	cleaner	5/26/1952
1042	Brittany Hymus	manager	10/24/2006
9540	Deny De Beauchamp	manager	7/12/1920
6759	Augusto Eastwell	stock clerk	12/20/1983
113	Neilla McKendo	assistant manager	5/2/1970
7645	Damara Prati	cleaner	6/9/1984
4647	Basy Brind	stock clerk	9/10/1943
2370	Mariellen Garton	manager	9/29/1939
2064	Minta Crosser	cleaner	10/28/1940
9352	Adelaide Dugdale	assistant manager	8/21/2018
9500	Kathlin Garland	cleaner	12/26/2022
5910	Harry Kitterman	sales associate	6/17/1951
8048	Odey Roman	customer service representative	1/10/1996
1956	Silvester Merigeau	stock clerk	12/1/1902
386	Lem Stanhope	customer service representative	1/18/1913
7678	Glenn Gotts	manager	5/7/2019
5992	Horton Forman	cleaner	9/26/2022
1428	Tan Worwood	manager	1/31/1941
5004	Deedre Pyton	cashier	5/29/1923
3672	Griffy JesseL	stock clerk	4/13/1956
9711	Pietra Sollowaye	manager	9/1/2022

Employees

AutoSave

Customers • Saved to this PC

Search

FileHomeInsertPage LayoutFormulasDataReviewViewAutomateHelp

Clipboard

Font

Alignment

Number

Conditional Formatting

Format as Table

Cell Styles

Insert

Delete

Format

Σ AutoSum

Fill

Sort & Filter

Find & Select

Add-ins

Analyze Data

A1

fx

CustomerID,CustomerName,CustomerEmail

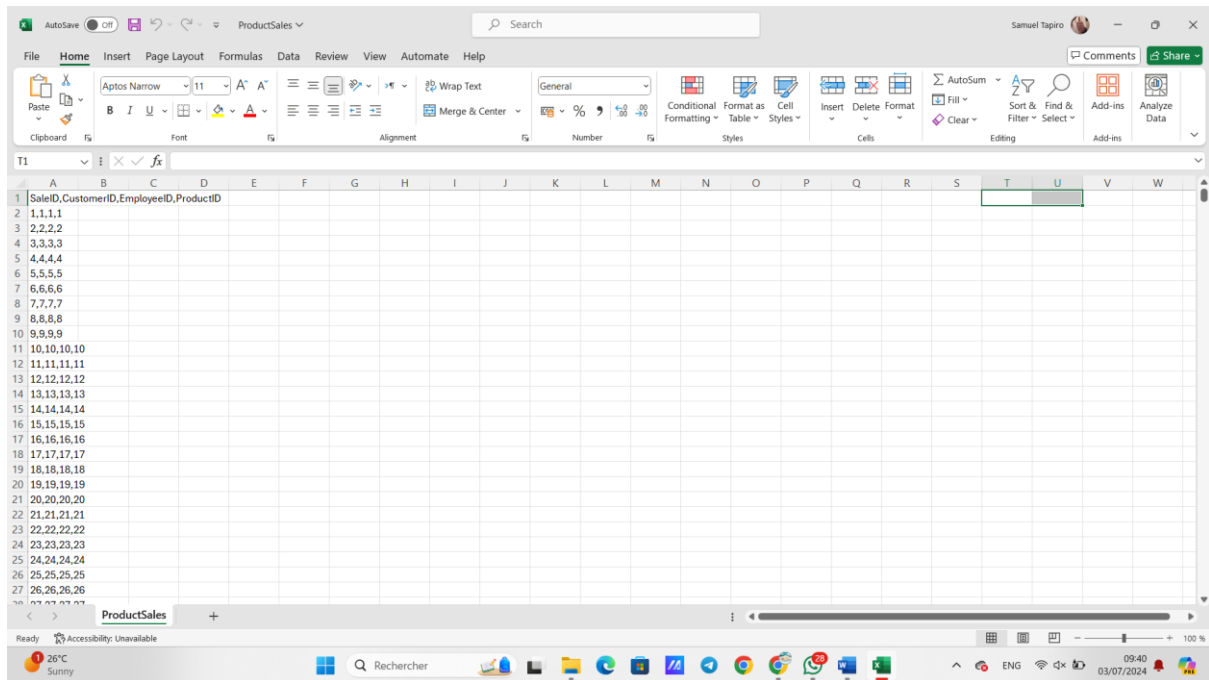
CustomerID	CustomerName	CustomerEmail
747	Doloritas Brevator	dbrevator@storify.com
667	Joycelin Gailor	jgailor1@globo.com
939	Dolli Handrel	dhandrel2@a8.net
458	Corena Habin	chabin3@privacy.gov.au
699	Anthia Tidgewell	atidgewell4@icio.us
176	Kariotta Lois	klouis5@e-recht24.de
132	Aigneis Iggulden	aiggulden6@narod.ru
527	Russell Beszant	rbeszant7@livejournal.com
622	Chaim Aujean	caujean8@livejournal.com
246	Hy Bulluck	hbulluck9@ifeng.com
472	Mallory Laba	mlabaa@ucoz.com
15	Mayor McCreedy	mmccreedyb@joomla.org
667	Cherrita Hannum	channumc@pagesperso-orange.fr
744	Terrel Revington	trevingtond@jalum.net
585	Nicholas Hawkeridge	nhawkeridgee@rambler.ru
547	Brrn Blunsum	blunsumf@amazon.com
433	Hunter Joyes	hjoyesg@dagondesign.com
294	Karin Bayle	kbayleh@statcounter.com
243	Gamaliel Gloy	ggloy@i2i.jp
583	Lizabeth Sivewright	lsivewrightj@dyndns.org
431	Barbee Obel	bobellik@elpais.com
848	Cosetta Shelbourne	cshelbourne@google.co.jp
382	Billy Ivashkin	bivashkinm@google.es
609	Claretta Jirzik	cjirzikn@gnu.org
483	Kizzie Slixby	kslixbyo@weather.com
308	Danna Filan	dfilanp@sphinn.com

Customers

26°C Sunny

Rechercher

09:41 03/07/2024



Method 3: Programming with Python

We created Python scripts to automate the data insertion process, leveraging the Faker library to generate realistic data (in Programming folder on the GitHub).

6. Data Backup and Recovery

Backup Process

We used PL/SQL Developer to create a backup of the database using the SQL Insert method, ensuring that CREATE TABLE commands were included.

Screenshots

