

Whole-ER Foods Inventory Management Database

IST 659 - Data Administration Concepts & Management

Mackenzie Houser, Blessy Thomas, Nathan Widlake





Planning

- Purpose
 - Understanding of problem
 - Outline scope and boundaries
- Outcome
 - Project charter

Problem

An up and coming grocery store is facing issues in this competitive market. Whole-ER Foods are able to get customers in with their greener, fresher, and healthier products, but are unable to supply enough products to keep up with demand. Whole-ER Foods restocks their shelves weekly through a reliable vendor who provides all their products in bulk on Fridays. Currently, the store tracks inventory manually in MS Excel and wishes to upgrade to a Relational Database in order to improve inventory tracking to keep up with customer demand

Scope and Boundaries

- Within scope: product inventory, shipments, transactions, and general customers
- Outside of scope: employee data, customer sensitive data, building lease data, and advertisement and campaign data

ONE-PAGE PROJECT CHARTER

PROJECT NAME	DATABASE ANALYSTS	PROJECT SPONSOR	
Whole-ER Foods Inventory Management Database Transformation	Mackenzie Houser Blessy Thomas Nathan Widlak	Holler Foods, CEO	
EMAIL	PHONE	ORGANIZATIONAL UNIT	
mnhouser@syr.edu , bthoma16@syr.edu , ntwidlak@syr.edu	000-000-0000	Data Engineering, Analytics, Operations and Project Management	
ESTIMATED START UP COSTS	ESTIMATED YEARLY COSTS	EXPECTED START DATE	EXPECTED COMPLETION
\$500,000	\$100,000	01/17/2023	03/28/2023

PROJECT OVERVIEW

PROBLEM OR ISSUE	An up-and-coming grocery store is facing issues in this competitive market. Whole-ER Foods can get customers in with their greener, fresher, and healthier products, but are unable to supply enough products to keep up with demand. Whole-ER Foods restocks shelves weekly through a reliable vendor who provides all their products in bulk on Fridays.
PURPOSE OF PROJECT	Currently, the store tracks inventory manually in excel and wishes to upgrade to a relational database to improve inventory tracking to keep up with customer demand.
BUSINESS CASE	To keep up with business, Whole-ER Foods needs an efficient system to manage supply and demand. Implementing a relational database will allow for Whole-ER Foods to maintain its current customers and expand.
GOALS / METRICS	Create a reliable relational database to help inventory tracking and decision making.
EXPECTED DELIVERABLES	Design and implement a relational database.

PROJECT SCOPE

WITHIN SCOPE	product inventory, shipments, transactions, and general customers (should also have dates table)
OUTSIDE OF SCOPE	employee data, customer sensitive data (for privacy means), building lease data, advertisement, and campaign data.

TENTATIVE SCHEDULE

KEY MILESTONE	START	FINISH
Form Project Team and Conduct Preliminary Review	01/17/2023	01/24/2023
Finalize Project Plan and Project Charter	01/31/2023	02/07/2023
Conduct Analysis Phase	02/07/2023	02/14/2023
Conduct Design Phase	02/14/2023	02/21/2023
Conduct Implementation Phase	02/21/2023	02/28/2023
Conduct Maintenance Phase	03/07/2023	03/14/2023
Close Out Project and Write Summary Report	03/14/2023	03/28/2022

Project charter



Analysis



- Purpose
 - Analyze the problem and capture data requirements
- Outcome
 - Conceptual data model

Informational needs

- Needs to supply enough products and improve inventory control in order to keep up with customer demand
- Needs to upgrade to a relational database

Ways to discover

- Conducting interviews (with manager/stock clerk), surveys, observations, or job-shadowing workers

Sources of information

- Store audits, warehouse receipts, invoices, POS (point of sale) data, sales orders, and purchase orders

System interfacing

- The system will interface with the POS (point of sale) system which consists of a barcode scanner and cash register

Sharing data

- The system will share its data with the project sponsor and CEO, Holier Foods



Data requirements and keys

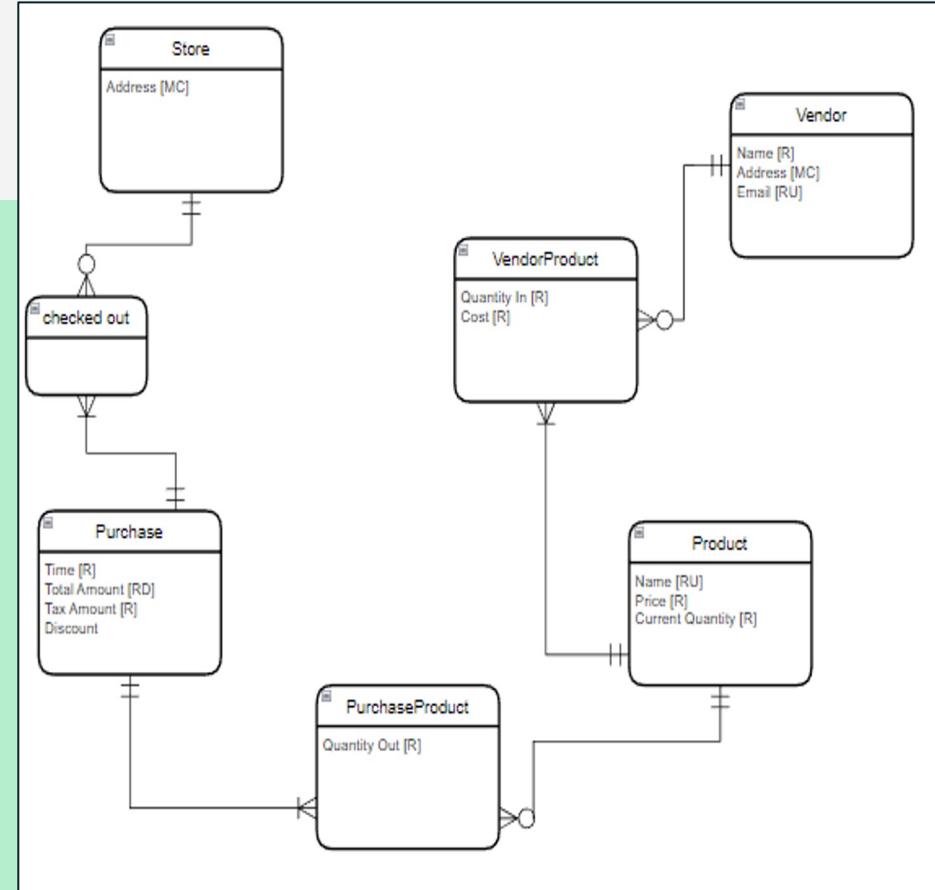
Table / CSV File	Description
dbo.address	<ul style="list-style-type: none">- Address_id [nvarchar][PK]: uuid- Primary_street [nvarchar]: street address- Secondary_street [nvarchar]: street name- City [nvarchar]: city name- Region [nvarchar]: region name- Postal_code {int}: zip code. Only #s- Country [nvarchar]: country name
dbo.product_category	<ul style="list-style-type: none">- Product_category_id [nvarchar][PK]: uuid- Name [nvarchar]: name
dbo.product	<ul style="list-style-type: none">- Product_id [smallint][PK]: numbered 1-500- Product_name [nvarchar]: name- Product_price [money]: price of product in american dollars- Current_quantity [tinyint]: count of quantity in store by product- Product_category_id [nvarchar]: uuid
dbo.purchase_product	<ul style="list-style-type: none">- Purchase_id [nvarchar][PK]: uuid- Product_id [smallint][PK]: numbered 1-500- Sold_quantity [tinyint]: count of quantity sold by purchase
dbo.purchase	<ul style="list-style-type: none">- Purchase_id [nvarchar][PK]: uuid- Purchase_date [date]: year/month/day- Purchase_amount [money]: base cost of transaction- Tax_amount [money]: tax amount on transaction- Discount_amount [money]: amount of savings on transaction. Could be \$0
dbo.store	<ul style="list-style-type: none">- Store_id [nvarchar][PK]: uuid- Store_address_id [nvarchar]: address of store location
dbo.vendor_product	<ul style="list-style-type: none">- Vendor_id [nvarchar][PK]: uuid- Product_id [smallint][PK]: numbered 1-500- Quantity_in [tinyint]: count of quantity available of product- Total_cost [money]: cost of the product offered by vendor
dbo.vendor	<ul style="list-style-type: none">- Vendor_id_int_identity [nvarchar][PK]: uuid- Vendor_address_id [nvarchar]: uuid- Vendor_name [nvarchar]: name of vendor- Vendor_email [nvarchar]: email address of vendor- Vendor_phonenumber [nvarchar]: phone number with zip code of vendor
dbo.checked_out	<ul style="list-style-type: none">- Store_id [nvarchar][PK]: uuid- Purchase_id [nvarchar][PK]: uuid



Entities, attributes, and relationships

Entities and Attributes				Relationships					
Entity	Attribute	Props	Description	Relationship	Entity	Rule	Min	Max	Entity
Product	name	RU	each product in the store	Product - Purchase	<u>Purchase</u>	Sells	1	M	<u>Product</u>
	price	R	price for the product		<u>Product</u>	Sold In	0	M	<u>Purchase</u>
	Current Quantity	R	Amount in stock		<u>Vendor</u>	provides	0	M	<u>Products</u>
	category	R	category it is in		<u>Product</u>	provided by	1	M	<u>Vendor</u>
Purchase	time occurred	R	when the transaction took place	Store - Purchase	<u>Store</u>	occurs	0	M	<u>Purchase</u>
	total Amount	RD	from the price of products and tax		<u>Purchase</u>	Occurs in	1	M	<u>Store</u>
	Tax Percent	R	current tax amount in location						
	Discount		if they are doing any promotions						
Vendor	name	RU	name of the vendor						
	address	MC	vendor location						
	email	RU	vendor email						
Store	address	MC	whole-er food location						

Conceptual data model



Design



- Purpose
 - Create specifications for solution
- Outcomes
 - Logical data model
 - Migration plan
 - Designs of forms and reports

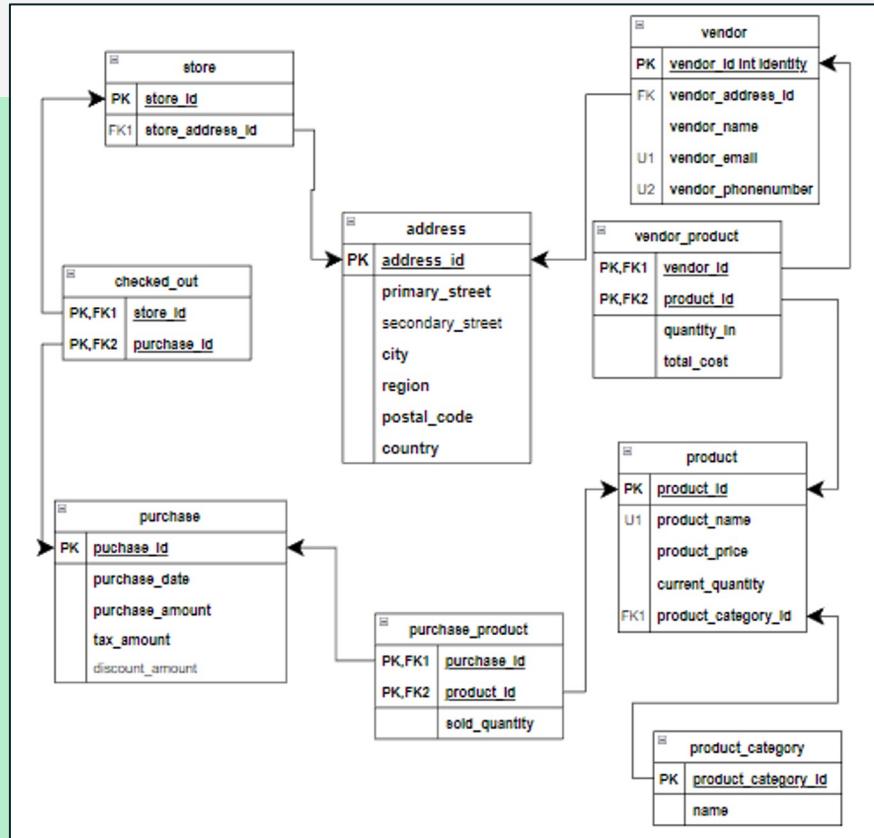
Overview- Specifications for Solution

Title	Whole-ER Foods Inventory Management Database Transformation.
Description/ Goal	Create a reliable relational database to help inventory tracking and decision making.
External Users	Relational database will be used by Corporate Analytics and Supply Management teams.
Initial Status and Preconditions	Currently using excel to track and maintain inventory.
Basic Flow	
Steps taken: STEP 1: Define and understand the problem. STEP 2: Brainstorm solutions. STEP 3: Create a goal. STEP 4: Analyze the problem. STEP 5: Capture data requirements. STEP 6: Assess and address performance needs. STEP 7: Build conceptual model.	
Steps to do: STEP 9: Build a logical model. STEP 10: Construct and carry out migration plan. STEP 11: Design forms and reports. STEP 12: Build internal, external, and physical models. STEP 13: Test internal, external, and physical models. STEP 14: Deploy internal, external, and physical models. STEP 15: Produce working application. STEP 16: Monitor and support application. STEP 17: Track and fix issues of application. STEP 18: Tune physical model for improved performance.	
Post Condition	
Successfully utilize relational database to improve inventory tracking to keep up with demand.	

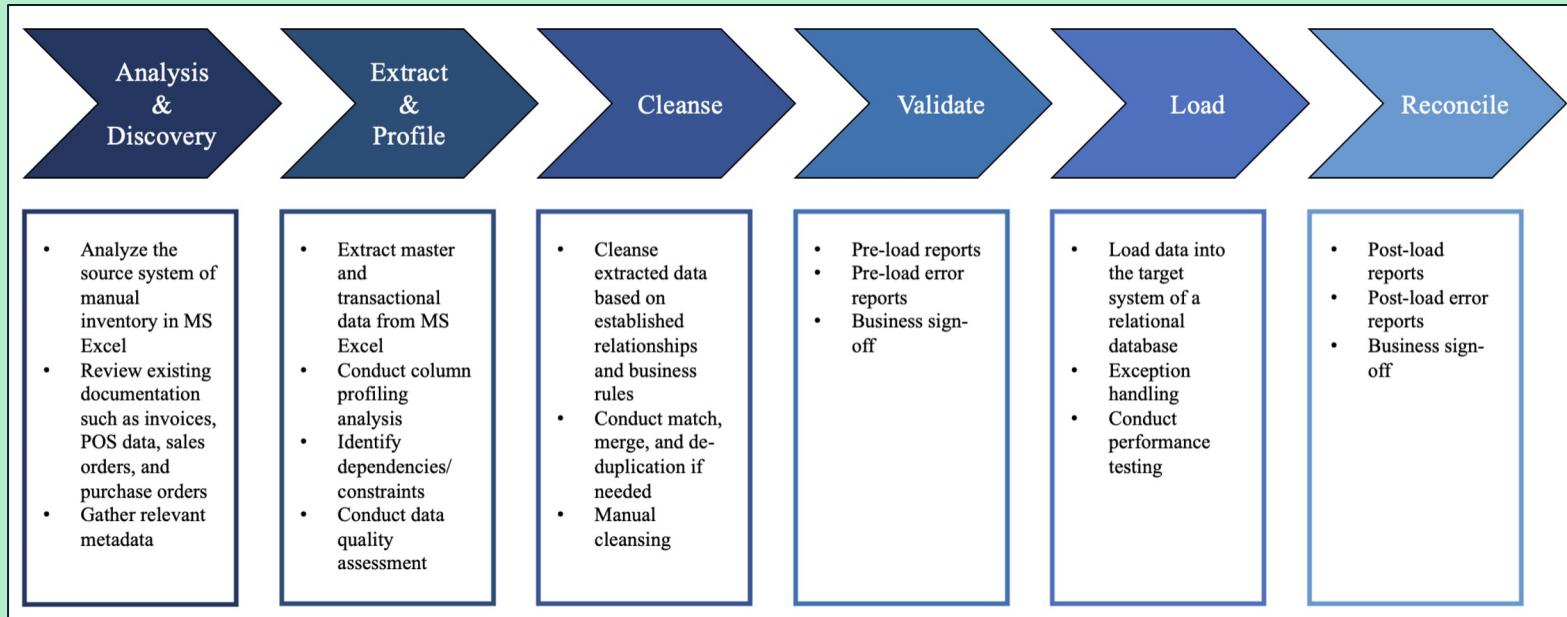
Specifications created for solution



Logical data model



Migration plan



Designs of forms and reports



- Basic layout: How each will be designed
- Internal:
 - Database with records of products and vendors
 - Trigger notifications with when items get below threshold
 - Each table will be able to interact with one another
 - Allows for deep analysis on store status
- External:
 - Power App
 - Interact with Internal Products and Vendors
 - Update, Change, Add for Either
 - Bounces back and forth with Internal Model

Implementation

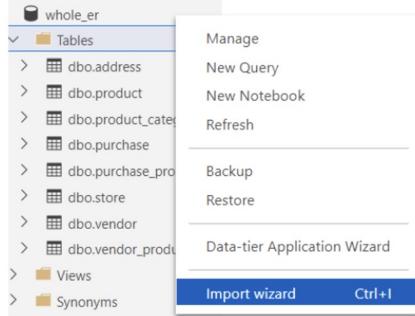


- Purpose
 - Build, test, and deploy solution
- Outcomes
 - Working application
 - Internal data model
 - External/Physical data model

A close-up photograph of a variety of fresh vegetables. In the foreground, there are several bright orange bell peppers. Behind them is a large head of green curly lettuce. Further back, there are red bell peppers and some purple leafy greens like red oak or purple looseleaf. The vegetables are arranged in blue plastic crates, suggesting they are at a market or grocery store.

Internal data model

Right click on database. Select "Import wizard"



Select file

Import flat file wizard

Step 1: Specify Input File

Server the database is in *

localhost (sa)

Database the table is created in *

whole-er

Location of the file to be imported *

C:\Users\localadmin\Downloads\product...

Browse

New table name *

product

Table schema *

dbo

1
2
3
4

Preview data

Step 2: Preview Data

This operation analyzed the input file structure to generate the preview below for up to the first 50 rows.

product_id	product_name	product_price	current_quantity	product_category_id
1	Table Cloth - White	\$7.00	15	4551208-010-4140-4701-0161
2	Table Cloth - Red	\$7.00	20	4551208-010-4140-4701-0162
3	Scotch - Queen Anne	\$1.35	20	4551208-010-4139-4701-0163
4	Basil - Fresh	\$0.75	30	4551208-010-4139-4701-0164
5	Wine - Sicilia Igt Nero Avola	\$6.00	10	4551208-010-4139-4701-0165
6	Vinegar - White	\$0.33	35	5007509-130-4221-4911-0166
7	Pasta - Cannelloni, Sheets, ...	\$0.00	17	ba272504-820-455-9e12-0f01-0167
8	Bat Mix - Fine Olives, 350 Ml	\$0.50	30	4551208-010-4139-4701-0168
9	Creamer - 1 L	\$0.69	20	5007509-130-4221-4911-0169
10	Bread - Rosemary Focaccia	\$2.29	10	4551208-010-4139-4701-0170
11	Marsala - Sperone, Fine, D.o.c.	\$1.29	50	6001350-420-4273-8005-016a
12	Sprouts - Green	\$0.49	25	4551208-010-4140-4701-016b
13	Millettes - 2K	\$1.34	23	6001350-420-4273-8005-016c
14	OIL - Olive Bertolli	\$0.53	10	4551208-010-4140-4701-016d
15	Salt - Fine	\$0.00	20	4551208-010-4140-4701-016e
16	Pie Pastry	\$2.49	20	ba272504-820-455-9e12-0f01-016f
17	Crab - Meat	\$0.84	25	5007509-130-4230-4670-016g
18	Sauce - Marin	\$0.40	34	4551208-010-4140-4701-016h
19	Beans - Yellow	\$7.49	20	4551208-010-4139-4701-016i
20	Juice - Lime	\$2.03	21	8abfb11c-720-4f03-9f12-016j
21	Table Cloth White Colour	\$0.55	22	4551208-010-4140-4701-016k
22	Purse - Nuchs	\$4.12	48	ba272504-820-455-9e12-0f01-016l

1
2
3
4

Begin using active database

```
SELECT TOP (100) [product_id]
      ,[product_name]
      ,[product_price]
      ,[current_quantity]
      ,[product_category_id]
  FROM [whole-er].[dbo].[product]
```

Results	Messages				
1	product_id	product_name	product_price	current_quantity	product_category_id
1	1	Table Cloth - White	\$7.00	15	4551208-010-4140-4701-0161
2	2	Table Cloth - Red	\$7.00	20	4551208-010-4140-4701-0162
3	3	Scotch - Queen Anne	\$1.35	20	4551208-010-4139-4701-0163
4	4	Basil - Fresh	\$0.75	30	4551208-010-4139-4701-0164
5	5	Wine - Sicilia Igt Nero Avola	\$6.00	10	4551208-010-4139-4701-0165
6	6	Vinegar - White	\$0.33	35	5007509-130-4221-4911-0166
7	7	Pasta - Cannelloni, Sheets, ...	\$0.00	17	ba272504-820-455-9e12-0f01-0167
8	8	Bat Mix - Fine Olives, 350 Ml	\$0.50	30	4551208-010-4139-4701-0168
9	9	Creamer - 1 L	\$0.69	20	5007509-130-4221-4911-0169
10	10	Bread - Rosemary Focaccia	\$2.29	10	4551208-010-4139-4701-0170
11	11	Marsala - Sperone, Fine, D.o.c.	\$1.29	50	6001350-420-4273-8005-016a
12	12	Sprouts - Green	\$0.49	25	4551208-010-4140-4701-016b
13	13	Millettes - 2K	\$1.34	23	6001350-420-4273-8005-016c
14	14	OIL - Olive Bertolli	\$0.53	10	4551208-010-4140-4701-016d
15	15	Salt - Fine	\$0.00	20	4551208-010-4140-4701-016e
16	16	Pie Pastry	\$2.49	20	ba272504-820-455-9e12-0f01-016f
17	17	Crab - Meat	\$0.84	25	5007509-130-4230-4670-016g
18	18	Sauce - Marin	\$0.40	34	4551208-010-4140-4701-016h
19	19	Beans - Yellow	\$7.49	20	4551208-010-4139-4701-016i
20	20	Juice - Lime	\$2.03	21	8abfb11c-720-4f03-9f12-016j
21	21	Table Cloth White Colour	\$0.55	22	4551208-010-4140-4701-016k
22	22	Purse - Nuchs	\$4.12	48	ba272504-820-455-9e12-0f01-016l

Repeat for all the tables desired in the database

Select file

Import flat file wizard

Step 1: Specify Input File

Server the database is in *

localhost (sa)

Database the table is created in *

whole-er

Location of the file to be imported *

C:\Users\localadmin\Downloads\product...

Browse

New table name *

product

Table schema *

dbo

1
2
3
4

Step 2: Preview Data

This operation analyzed the input file structure to generate the preview below for up to the first 50 rows.

product_id	product_name	product_price	current_quantity	product_category_id
1	Table Cloth - White	\$7.00	15	4551208-010-4140-4701-0161
2	Table Cloth - Red	\$7.00	20	4551208-010-4140-4701-0162
3	Scotch - Queen Anne	\$1.35	20	4551208-010-4139-4701-0163
4	Basil - Fresh	\$0.75	30	4551208-010-4139-4701-0164
5	Wine - Sicilia Igt Nero Avola	\$6.00	10	4551208-010-4139-4701-0165
6	Vinegar - White	\$0.33	35	5007509-130-4221-4911-0166
7	Pasta - Cannelloni, Sheets, ...	\$0.00	17	ba272504-820-455-9e12-0f01-0167
8	Bat Mix - Fine Olives, 350 Ml	\$0.50	30	4551208-010-4139-4701-0168
9	Creamer - 1 L	\$0.69	20	5007509-130-4221-4911-0169
10	Bread - Rosemary Focaccia	\$2.29	10	4551208-010-4139-4701-0170
11	Marsala - Sperone, Fine, D.o.c.	\$1.29	50	6001350-420-4273-8005-016a
12	Sprouts - Green	\$0.49	25	4551208-010-4140-4701-016b
13	Millettes - 2K	\$1.34	23	6001350-420-4273-8005-016c
14	OIL - Olive Bertolli	\$0.53	10	4551208-010-4140-4701-016d
15	Salt - Fine	\$0.00	20	4551208-010-4140-4701-016e
16	Pie Pastry	\$2.49	20	ba272504-820-455-9e12-0f01-016f
17	Crab - Meat	\$0.84	25	5007509-130-4230-4670-016g
18	Sauce - Marin	\$0.40	34	4551208-010-4140-4701-016h
19	Beans - Yellow	\$7.49	20	4551208-010-4139-4701-016i
20	Juice - Lime	\$2.03	21	8abfb11c-720-4f03-9f12-016j
21	Table Cloth White Colour	\$0.55	22	4551208-010-4140-4701-016k
22	Purse - Nuchs	\$4.12	48	ba272504-820-455-9e12-0f01-016l

1
2
3
4

Preview data

Step 3: Modify Columns

Column Name	Data Type	Primary Key	Allow Nulls
product_id	smallint	<input checked="" type="checkbox"/>	<input type="checkbox"/>
product_name	nvarchar(50)	<input type="checkbox"/>	<input type="checkbox"/>
product_price	money	<input type="checkbox"/>	<input type="checkbox"/>
current_quantity	tinyint	<input type="checkbox"/>	<input type="checkbox"/>
product_category_id	nvarchar(50)	<input type="checkbox"/>	<input type="checkbox"/>

Modify columns. Select PK (s) and null accepting columns

A photograph of a supermarket aisle featuring a large stack of apples. In the foreground, there are many green apples, while further back and to the right, there are red apples. The apples are piled high in a green plastic bin. In the background, there are other bins of fruit and some blurred figures of people.

External data model

Whole-ER Foods Inventory



Products

Vendors



Products



Search: _____

7up Diet, 355 mL

34



Apple - Delicious, Red

31



Apricots - Dried

50



Arizona - Green Tea

41



Add Product



Product Name

A large, empty rectangular input field for entering the product name. It has a light gray background and a thin black border.

Product Price

A large, empty rectangular input field for entering the product price. It has a light gray background and a thin black border.

Current Quantity

A large, empty rectangular input field for entering the current quantity of the product. It has a light gray background and a thin black border.

Vendor

A large, empty rectangular input field for entering the vendor information. It has a light gray background and a thin black border.



Products



Search: _____

7up Diet, 355 MI

34



Apple - Delicious, Red

31



Apricots - Dried

50



Arizona - Green Tea

41





Product Detail



Order

Product Name

7up Diet, 355 MI

Product Price

\$6.02

Current Quantity

34

Vendor

Jenkins, Parker and
Gulgowski

Edit Product



Product Name

7up Diet, 355 MI

Product Price

\$6.02

Current Quantity

34

Vendor

Jenkins, Parker and
Gulgowski



Product Detail



Order

Product Name

7up Diet, 355 MI

Product Price

\$6.02

Current Quantity

34

Vendor

Jenkins, Parker and
Gulgowski

Order



Order Amount

Sending Order to:

dhunnama@google.co.uk

TO: dhunnama@google.co.uk
FROM: whole.er.foods@grocery.co

Dear Jenkins, Parker and Gulgowski,

Please provide [Order Amount] of 7up Diet, 355 MI to the Whole-ER foods store.

Best,
Whole-ER Foods

SEND



Product Detail



Order

Product Name

7up Diet, 355 MI

Product Price

\$6.02

Current Quantity

34

Vendor

Jenkins, Parker and
Gulgowski



Products



Search: _____

7up Diet, 355 MI
34 

Apple - Delicious, Red
31 

Apricots - Dried
50 

Arizona - Green Tea
41 

Whole-ER Foods Inventory



Products

Vendors



Vendors



Search: _____

Jenkins, Parker and Gulgowski
dhunnama@google.co.uk



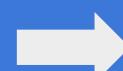
Hansen LLC
zdabblingc@vistaprint.com



Rowe LLC
ebranne@bloglovin.com



Weissnat Inc
kglenisteri@quantcast.com



Add Vendor



Vendor Name

A large, empty rectangular input field with a light gray background, used for entering the vendor's name.

Vendor Email

A large, empty rectangular input field with a light gray background, used for entering the vendor's email address.

Vendor Phone Number

A large, empty rectangular input field with a light gray background, used for entering the vendor's phone number.

Sells Category:

A large, empty rectangular input field with a light gray background, used for entering the vendor's selling category.



Vendors



Search: _____

Jenkins, Parker and Gulgowski
dhunnama@google.co.uk



Hansen LLC
zdabblingc@vistaprint.com



Rowe LLC
ebranne@bloglovin.com



Weissnat Inc
kglenisteri@quantcast.com





Vendor Detail



Vendor Name

Jenkins, Parker and
Gulgowski

Vendor Email

dhunnama@google.co.uk

Vendor Phone

515-505-2996

Sells Category:

category_o

Edit Vendor



Vendor Name

Jenkins, Parker and
Gulgowski

Vendor Email

dhunnama@google.co.uk

Vendor Phone

515-505-2996

Sells Category:

category_o



Vendor Detail



Vendor Name

Jenkins, Parker and
Gulgowski

Vendor Email

dhunnama@google.co.uk

Vendor Phone

515-505-2996

Sells Category:

category_o



Vendors



Search: _____

Jenkins, Parker and Gulgowski
dhunnama@google.co.uk



Hansen LLC
zdabblingc@vistaprint.com



Rowe LLC
ebranne@bloglovin.com



Weissnat Inc
kglenisteri@quantcast.com



Whole-ER Foods Inventory



Products

Vendors



Data logic

- When a product order is placed, current quantity is updated
- When a product is sold, current quantity is updated
- Alert when current_quantity drops below threshold
- Alert when quantity_in goes above threshold

Maintenance



- Purpose
 - Monitor and support application
- Outcomes
 - Track and fix issues
 - Tune physical model to improve performance

Monitor and support application

- Create email for maintaining contact with customer over potential needed support
- wholer.foods-maintain@greenfoods.com

Track and fix issues

- Keep logs of our external data model's performance weekly to track any anomalies that might need to be fixed

Tune physical model to improve performance

- When we get the logs that include data - if it has errors we will send a representative to go and address the issue, to maintain a good relationship with the customer and ensure our product is up to standards

